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JERRY SUMNERS SR. AURORA MUNICIPAL AIRPORT

Master Plan Update | Final Report

March 2018

Jerry Sumners Sr. Aurora Municipal Airport (2H2)
Master Plan Update

MoDOT Project Number: 13-091B-2

Prepared for:

Aurora
Summit City of the Ozarks
Missouri

Prepared by:

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"The airport runway is the most important main street in any town."
- Norm Crabtree, former aviation director of Ohio [1]

MODOT DISCLAIMER

The preparation of this document was financed, in part, through a State Block Planning Grant from the Missouri Department of Transportation (MoDOT), Aviation Section. The contents of this document do not necessarily reflect the views or policy of the MoDOT, Aviation Section or the U.S. Department of Transportation, Federal Aviation Administration (FAA). Acceptance of this document by the MoDOT, Aviation Section does not in any way constitute a commitment on the part of the State of Missouri to participate in any development concept depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with applicable public laws.

1. Terwillinger, B. J. (Producer & Director). (2005). Once Six Right-The Romance of Flying [DVD]. VNY Documentary, LLC.

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Existing Conditions

The initial step towards the development of this airport planning update begins with the collection of comprehensive data on existing conditions concerning the airport's physical and operational characteristics and the area it serves. This inventory of data serves as the foundation for evaluating future aviation demand, support facilities, and other analyses throughout this planning study and airport layout plan (ALP) update. The inventory effort was accomplished through physical observations of existing facilities, interviews with City officials, representatives of government agencies, airport staff, and review of previous airport studies and records.

FACILITY INFORMATION

AIRPORT LOCATION

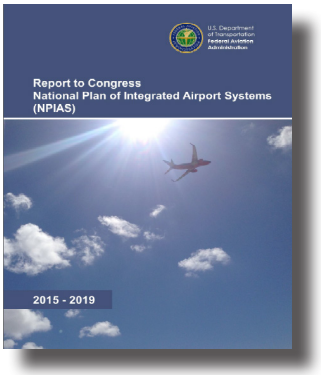
The Jerry Sumners Sr. Aurora Municipal Airport serves the City of Aurora and residents of southern Lawrence County, and adjacent northern areas of Christian, Stone, and Barry counties. Lawrence County is located in the southwest part of Missouri, approximately 35 miles from the Arkansas state border, and contains major highway transportation corridors of Interstate 44, U.S. Highway 60, Missouri Routes 37, 39, 96, 97, 174, and 265. The city of Aurora is situated in the southeast corner of Lawrence County, approximately 30 miles west of Springfield, Missouri, and 50 miles east of Joplin, Missouri. U.S. Highway 60 and Missouri Route 39 are the two major highway corridors serving the city of Aurora. The Burlington Northern Santa Fe Railroad (BNSF) and the Missouri and Northern Arkansas Railroad (MNA) converge on the city of Aurora as well.

The Airport is located within the city limits of Aurora, approximately two miles southeast of city center, and immediately south of East Highland Street. Airport access can be gained by exiting from U.S. Business 60 onto East Highland Street and then onto Airport Road to the hangars. All facilities are located on the east side of the Airport. The Airport is comprised of approximately 75 acres and is bounded by roadways to the north and south, light residential and agriculture to the west, and light residential and commercial on the east. **Exhibit 1.1** depicts the location of the Jerry Sumners Sr. Aurora Municipal Airport (2H2).

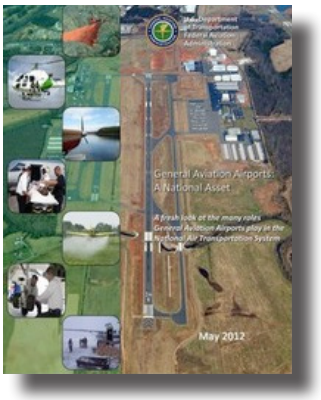
AIRPORT ROLE

At the national level, 2H2 is recognized as a non-primary general aviation airport in the federal government's *National Plan of Integrated Airport System (NPIAS)*. The document sets forth FAA's goals for safety, capacity, and enhancement, identifying 3,431 existing airports that are of significance to the national air transportation system and sets forth eligibility to receive federal funding under FAA's Airport

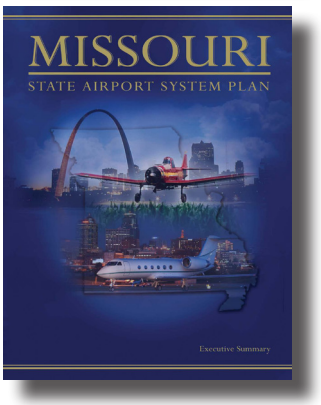
Improvement Program (AIP). The airport has and continues to receive federal funding support.



The FAA published *General Aviation Airports: A National Asset*, to reexamine the roles of general aviation airports in the NPIAS. This review focused on five core areas that included emergency preparedness and response; critical community access; certain aviation specific functions; commercial, industrial and economic activities; and destination and special events. Out of this analysis came four new categories of general aviation airports - National, Regional, Local, and Basic. These categories will be incorporated into future NPIAS publications to help further define justified needs and priorities for the national system. 2H2 is categorized as Local, which is considered the backbone of general aviation representing approximately 38 percent of the total flying at general aviation airports.



At the state level, the Missouri Department of Transportation (MoDOT), Aviation Section, maintains the *Missouri Airport System Plan (MoSASP)*. This plan identifies public-use airports and heliports that perform an essential role in the economic and social development of Missouri. According to the latest system plan analysis 116 facilities meet the plans requirements. 2H2 is included in that number and is categorized as a Business Airport - an airport that provides community and local access by general aviation aircraft. The airport has and continues to receive state funding assistance.



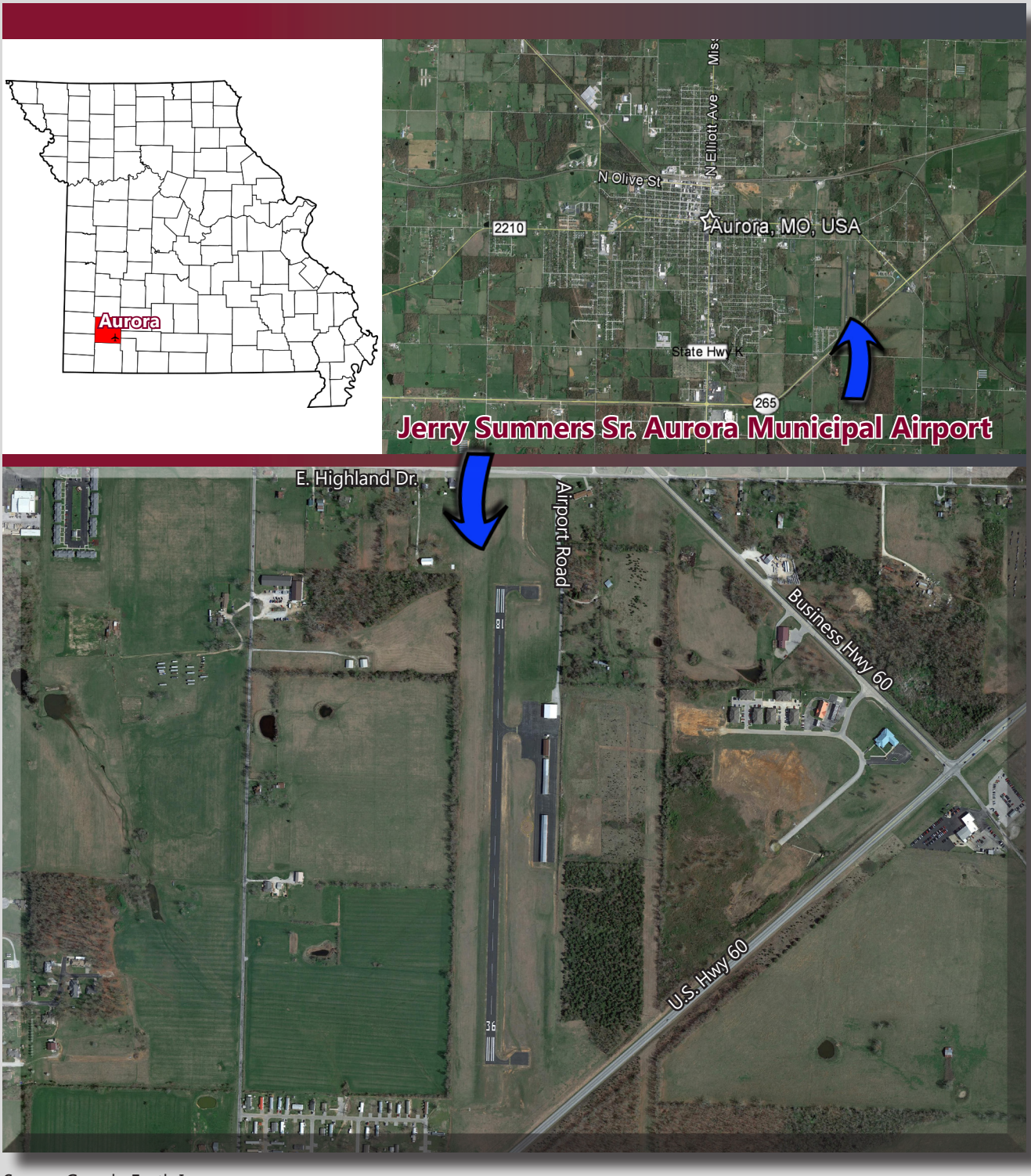
Regionally, the Southwest Missouri Council of Governments (SMCOG), comprised of Barry, Christian, Dade, Dallas, Greene, Lawrence, Polk, Stone, Taney, and Webster counties, works to maintain an overall transportation plan that provides the most desirable and efficient means of meeting transportation needs for the area. The *Southwest Missouri Regional Transportation Plan* identifies 2H2 as part of the existing transportation network, but does not specifically identify any capital improvement projects or goals for the airport. Locally, the City of Aurora is committed to continued development and refinement of the airport in accordance with the aforementioned studies.

AIRPORT ADMINISTRATION

The Airport is owned and operated by the City of Aurora. Management oversight from the City is completed through the Planning and Zoning office, which reports to the Mayor and City Council. An airport advisory board provides management recommendations to the City Council. The City owns the land and improvements on the Airport and holds the responsibility to operate and maintain the Airport accordingly.

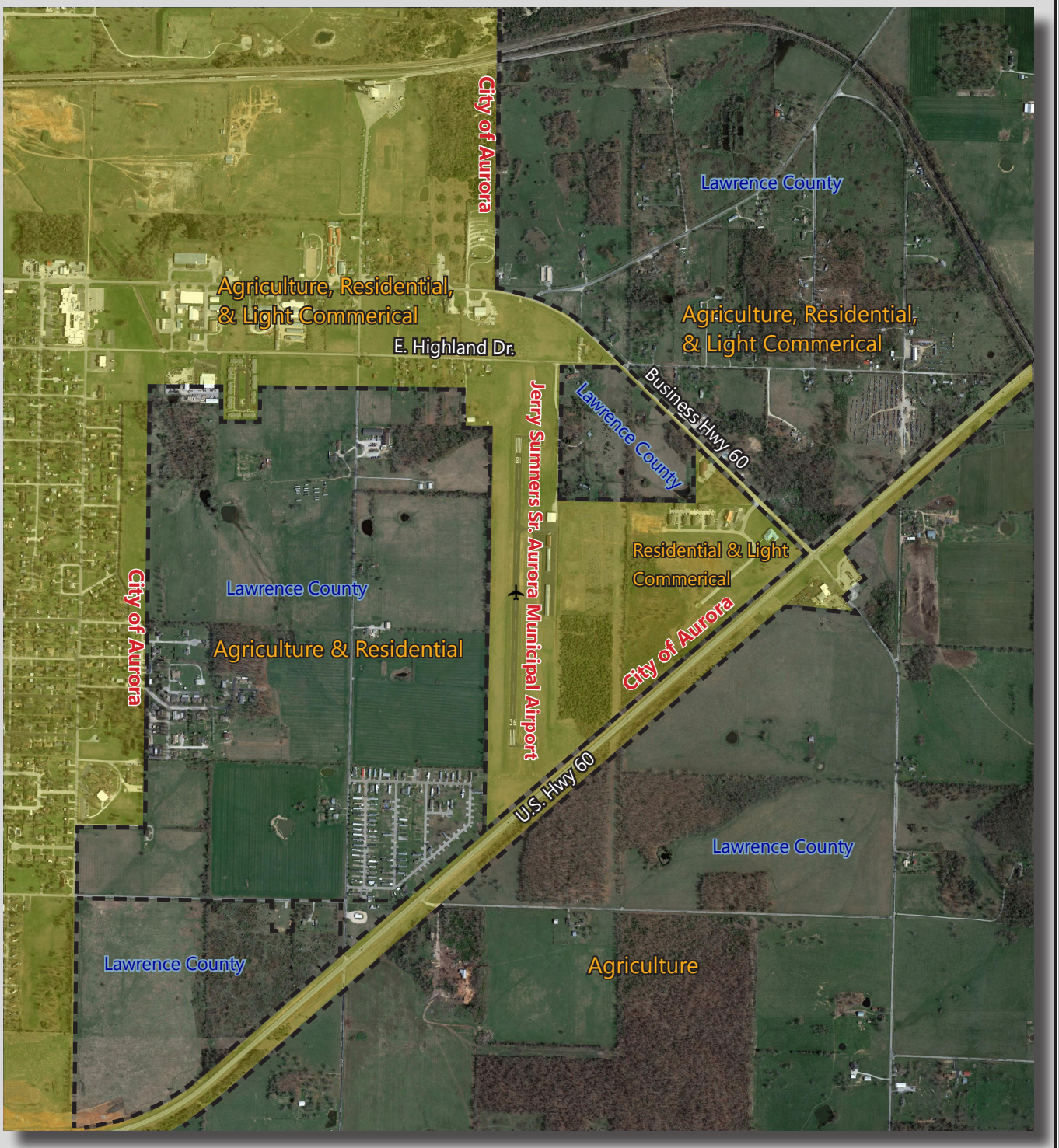
The day-to-day management of the Airport is leased to Aurora Aviation, LLC, the full-time Fixed Base Operator (FBO), through a lease agreement. Specific services provided by Aurora Aviation, include: aircraft line service, flight instruction, aircraft rentals, airframe and piston engine repair/maintenance, ramp parking and hangar storage, and aircraft fueling.

Exhibit 1.1
Airport Location



Source: Google Earth Imagery

Exhibit 1.2
Surrounding Land Use



Source: Lawrence County GIS and Lochner

SURROUNDING LAND USE

One of the primary challenges and requirements of a federally obligated airport to ensure safe and efficient use of airspace and airport operations is having neighboring airport-compatible land uses. Airport-compatible land uses can be defined as those developments that comply with generally accepted restrictions on location, height, and activity that provide for safe aircraft movement and airport operations. The City currently does not have a height and hazard ordinance or means of local zoning to protect 2H2.

2H2 is situated in the City of Aurora and is bordered on all sides of airport property by a mixture of agricultural, light commercial and retail, pockets of residential neighborhoods, and unincorporated areas of Lawrence County. **Exhibit 1.2** illustrates the existing land uses surrounding the airport.

SERVICE AREA AND NEIGHBORING AIRPORTS

The service area of an airport is generally identified as a geographic region served by the airport. The service area identified for 2H2 uses planning criteria established in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airports System (NPIAS)*. This criteria defines a service area that encompasses a 30-minute ground travel time (or 20-mile radius) from the airport. Within this area are other competing airports that have varying degrees of influence on the actual service area for 2H2. Factors such as competing services, facilities and equipment, hangars, navigational aids, accessibility, and planned expansion projects at these airports can influence demand and competition for the facility and further define its service area.

Exhibit 1.3 provides an illustration of the NPIAS service area for the Airport. **Table 1.1** contains information on the role, facilities, and services offered at the neighboring public-use airports.

AIRPORT FACILITIES

Airport facilities are typically divided into two broad categories: airside and landside. Airside facilities are those areas on the airport that facilitate the safe movement of aircraft while landside facilities provide the point of transfer from surface to air as well as providing aeronautical services to support the operation of the airport. 2H2's airfield facilities are illustrated on **Exhibit 1.4**. Following is a discussion of each airside facility at the airport. **Table 1.2** summarizes airside facilities at 2H2.

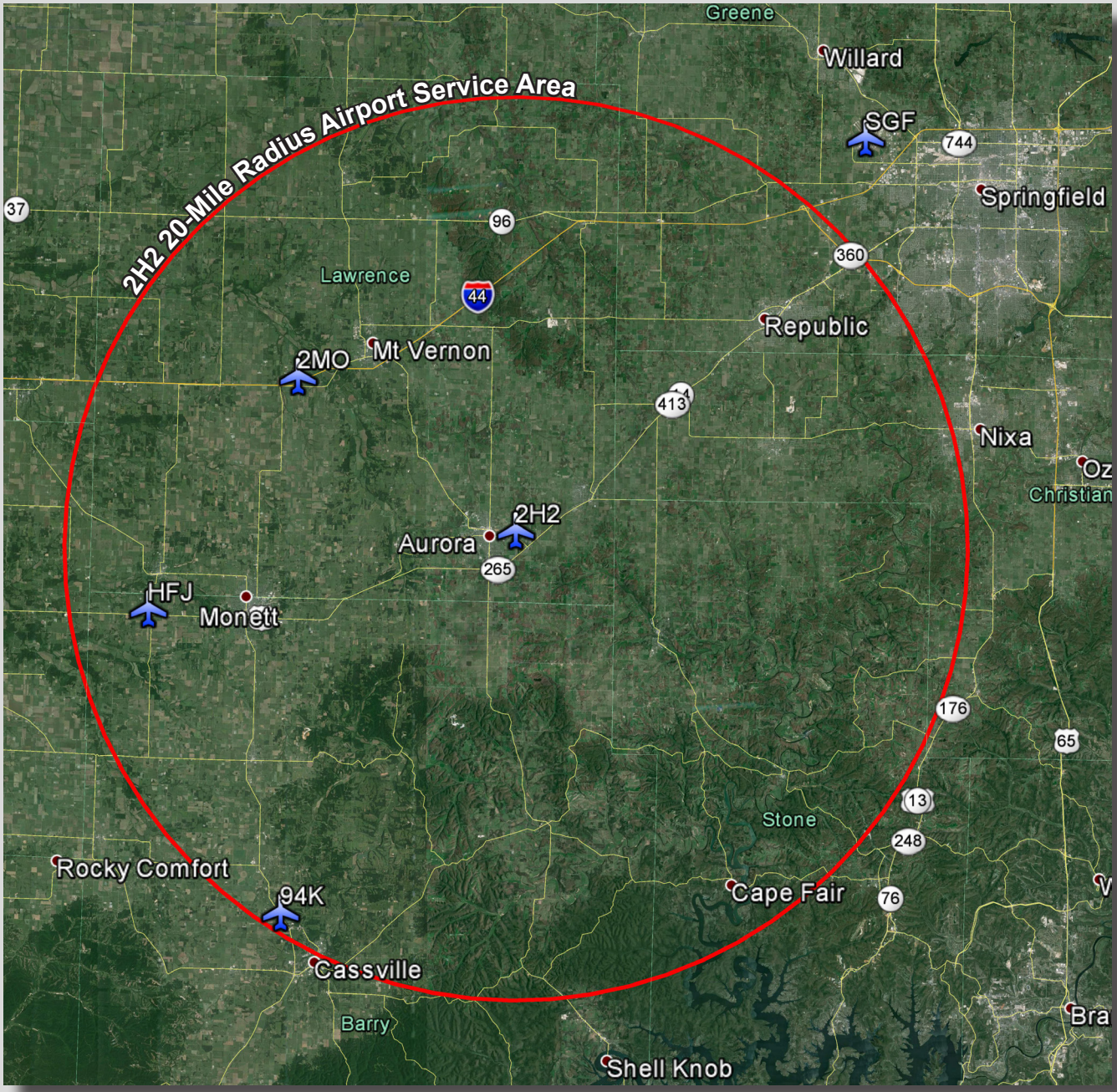
Table 1.1
Neighboring Airports

Runways	Airport Services	MoSASP Role	NPIAS Service Level	Distance/Direction from 2H2[1]
Mount Vernon Municipal Airport				
Runway 18-36 (3,195' x 60')	Parachute Jumping	Community	General Aviation	18 Miles/NW
Monett Regional Airport				
Runway 18-36 (5,000' x 75')	Fuel	Regional	General Aviation	24 Miles/W
Springfield-Branson National Airport				
Runway 2-20 (7,003' x 150') Runway 14-32 (8,000' x 150')	Fuel, Maintenance, Oxygen, Freight, Air Ambulance, Avionics, Charter and Sales	Commercial	Commercial	28 miles/NE
Cassville Municipal Airport				
Runway 9-27 (3,599' x 60')	Fuel	Business	General Aviation	32 Miles/S

Source: FAA 5010 Airport Master Record, NPIAS, MoDOT SASP

[1] Approximate driving distance from 2H2

Exhibit 1.3
Airport Service Area and Neighboring Airports



Airport Identifier	Airport Name	Service Level
2H2	Jerry Sumners Sr. Aurora Municipal Airport	General Aviation
2MO	Mount Vernon Municipal Airport	General Aviation
HFJ	Monett Municipal Airport	General Aviation
94K	Cassville Municipal Airport	General Aviation
SGF	Springfield-Branson National Airport	Commercial Service

Sources: Google Earth, FAA 5010 Airport Master Records, FAA Order 5090.3C, Lochner

RUNWAYS

2H2 is served by one runway designated as 18-36, and is aligned in a north-south orientation. Runway 18-36 is an asphalt runway that measures 3,001 feet long by 60 feet wide. It has a weight bearing capacity of 12,500 pounds single wheel gear (SWG). Each end of the runway is marked with non-precision markings that currently accommodate non-precision instrument approaches. Runway 18-36 is in good condition.

TAXIWAYS

The taxiway system consists of connecting turnarounds at each of the runway and a connecting taxiway from the runway to the apron. These taxiways measure 25 feet wide and are in good condition.

PAVEMENT MARKINGS AND AIRFIELD SIGNAGE

Airfield pavement markings provide information to a pilot during takeoff, landing, and taxiing. Uniformity in airport markings and signs enhances safety and improves efficiency. The Runway 18 and 36 ends are marked with standard non-precision threshold markings. These non-precision markings are comprised of the runway designation, threshold stripes, and runway centerline. The runway's markings are in good condition.

Taxiway markings are comprised of centerline markings and runway holding position markings. The runway holding position markings are currently located at a distance of 125 feet from the runway centerline on the connecting taxiways. Runway holding position signs are located adjacent to each holding position marking. The markings and signage are standard and in good condition.

AIRFIELD LIGHTING

Airport lighting systems assist pilots in navigating aircraft on the airfield in periods of darkness and when weather conditions necessitate lighted guidance on or to the airport. Airport lighting systems can be simple to very complex. The lighting systems installed at the airport are discussed by category.

- **Runway Edge Lighting** - Runway edge lights are used to outline the edges of runways during periods of darkness or restricted visibility conditions. These light systems are classified according to the intensity or brightness they are capable of producing. Runway 18-36 is equipped with Medium Intensity Runway Lights (MIRL). Each end of the runway is equipped with threshold lights at the physical end of the pavement. The runway lighting system is in good condition.
- **Taxiway Edge Lighting** - Taxiway edge lights are used to outline the edges of taxiways during periods of darkness or restricted visibility conditions. Taxiway reflectors have been installed around the edges of the turnarounds at each runway end.
- **Airfield Signage** - Though not lighted, the runway holding position signs contain a reflective background for night time operations. The reflective background for the signs are in good condition.
- **Pilot-Controlled Lighting** - The airport's lighting schedule is set to a photoelectric cell that allows the runway edge lighting system to be activated by pilots. Pilots will perform a number of microphone clicks using the aircraft's radio transmitter over the airport's designated traffic frequency of 122.800 MHz to increase the intensity (in increments) of the edge lights.
- **Airport Beacon** - The airport is equipped with a rotating beacon located on east side of the airport. The airport beacon provides visual recognition of the airport from dusk to dawn and during the day when ground visibility is less than three miles and/or the cloud ceiling is less than 1,000 feet. The beacon emits a white and green light on a spaced interval. The airport beacon is in good working condition.

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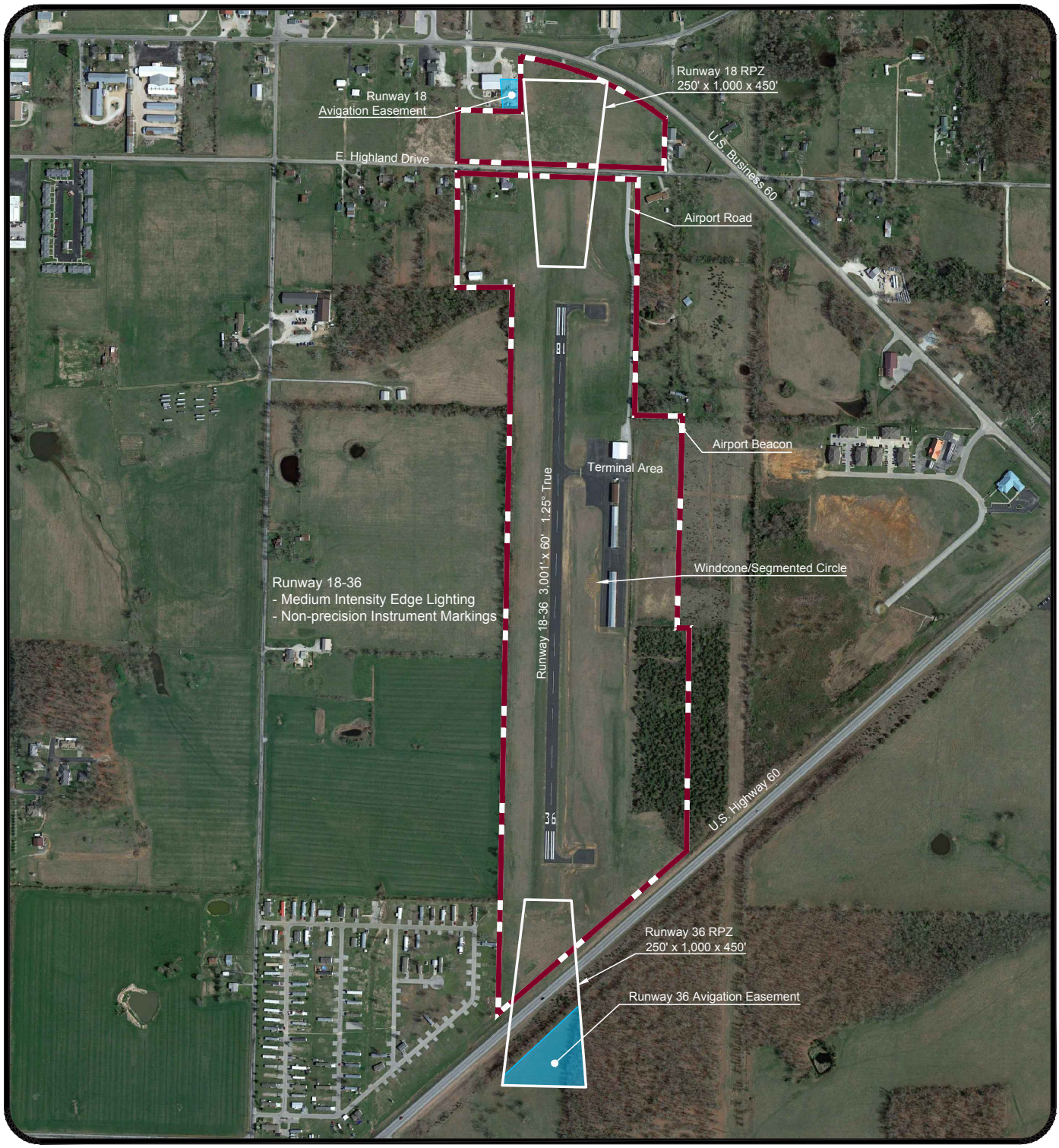
JERRY SUMNERS SR. AURORA MUNICIPAL AIRPORT (2H2)

City of Aurora, Missouri

Exhibit 1.4
Existing Airside Facilities



Source: Google Earth, Inc. aerial photo.

N

Township 26 N, Range 25 W
Sections 8 and 17
NOT TO SCALE

Legend
Existing Property Line
Clear Zone/Avigation Easements

Aurora
Summit City of the Ozarks
Missouri

- **Lighted Windcone** - The airport is equipped with an internally lighted windcone for night operations. It is located in the middle of the segmented circle, approximately mid-field, adjacent to the hangar taxilane.

Table 1.2
Airfield Facilities Summary

Airfield Item	Physical Description	Condition
Runway 18-36		
Dimensions	3,001' x 60'	N/A
Surface Type	Asphalt	Good
Pavement Strength	12,500 (SWG)	N/A
True Runway Bearing	1.27°	N/A
Pavement Markings	Non-precision	Good
Edge Lighting	Medium Intensity Edge Lights	Good
Taxiway Systems		
Pavement Markings	Holdlines, Centerlines	Good
Edge Lighting	Reflectors	Good
Signage	Holding Position (Reflective)	Good
Other Airfield Items		
Airport Rotating Beacon	White/Green	Good
Lighted Windcone/Segmented Circle	Mid-field adjacent to hangar taxilanes	Good

Sources: Lochner, FAA Airport Facility Directory, FAA 5010 Airport Master Record

WEATHER REPORTING SYSTEM

2H2 is not currently served by an automated surface observation system (ASOS) or automated weather observing system (AWOS), which is a suite of sensors that measure, collect, and disseminate weather data to help meteorologists, pilots, and other flight personnel prepare and monitor weather forecasts, plan flight routes, and provide necessary information for aircraft takeoffs and landings. According to published information, aircraft operating into and out of Aurora are to utilize the Springfield-Branson National Airport (KSGF) ASOS for current altimeter and weather reporting information.

TERMINAL AREA FACILITIES

Landside facilities (or terminal area facilities) are those facilities that provide the point of transfer from surface to air as well as providing aeronautical services to support the operation of the airport. The following facilities that are available at the airport are discussed below and identified in **Exhibit 1.5**.

TERMINAL BUILDING/FBO HANGARS

The terminal building/FBO hangar is the focal point of the airport, especially for a general aviation airport. At 2H2, the terminal building is part of the FBO hangar that is located on the northeast edge of the aircraft parking apron with direct access to East Highland Road. The building provides space for airport administration office functions, fixed base operations, flight planning room, restrooms, and pilot lounge. The building serves as the center for airport operations and management by Aurora Aviation, LLC, the current fixed base operator. The building's total size is approximately 6,300 square feet and is in good condition.

AIRCRAFT PARKING APRON

The asphalt aircraft parking apron lies in a general north-south direction from the terminal building/FBO

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JERRY SUMNERS SR. AURORA MUNICIPAL AIRPORT (2H2)

City of Aurora, Missouri

Exhibit 1.5

Existing Terminal Area Facilities

Source: Google Earth, Inc. aerial photo.

N

Township 26 N, Range 25 W
Sections 8 and 17
NOT TO SCALE

Legend
Existing Property Line

Aurora
Summit City of the Ozarks
Missouri

hangar and parallel to the runway, and is comprised of approximately 34,700 square feet in total apron space, tie-downs, and taxi-lanes. The apron is in fair condition. There are a total of six tie-down locations throughout the apron area. All tie-downs coincides with the apron, fair condition. An area to the east of the main apron and between the terminal building/FBO and T-hangars is designated for aircraft fueling and servicing.

AIRCRAFT HANGARS

The airport's hangars contain the large FBO clear span hangar and three T-hangar buildings. **Table 1.3** summarizes the existing airport hangars. The FBO hangar is located on the northeast edge of the terminal area and is being used by Aurora Aviation, LLC, to provide aircraft maintenance, flight training, and other aviation services. South of the FBO hangar, there are three T-hangar buildings. All hangars are in fair to good condition.

Table 1.3
Existing Airport Hangars

Hangar Name	Hangar Style	Size	Condition
T-hangar 1	T-hangar	35' x 98'	Fair/Poor
T-hangar 2	T-hangar	30' x 220'	Fair/Poor
T-hangar 3	T-hangar	35' x 295'	Fair/Poor
FBO Hangar	Box	80' x 85'	Good

Source: Lochner

Table 1.4
Historic Fuel Sales

Year	Gallons
2010	13,060
2011	13,285
2012	10,452
2013	9,881
2014	10,525

Source: City of Aurora

AUTO PARKING AND GROUND ACCESS

The airport entrance road from East Highland Drive provides the only ingress/egress into the airport and terminal hangar area. The entrance road ends at the parking lot and the terminal building/FBO hangar. Auto parking spaces are not delineated; however, it appears approximately seven to ten vehicles are capable of parking within the 1,100 square foot area, which is in good condition. One dusk-dawn light provides lighting for the parking area.

AVIATION FUEL STORAGE AND DISPENSING

The airport is equipped with one above ground 100LL fuel storage tank that is located south of the terminal building/FBO hangar and next to the northern most T-hangar building. The tank's capacity is 8,500 gallons. The fuel storage tank, systems, and fuel dispensing locations were found to be in good condition. **Table 1.4** identifies the amount of 100LL gallons sold over the last 5 years, which has averaged 11,440 per annum or 950 per month.

AREA AIRSPACE CHARACTERISTICS

The Federal Aviation Administration (FAA) is responsible for insuring the safe, efficient, and secure use of the Nation's airspace by civil aviation and military aircraft. The FAA created the National Airspace System (NAS) to protect persons and property on the ground, and is made up of a network of air navigation facilities, ATC facilities, airports, technology, and appropriate rules and regulations that are needed to operate the system.

There are two categories of airspace or airspace areas as defined by the FAA: Regulatory and Non-regulatory. Within these two airspace categories there are four types: controlled, uncontrolled, special use, and other airspace. This discussion will identify the airspace areas applicable to 2H2. **Exhibit 1.6** illustrates the area airspace for 2H2.

CONTROLLED AIRSPACE

- **Class A** - This airspace is generally from 18,000 feet mean sea level (MSL) and up to and including flight level (FL) 600 (or 60,000 feet MSL).
- **Class B** - This airspace is from the surface to 10,000 feet MSL and surrounds the nation's busiest airports. The shape of this particular airspace is individually tailored by the FAA for these busy airports (e.g. Kansas City International Airport).
- **Class C** - This airspace is generally from the surface to 4,000 feet MSL and surrounds those airports that have a control tower, are serviced by radar approach control, and have a certain number aircraft operations on instrument flight plans. The shape of the airspace is also individually tailored by the FAA for these airports but generally do not exceed more than ten nautical miles from the center of the airport (e.g. Springfield-Branson National Airport, Northwest Arkansas Regional Airport).
- **Class D** - This airspace is generally from the surface to 2,500 feet above the airport elevation and surrounds those airports that have a control tower and in some cases extends to protect instrument procedures (e.g. Joplin Regional Airport, Branson Airport).
- **Class E** - If the airspace is not classified as Class A, B, C, or D, and is controlled airspace, then it is Class E airspace. This airspace extends upward from either the surface or a designated altitude to the adjacent airspace. When starting from the surface, it will contain all the instrument procedures. It will also contain low level federal airways and extends up to but not including 18,000 feet MSL. At the 2H2, Class E transitional airspace surrounds the airport and begins at 700 feet above the ground and extends up to but not including 18,000 feet MSL. This airspace also encompasses the instrument flight procedures to the Runway 36 end.

UNCONTROLLED AIRSPACE

Airspace that has not been designated Class A, B, C, D or E is identified as Class G uncontrolled airspace. This airspace extends from the surface to the base of the overlying or adjacent Class E airspace, which is 700 feet MSL at 2H2.

OTHER AIRSPACE

Any other airspace areas are generally referred to the majority of remaining airspace, which includes Local Airport Advisory, Military Training Routes (MTR), Temporary Flight Restrictions (TFR), Parachute Jump Operations, VFR Routes & Corridors, Terminal Radar Service Area (TRSA), and National Security Area (NSA).

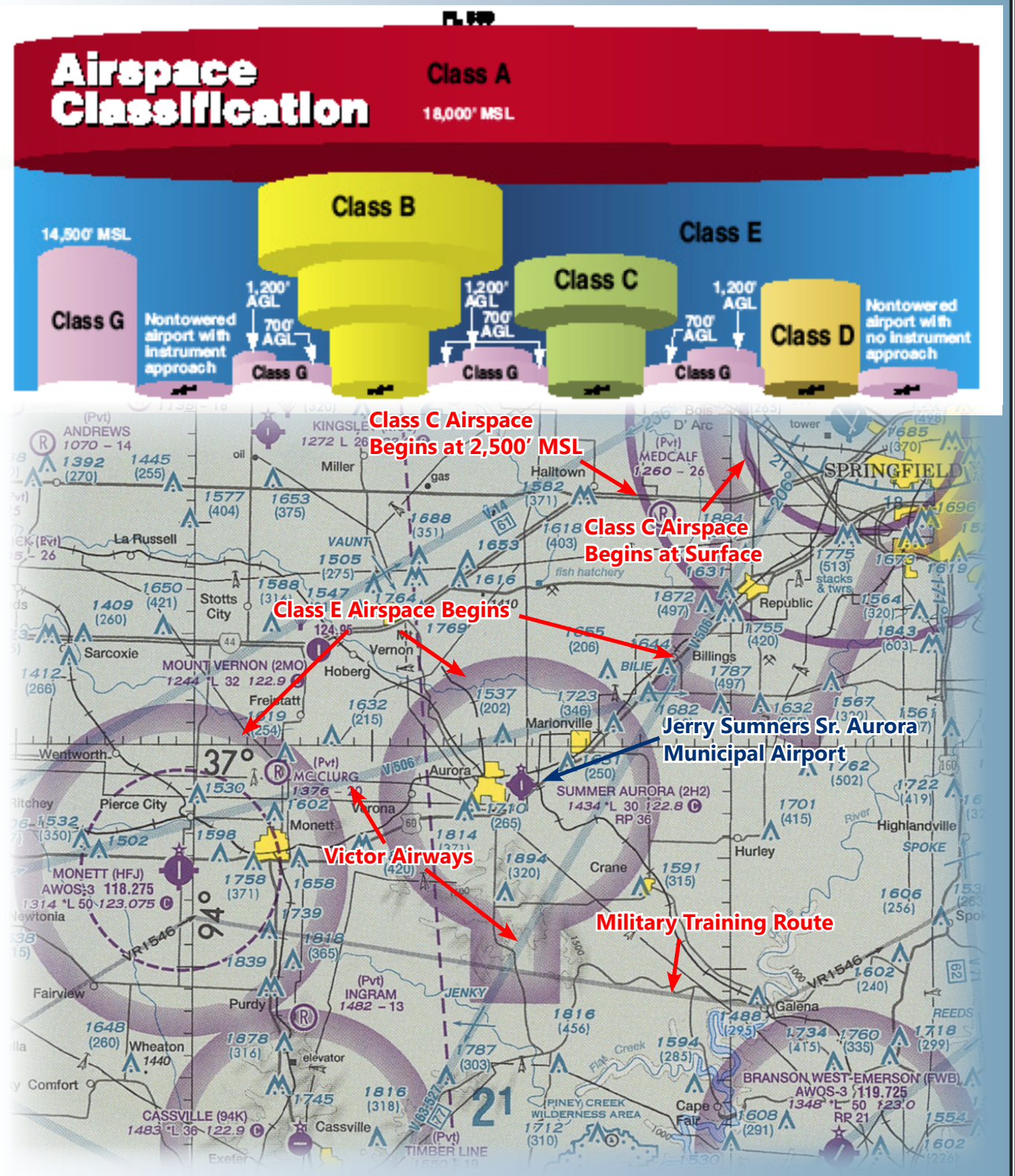
An MTR is published approximately eight nautical miles south of the airport. Military aircraft operating along this route are on visual flight rules, operating at an altitude of 1,500 feet MSL or less, and are required to fly from the west to east.

VICTOR AIRWAYS

Established air routes, also known as Victor Airways, are charted and published routes linking VOR (Very High Frequency Omnidirectional Range) navigation facilities. These Victor Airways are low level Class E corridors that begin at 1,200 feet MSL up to but not including 18,000 feet MSL and are 10 nautical miles wide.

2H2 has two Victor Airways that traverse its Class E airspace area. Additional routes are located north and south of the airport. These Victor Airways are connected to the nearby "Springfield" VORTAC facility located near the Springfield-Branson National Airport. These airways are identified by number and follow a radial to and from the VOR navigation facility. Those Airways near 2H2 are as follows: V506, V63-527, and V14.

Exhibit 1.6
Area Airspace Characteristics



Sources: FAA Pilot's Handbook of Aeronautical Knowledge, FAA Kansas City Sectional Chart

In addition to the "Springfield" VORTAC, four additional VOR navigation facilities are available for aircraft to use in order to navigate to 2H2. Approximately 36 nautical miles to the west is the "Neosho" VOR/DME, "Razorback" VORTAC located approximately 48 nautical miles to the southwest, "Harrison" VOR/DME located approximately 46 nautical miles southeast, and the "Dogwood" VORTAC located approximately 40 nautical miles east of 2H2.

LOCAL AIRSPACE PROCEDURES

2H2 is an "uncontrolled" airport (not uncontrolled airspace) which means there is not an air traffic control tower located at the airport. Airports without an air traffic control tower follow prescribed operating standards for traffic flow in and out of the airport. For 2H2, the airport traffic pattern flow is established at 1,000 feet above ground level (AGL) and on the east side of the airport. This keeps arriving and departing aircraft away from tall towers and obstructions on the west side of the airport. The segmented circle located near the middle of the airport and adjacent to the hangar taxilane provides visual guidance to pilots that the traffic pattern is established on the east side of the airport.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures (IAP) provide access to the airport during periods of inclement weather and are essential for the economic operation of an airport. Without instrument approach procedures, an airport is only accessible in times of good weather, limiting the operation and access to the community the airport serves.

IAPs are essentially a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually or the missed approach procedure is initiated. Pilots fly these procedures via navigation from air traffic control and using equipment and instrumentation in the aircraft by communication received from ground- and satellite-based navigation facilities. Despite the emphasis given here on approach procedures, aircraft also take-off during periods of inclement weather following a set of prescribed operating standards, but generally do not take-off if conditions are less than those minimums described in the approach procedure.

2H2 has three published IAPs and one takeoff procedure. Each procedure has defined minimums of visibility and altitude for the type of procedure category and aircraft category in order for it to be safely flown. Essentially, if the aircraft is flown to the minimum altitude shown, the pilot should then visually see the runway for landing. **Table 1.5** identifies the procedures and minimums for each of the published IAPs for 2H2. In order for 2H2 to achieve better minimums for an IAP, obstructions would need to be mitigated beyond each end of the runway.

GENERAL AVIATION ACTIVITY

The FAA recognizes three broad categories of aircraft activity (or operations) being general aviation, certificated air carrier, and military. The level of aircraft operations establishes the basis for effective decisions in airport planning and development. Because 2H2 is not a commercial service airport, aviation activity at the airport is general aviation and occasional military. This data will be used as the baseline for the airport's aviation demand forecasts in Chapter Two.

BASED AIRCRAFT

A summary of historical based aircraft at 2H2 is presented in **Table 1.6**. From 2000 to 2017, the airport has witnessed very little variation with a low of 30 in 2000 to a high of 35 in 2007.

Table 1.5
Published Instrument Approaches

	Weather Minimums							
	Category A Aircraft		Category B Aircraft		Category C Aircraft		Category D Aircraft	
	Ceiling Minimum (AGL)	Visibility (miles)	Ceiling Minimum (AGL)	Visibility (miles)	Ceiling Minimum (AGL)	Visibility (miles)	Ceiling Minimum (AGL)	Visibility (miles)
Runway 18								
LP	506′	1-Mile	506′	1-Mile	–	–	–	–
LNAV/VNAV	506′	1-Mile	506′	1-Mile	–	–	–	–
Circling	526′	1-Mile	526′	1-Mile	–	–	–	–
Runway 36								
LP	626′	1-Mile	626′	1-Mile	–	–	–	–
LNAV	626′	1-Mile	626′	1-Mile	–	–	–	–
Circling	626′	1-Mile	626′	1-Mile	–	–	–	–
Runway 18-36								
VOR/DME-A	526′	1-Mile	526′	1¼-Miles	526′	1½-Miles	–	–

Source: U.S. Terminal Procedures – North Central (NC-3)

Table 1.6
Historic Based Aircraft Summary

Year	Single Engine	Multi-Engine	Helicopter	Total Based Aircraft
2000	30	0	0	30
2001	30	0	0	30
2002	31	0	0	31
2003	31	0	0	31
2004	30	1	0	31
2005	31	1	0	32
2006	31	2	0	33
2007	32	3	0	35
2008	32	3	0	35
2009	31	3	0	34
2010	31	3	0	34
2011	30	3	0	33
2012	30	3	0	33
2013	30	3	0	33
2014	28	3	0	31
2015	28	3	0	31
2016	28	3	0	31
2017	28	3	0	31

Sources: MODOT; City of Aurora

ANNUAL OPERATIONS

Table 1.7 provides a tabulation of the estimated historical operational activity for 2H2 from 2000 to 2017 as provided by the FAA Terminal Area Forecasts produced by the FAA. Because there is not an air traffic control tower on the airport to provide actual operational counts, activity is typically a best guess from local personnel most familiar with the airport and its operational characteristics. However, after discussions with airport personnel, it was ascertained the TAF forecasts are shown too low for the current activity conducted at the airport. Due to the flight training provided by Aurora Aviation at the airport, as well as, the training activity performed by students from Springfield, the operational activity level is closer to an approximate level of 11,000 per year. In addition, due to the training by Blackhawk helicopters, affiliated with Ft. Leonard Wood, located in Rolla, and the Army National Guard helicopter maintenance and overhaul (AVCRAD) facility in Springfield, military operations equate to approximately 300 operations per year.

Table 1.7
Historic Annual Operations Summary

	Local Operations		Itinerant Operations		
Year	General Aviation	Military	General Aviation	Military	Total
2000	5,940	0	2,700	50	8,690
2001	6,080	0	2,750	50	8,880
2002	6,220	0	2,800	50	9,070
2003	6,360	0	2,850	50	9,260
2004	6,500	0	2,900	50	9,450
2005	6,500	0	2,900	50	9,450
2006	6,300	0	2,825	50	9,175
2007	6,100	0	2,750	50	8,900
2008	6,100	0	2,750	50	8,900
2009	6,200	0	2,757	50	9,007
2010	6,300	0	2,764	50	9,114
2011	6,400	0	2,650	50	9,220
2012	6,400	0	2,650	50	9,220
2013	6,400	0	2,650	50	9,220
2014	7,900	0	2,675	300	10,875
2015	7,900	0	2,675	300	10,875
2016	7,900	0	2,675	300	10,875
2017	7,900	0	2,675	300	10,875

Source: FAA Terminal Area Forecasts

CLIMATIC CONDITIONS

Airport climatic conditions are essential to the development of an airport and utilized in determining such things as runway dimensions, crosswind runway needs, and navigational and lighting aids to accommodate instrument approaches. Temperature and wind are the most significant factors that affect daily operations. Climate data for 2H2 was derived from the National Climatic Data Center (NCDC) approved weather station at the Springfield-Branson National Airport (SGF).

TEMPERATURE AND PRECIPITATION

On average, the warmest months at 2H2 over the 10-year period are July & August. The mean maximum temperature of these hottest months averaged 90.5 degrees Fahrenheit (F). The total annual average rainfall over the data period is approximately 44.5 inches, of which a majority of this rainfall comes during the late spring and fall months.

WIND ANALYSIS

Surface wind conditions have a direct impact and effect on airport functionality. Runways that are not oriented to take full advantage of prevailing winds will restrict the capacity of the airport. When landing and taking-off, aircraft are able to operate on a runway properly and safely as long as the wind velocity crosswind component is not excessive. Smaller aircraft are affected by the crosswind component more than larger aircraft.

The determination of the appropriate crosswind component is dependent upon the Runway Design Code (RDC) for the airport and each individual runway. According to Advisory Circular (AC) 150/5300-13,

Airport Design, Change 1, the maximum crosswind component for RDC A-I and B-I is 10.5 knots, a 13-knot crosswind component is used for RDC's A-II and B-II, and for A-III, B-III, C-I and D-I through D-III a 16-knot crosswind is used. All other RDC's would fall within the 20-knot crosswind component category.

The desirable wind coverage for an airport is 95%, which means the runway system should be oriented so that the maximum crosswind component is not to be exceeded more than 5% of the time. Using the NCDC data, percentage coverage was produced for each element to include all-weather, visual, and instrument conditions. **Table 1.8** presents the wind coverage for all-weather, visual, and instrument conditions.

The wind analysis indicates the airport's existing runway orientation is more than adequate for coverage during all-, IFR, and VFR weather conditions. The runway system provides 99.5% coverage for the 10.5-knot crosswind, 99.7% for the 13-knot crosswind, and 99.9% for the 16-knot crosswind components. Additionally, calm winds (less than 10-knots) occur 69.0% of the time during all weather conditions and strong winds (greater than 10-knots) occur 31.0% percent of the time.

Table 1.8
All-Weather, VFR, and IFR Wind Coverage

Runway Alignment	10.5-Knots	13.0-Knots	16.0-Knots	Calm and Light Winds (<10-Knots)	Strong Winds (>10-Knots)
All-Weather Wind Coverage					
Runway 18-36					
Runway 18	91.75%	91.9%	92.0%	–	–
Runway 36	94.8%	94.9%	95.0%	–	–
Combined	99.5%	99.7%	99.9%	69.0%	31.0%
IFR Weather Wind Coverage [1]					
Runway 18-36					
Runway 18	84.6%	84.6%	84.6%	–	–
Runway 36	98.1%	99.3%	99.5%	–	–
Combined	98.5%	99.8%	100%	65.4%	34.6%
VFR Weather Wind Coverage					
Runway 18-36					
Runway 18	92.0%	92.1%	92.2%	–	–
Runway 36	95.6%	95.7%	95.7%	–	–
Combined	99.7%	99.8%	99.9%	69.8%	30.2

Source: NOAA, NCDC, Asheville, NC; Station 627520, Springfield, MO

[1] Ceiling less than 1,000', but equal to or greater than 200' and/or visibility less than 3-miles, but equal to or greater than ½-mile

SOCIOECONOMIC CONDITIONS

Population, income data including per capita income (PCI), and median household income (MHI), as well as labor force participation information has been collected to understand and evaluate current socioeconomic conditions in the region that will assist in formulating assumptions and developing aviation demand projections for 2H2.

POPULATION

In terms of economic and demographic data, the Missouri Department of Economic Development, Missouri Economic Research and Information Center (MERIC), provides information for each county based

on delineated regions. Lawrence County, affiliated with the seven-county Southwest Region, is located on the eastern periphery, and Greene County, affiliated with the seven-county Ozark Region, is on the western periphery and has been included to its adjacency to Lawrence County. **Table 1.9** illustrates the population trends for these counties since 2000.

Table 1.9
Historic Population Summary

Place Name	2000	2010	Current[1]	Annual Growth Rate
Lawrence County	35,204	38,634	38,185	0.62%
Newton County	52,636	58,114	58,845	0.84%
Jasper County	104,686	117,404	116,398	0.79%
Dade County	7,923	7,883	7,578	-0.31%
Barry County	34,010	35,597	35,572	0.32%
Greene County	240,391	275,174	283,870	1.3%
Christian County	54,285	77,422	80,899	3.5%
Stone County	28,658	32,202	31,297	0.65%
Totals	**557,793**	**642,430**	**652,644**	**0.96%**
State of Missouri	5,595,211	5,988,9274	6,063,589	0.59%

Source: MERIC; U.S. Census Bureau
[1] Reflects estimates.

Over the past 20+ years, Lawrence County's population has remained relatively flat, exhibiting an average annual growth rate of 0.6 percent, while the combined surrounding seven county region has witnessed an average annual growth rate of 0.96% for the same time period. This growth rate seems to be somewhat low compared to population statistics as a whole; however, it is in line with trends witnessed across the U.S. with cities not affiliated with a major Metropolitan Statistical Area (MSA).

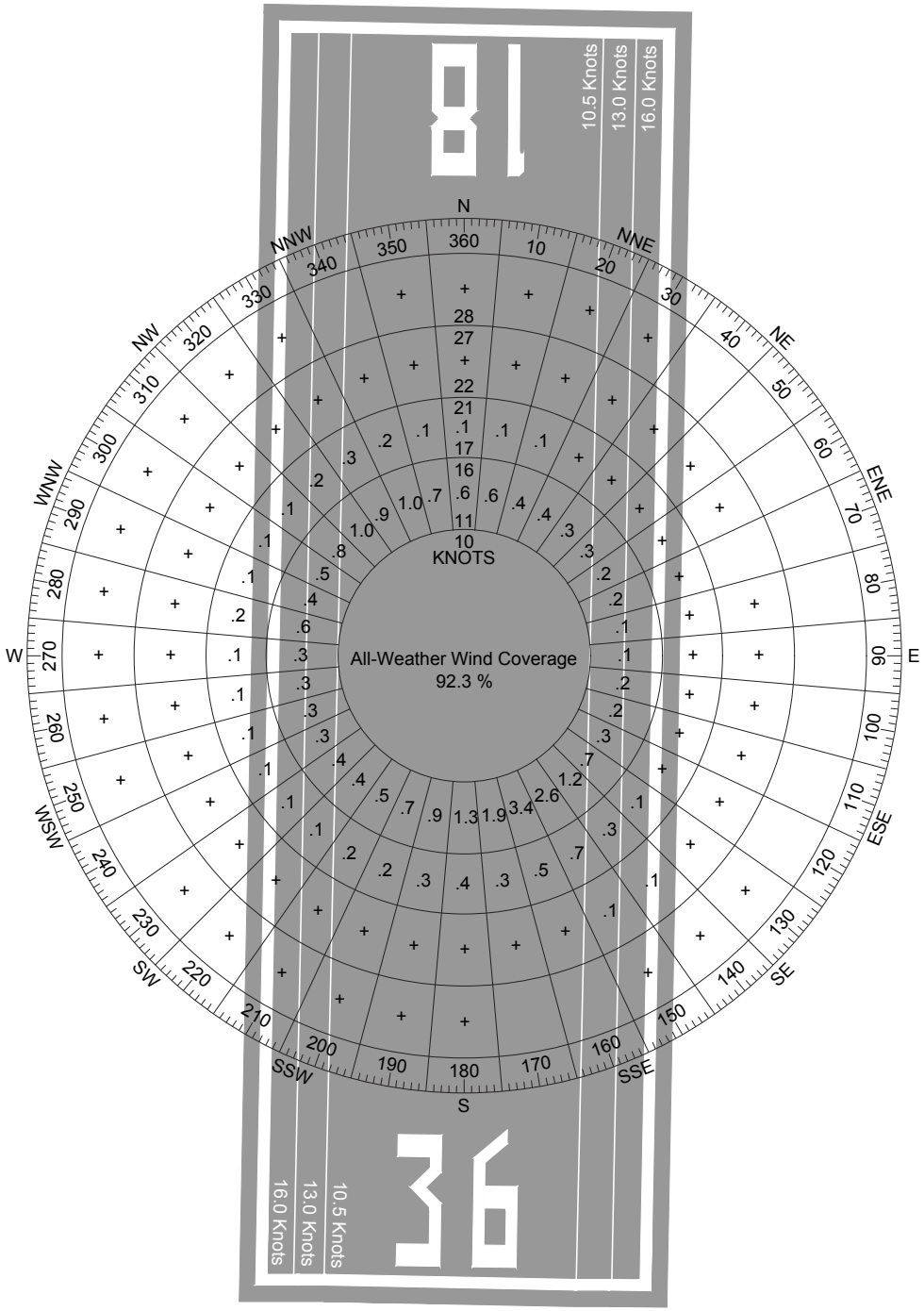
As indicated in **Table 1.10**, population growth in the region is expected to remain relatively flat, with the exception of Dade and Stone Counties, which are reflecting a negative growth rate through 2030. Jasper and Christian Counties exhibit the greatest average annual growth rates with 1.05 percent and 1.77 percent, respectively. Based on these figures, the region can expect an increase in 92,668 new residents and average an annual growth rate of 0.88 percent.

Table 1.10
Projected Population Summary

Place Name	Current[1]	2020	2025	2030	Annual Growth Rate
Lawrence County	38,185	39,865	41,265	42,384	0.68%
Newton County	58,845	61,359	63,454	65,138	0.48%
Jasper County	116,398	124,270	130,830	136,083	1.05%
Dade County	7,578	7,422	7,292	7,189	-0.32%
Barry County	35,572	37,954	39,939	41,541	1.04%
Greene County	283,870	298,474	310,644	320,388	0.80%
Christian County	80,899	90,061	97,696	103,815	1.77%
Stone County	31,297	30,289	29,449	28,774	-0.50%
Totals	**652,644**	**689,694**	**720,569**	**745,312**	**0.88%**
State of Missouri	6,063,589	6,389,850	6,580,868	6,746,762	0.4%

Source: MERIC; U.S. Census Bureau; Proximityone.com/demographics
[1] Reflects estimates.

Exhibit 1.7
All-Weather Wind Rose



Source: Springfield-Branson National Airport (SGF) Wind Observations.

N

Township 26 N, Range 25 W
Sections 8 and 17
NOT TO SCALE

Aurora
Summit City of the Ozarks
Missouri

PER CAPITA AND MEDIAN HOUSEHOLD INCOME

Per capita Income (PCI) and median household income (MHI) are widely used indicators for gauging the economic performance of local economies. PCI serves as an indicator of the economic well-being of a community being defined as the total personal income for all people in an area, divided by the total number of people. MHI, on the other hand, includes the income of the householder and all other persons 15 years and older in the household, whether related to the householder or not, and represents the value in the middle when all incomes in a geographical area are arranged highest to lowest. **Table 1.11** illustrates the PCI and MHI for the state and the region since 2000.

LABOR FORCE

Table 1.12 illustrates the labor force in terms of unemployment for the region. Greene County currently offers the lowest unemployment environment at 4.6 percent whereas Stone County has the highest rate at 15.5%. The average unemployment rate for the region equates to 5.2 percent, which is slightly less than the state of Missouri.

Table 1.11
Per Capita and Median Household Income Summary

Place Name	2000	Current	Annual Growth Rate
Per Capita Income			
Lawrence County	$15,399	$19,060	1.69%
Newton County	$17,502	$22,341	1.97%
Jasper County	$16,227	$20,034	1.67%
Dade County	$14,254	$28,352	7.06%
Barry County	$14,980	$19,489	2.15%
Greene County	$19,185	$23,520	1.61%
Christian County	$18,422	$25,134	2.60%
Stone County	$18,036	$21,733	1.46%
Average Totals	**$16,751**	**$22,458**	**2.43%**
State of Missouri	$19,936	$25,649	2.04%
Median Household Income (MHI)			
Lawrence County	$31,239	$39,334	1.85%
Newton County	$35,041	$42,268	1.47%
Jasper County	$31,323	$40,399	2.09%
Dade County	$29,097	$35,483	1.56%
Barry County	$28,906	$39,710	2.66%
Greene County	$34,157	$40,337	1.29%
Christian County	$38,085	$52,838	2.76%
Stone County	$32,637	$40,850	1.79%
Average Totals	**$32,561**	**$41,402**	**1.90%**
State of Missouri	$37,934	$47,380	1.77%

Source: MERIC; U.S. Census Bureau

AIRPORT ECONOMIC BENEFIT

MoDOT, Aviation Section, completed The Economic Benefit of Missouri's Airport System to determine the overall benefits of Missouri's system of public-use airports to the statewide economy. The total economic benefit of aviation activity in Missouri was quantified in terms of employment, payroll, and output (economic activity).

The airports were surveyed to measure the direct benefits associated with on-airport businesses and indirect benefits related to visitor expenditures. Direct benefits include the economic activity associated not only with on-airport businesses, but airport tenants and governmental entities which support general aviation. Indirect benefits generally occur off-airport and can be attributed to visitor expenditures. Secondary benefits consist of the induced impact of the recirculation of direct and indirect benefits which results in a "multiplier effect". The multiplier effect attributed to both direct and indirect economic benefits is calculated to determine the overall economic impact of each airport.

The following discussion highlights each benefit measured for the airport in terms of employment, payroll, and total economic output to the local community.

Table 1.12
Labor Force Summary

Place Name	Civilian Labor Force	Employed	Unemployed	Unemployment Rate
Lawrence County	17,706	16,643	930	6.3%
Newton County	29,405	27,952	333	6.0%
Jasper County	58,722	55,961	2,761	4.7%
Dade County	3,551	3,355	196	5.5%
Barry County	14,766	13,836	930	6.3%
Greene County	148,867	141,955	6,912	4.6%
Christian County	42,527	40,339	2,188	5.1%
Stone County	13,010	10,998	2,012	15.5%
Totals	**328,554**	**311,039**	**16,262**	**5.2%**
State of Missouri	3,047,498	2,855,434	192,064	6.3%

Source: MERIC; Bureau of Labor Statistics, U.S. Department of Labor

EMPLOYMENT

Employment measures the number of people employed as a result of the operation and maintenance of the airport. This also includes citizens employed in the aviation industry and those jobs that support aviation activity. 2H2 is responsible for the employment of approximately 12 citizens.

PAYROLL

Payroll measures the annual wages and benefits paid to employees whose salaries are directly or indirectly attributed to the airport. The total payroll attributed to the operation of the airport is estimated to be approximately $334,000.

TOTAL ECONOMIC IMPACT

Economic impact measures the dollar value of all aviation and non-aviation related goods and services that exist within the region as a direct result of 2H2 providing general aviation goods and services to local and transient airport users. The total economic benefit is approximately $1,377,000 which is assumed to be the sum of annual gross sales of aviation and activity induced by airport operations occurring within the community.

Table 1.13 provides information regarding the economic impact of 2H2 to the local economy.

Table 1.13
Airport Economic Benefits Summary

Total Employment	Total Payroll	2H2 Total Economic Impact
12	$334,000	$1,377,000

Source: The Economic Benefit of Missouri's Airport System, MoDOT, Aviation Section

SUMMARY

The information provided in the existing conditions chapter establishes the foundation on which the remaining elements of the master plan will be based. Aviation demand forecasts, facility requirements, alternatives analysis, environmental overview, 20-year phased airport capital improvement program (ACIP) and development costs, update to the airport layout plan (ALP) set of drawings, as well as a financial program will be addressed in the subsequent chapters of this study.

2

Demand Forecasts

The demand forecast element of the master plan is used as a method to determine the need for future capital development, as well as investment in the facility itself. Essential to this determination is the generation of forecasts and projected increases in airport activity. Demand forecasts provide a means of determining the type, extent, size, location, timing, and financial feasibility of future capital improvements. Consequently, demand forecasts influence the remaining phases of the master plan process.

Forecasting aviation activity requires more than an extrapolation of past trends and the application of statistical measures to correlate future demand with population projections, economic performance, and demographic data. Demand forecasting requires the application of professional judgment and experience, as well as an understanding of the market forces that tend to promote or limit aviation growth. In the case of 2H2, the market forces that directly relate to activity at the airport are represented by 1) historic socioeconomic and demographic growth within the City of Aurora, as well as the surrounding region and 2) the historic and projected growth rates of the general aviation segment of the air transportation system.

Demand forecasts have been prepared and are presented in this chapter to assist the city in the evaluation of the performance-based needs of the airport during the next 20 years. The forecasts are organized to include: based aircraft and fleet mix; annual operations; local versus itinerant operational activity; operational fleet mix; annual instrument approach demand; and ultimate critical aircraft.

DATA SOURCES

The forecasting process begins by obtaining recorded data pertinent to the operation and administration of the airport. When necessary, this information is supplemented with historical trends which evolve from a thorough examination of historic data and planning documents related to the airport. Data sources used to generate the demand forecasts include the *FAA Aerospace Forecasts*; FAA Form 5010-1, *Airport Master Record*; regional socio economic and demographic characteristics as provided by the U.S. Census Bureau and the Missouri Economic Research and Information center (MERIC); FAA Order 5090.3c, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*; and the Missouri State Airport System Plan (MOSASP). In addition, supplemental publications such as the *General Aviation Statistical Databook and Industry Outlook and Business Aviation Fact Book* will be referenced and evaluated for concurrence of the latest trends and conditions of the aviation industry.

FACTORS AFFECTING FUTURE AVIATION DEMAND

Projected aviation demand at 2H2 can, and is, expected to be potentially influenced by a number of local, national, and global factors. These conditions are discussed in the following passages and involve a wide range of operational, socio economic and industry related topics that are not discussed in any order of priority.

FAA AEROSPACE FORECASTS AND THE GENERAL AVIATION MARKET SEGMENT

Forecasts for active aircraft, projected by the FAA, include fleet size, hours flown, and utilization, from the General Aviation and Part 135 Activity Survey (GA Survey). The GA Survey establishes a baseline of activity to which anticipated growth trends can be applied. In recent years, the FAA has developed statistical improvements to the survey methodology for data collection. Since 2004, the improvements to the GA Survey have resulted in superior estimates compared to aviation projections based on past surveys. These improvements are viewed as an indication of a higher level of reliability of the FAA's forecasts. Accordingly, the FAA's assumptions have a high level of influence on the forecasts which highlight positive factors potentially influencing demand at 2H2.

The U.S. economy has only recently assumed a positive growth trajectory from the turmoil of the 2008/09 Great Recession, debt ceiling crises, sequestration, and other global and political factors, which were the culprits of across-the-board decreases in aviation activity. Unemployment has begun to decrease and the U.S. economy seems to have stabilized with increasing, but limited, output and business investment is increasing. As such, aviation demand is experiencing slight but positive increases in activity and aircraft deliveries.

Each year, the General Aviation Manufacturers Association (GAMA) highlights various topics within the general aviation market with their publication of the *General Aviation Statistical Databook*. GAMA is an international trade association devoted to fostering and advancing the interests and activities of general aviation. This publication helps paint a broad picture of the overall condition of general aviation, which, in turn, helps to understand how and what assumptions to associate with future activity at an airport. Highlights from the market overview include:

- ✈ General aviation aircraft deliveries increased 4.3 percent;
- ✈ The business jet market stabilized, after slowing down the prior four years;
- ✈ The turbo-prop aircraft sector increased 10 percent. Greatest growth was seen in deliveries of agricultural aircraft;
- ✈ Piston aircraft deliveries increased 2.8 percent, mostly driven by the global demand for flight training aircraft;
- ✈ The fractional aircraft fleet decreased by 36 percent; while fractional aircraft ownership increased by 15 percent, the five-year trend has a decrease. Both aircraft and ownership peaked in 2008; and
- ✈ U.S. pilot population continues to follow its downward trajectory of membership. The average of 7,500 pilots year over year leaving the private pilot market have decreased the overall population from its peak of 357,479 in the early 1980s to today's membership of 180,214. A bright spot in the pilot segment is female aviatorship has reached its highest ratio – 6.78 percent.

Growth of single-engine airplanes is expected to be largely the result of light sport aircraft (LSA) replacing traditional low-end piston single-engine airplanes. Twin-engine piston airplanes are expected to decline

throughout the planning period due to attrition of the aging fleet. Lastly, system-wide growth of the turbine fleet – turbo-prop and jets – is expected to increase 1.6 and 3.0 percent, respectively.

GA fleet utilization rates (hours flown) are expected to decrease for both single-engine and multi-engine piston by 0.6 percent and 0.5 percent, respectively. However, increases are postulated for turbo-props at 1.8 percent, business jets at 4.3 percent, and LSA's at 5.1 percent. With the exception of LSAs and piston propulsion aircraft, increased utilization rates are anticipated to be the result of business usage of GA aircraft expanding at a faster rate than personal/recreational use. Factors such as short-term post-recession recovery increased the size of the overall GA fleet, and recovery from recession induced record lows are also expected to contribute to the increase in GA flight activity throughout the planning period.

NATIONAL AND GLOBAL ECONOMIC CLIMATE

Although the demand for GA air transportation has proven to be resilient in the past despite a slow recovery from the 2008 recession, including numerous industry, financial, and economic factors, there are still some conditions that remain which have the potential to negatively influence the demand projections for 2H2.

Aviation demand decreased drastically in response to the recession of 2001 which was exacerbated by the terrorist attacks of 9/11. Although recovery occurred around 2004, it was relatively short-lived with the most recent recession occurring in 2008. The more recent downturn was a direct result of the collapse of the housing market which stalled credit markets and disrupted the global financial and economic infrastructure. Unemployment, reduction in the U.S. economy's output, continued deterioration of the housing and credit markets, reduced consumer spending, weakened business investment, and slow world economic growth resulted in the loss of wealth among citizens, as well as private and publicly traded corporations.

It goes without saying that domestic and international terrorism remains atop the list of concerns that may influence demand for aviation services on a national scale and at 2H2. Additionally, the uncertainty of oil prices, punctuated by potential spikes in oil demand, has the ability to depress optimism once economic growth resumes. Either of these prospects has the ability to 1) shift consumer spending away from air travel, 2) lower industry profitability, and 3) reduce new orders and/or scuttle the purchase of a new or used aircraft which could further depress the forecasts on a local and national scale.

LOCAL SOCIOECONOMIC CONDITIONS

General Aviation operations and based aircraft are more directly tied to local economic conditions than any other segment of the industry. Population trends also play a role in determining airport activity. Given this fact, the forecast of general aviation demand at 2H2 will reflect historic socioeconomic trends for both Aurora and the surrounding county region.

Over the past decade, the combined population of the southwest economic region, in addition to Greene County, has increased approximately 0.96 percent annually, resulting in a total population of 652,644 residents in 2014, up from 557,793 residents in 2000. In addition to population, per capita income (PCI) and median household income (MHI) are widely used indicators for gauging the economic performance of communities as well. The PCI levels for the region have increased an impressive 2.4 percent annually from 2000 while the MHI has increased 1.9 percent annually through this same period.

AIRPORT ROLE

2H2 is expected to remain a NPIAS general aviation facility throughout the planning period while at the same time remaining classified as a Business Airport according to the MOSASP. Considering historic and current operational activity, fleet mix, and future demand at the facility, the airport should strive to

accommodate 95 percent of the aircraft fleet with less than 10 passenger seats weighing less than 12,500 pounds on a consistent basis. Additionally, a vast majority of the airport's operations will be generated by single- and twin-piston type aircraft. While turbine aircraft are expected to contribute a small percentage of the overall airport activity level, this segment could see great increases if runway lengths were to increase.

CRITICAL AIRCRAFT

The critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 annual itinerant operations (combination of 250 takeoffs and landings) at the airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design and safety area standards, as well as structural and equipment needs to the airfield and terminal area facilities. **Table 2.1** provides information regarding the existing critical aircraft for 2H2.

Of the current based aircraft at the airport, the Piper Seneca (PA-34) is the most demanding and will be utilized as the airport's critical aircraft. The Piper Seneca is a common twin-engine piston aircraft operating within the national system, and conducts nearly 1,300 annual operations at 2H2. According to the FAA aircraft registry website, there are 6 variants of the aircraft, with approximately 1,237 registered in the US. The PA-34 is capable of operating from a 3,001-foot runway during extreme (hot) weather conditions while carrying nearly a full-compliment of payload including passengers, baggage, and fuel. Currently, this aircraft performs approximately 1,300 operations at the airport.

Table 2.1
Existing-Critical Aircraft – Piper Seneca (PA-34)

Characteristics	Specifications and Performance
Airport Reference Code (ARC)	B-I
Wing Span	38' 9"
Length	28' 6"
Height	9' 9"
Seating (Crew + pax)	1 + 5/6
Maximum Takeoff Weight (MTOW)*	4,750 pounds
Maximum Landing Weight (MLW)**	3,397 pounds
Approach Speed	61 knots
Balanced Field Takeoff Length	2,180'
Landing Distance	1,400'
Maximum Range Performance***	828 miles

Source: Piper Aircraft
(*) MTOW, sea level, standard temperature, and departure flaps.
(**) Max. landing weight, sea level, standard temperature, and approach over 50 foot obstacle.
(***) Full fuel and available payload

GENERAL AVIATION FORECASTS

Aviation activity is forecasted by using various methods such as analytical and statistical processes (trend lines and single/multiple regression), historical data, and judgmental processes to incorporate relevant assumptions, conditions, and trends. Forecasting, by its nature, is as much an art as a science and represents a suitable "best guess" at a particular time, no matter the sophistication of the forecast method. Therefore, forecasts should be updated periodically and revised to reflect new conditions and developments. Activity forecasts for airports are often established using various sets of assumptions that generate different outcomes providing a broad view of future airport utilization potentials.

The following sections will concentrate on the activity generated by the airport's total based aircraft fleet including annual operations, local versus itinerant operational activity, and annual instrument approach (AIA) flight activity, and operational fleet mix estimates. Larger, more complex airports rely mostly on statistical analysis or trend line methods to compute forecasting numbers; however, these analysis methods become more difficult to utilize at lower activity airfields due to their inconclusiveness or negative results. While such trends are not necessarily a desired outcome, it is recognized they negatively impact the ability for an airport to appropriately plan for future development. Thus, the forecasts presented in this section will be based on growth rates and scenarios with anticipated growth rates associated with population, income, and/or the FAA's anticipated growth rates for general aviation.

FORECAST OF BASED AIRCRAFT

There are many factors that determine the number of general aviation aircraft that can be expected to be based at an airport, such as radio and weather communications, available facilities and services, airport proximity and access, and amenities and facilities of adjacent or other nearby airports. General aviation aircraft owners and operators are particularly sensitive to both the quality and location of their basing facilities. Generally, owners would rather be in close proximity to their home and/or work, and typically weigh this need high when determining and considering a location.

Table 2.2
Forecast of Based Aircraft Summary

Forecast Methodology	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
FAA Terminal Area Forecasts	31	33	33	33
Scenario One (0.95%)	31	33	34	38
Scenario Two (2.0%)	31	36	39	47
Scenario Three (3.1%)	31	37	43	59

Source: Lochner

Scenario One postulates a forecast based on the average annual population growth rate of 0.95 percent for the southwest economic region, including Greene County. Under this scenario, based aircraft will increase from the current level of 31 to 38 by the end of the planning period.

Scenario Two is a combination of the average annual growth rate of turbine aircraft as provided in the *FAA Aerospace Forecasts*, the average annual population growth rate for the region, and the regional average annual median household growth rate. Based on these assumptions, based aircraft would grow from 31 to 47 by the end of the 20-year time period. This scenario is also chosen as the preferred forecast as it reflects a growth rate that is consistent with trends of airports of similar size.

The Scenario Three forecast reflects a combination of the average annual turbine growth rate as postulated in the *FAA Aerospace Forecasts*, in addition to the population growth rate for Lawrence and surrounding counties. The average annual growth rate of 3.1 percent will increase the overall based aircraft from the current 31 to 59 by the end of the 20-year planning effort.

PREFERRED BASED AIRCRAFT DEMAND AND FLEET MIX

Based on the principle that shows based general aviation aircraft are directly tied to local economic conditions, the projected based aircraft will coincide with historic and future regional population. In

addition, the airport maintains an active waitlist for hangar needs of approximately 13 individuals with various type aircraft. FAA fleet growth estimates were also taken into account to arrive at a preferred based aircraft forecast to accommodate long-term demand. The preferred based aircraft estimates are expected to increase 2.0 percent annually and result in the addition of 16 aircraft to total 47 aircraft based at the airport. **Table 2.3** and **Exhibit 2.1** summarize the airport's preferred forecast of based aircraft.

The single-engine fleet is expected to increase from 28 existing units to 35 units totaling an additional seven traditional single-engine, experimental and light sport aircraft at the conclusion of the planning period. Multi-engine aircraft are expected to increase from three to five within the same time frame. In the short term, the airport is anticipated to accommodate at least two based single- or multi-engine turbo-prop. The most probable scenario for an increase in turbo-prop aircraft would likely be the result of a business or individual upgrading their current piston engine aircraft to a more powerful, fuel-efficient turbine. Popular aircraft examples include the single-engine TBM-700/850 or Pilatus PC-12 turbo-prop or the Beechcraft King Air C90, a multi-engine turbo-prop. Additionally, considering historic activity, current demand, projected turbine utilization rates, air transportation needs of the region, and existing airfield facilities, the airport is not expected to host a based business jet or helicopter during the 20-year planning period.

Table 2.3
Preferred Based Aircraft and Fleet Mix Summary

Aircraft Category	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Single-Engine	28	30	31	35
Multi-Engine	3	4	5	5
Turbo-Prop	0	2	3	7
Business Jet	0	0	0	0
Helicopter	0	0	0	0
Total Based Aircraft	31	36	39	47

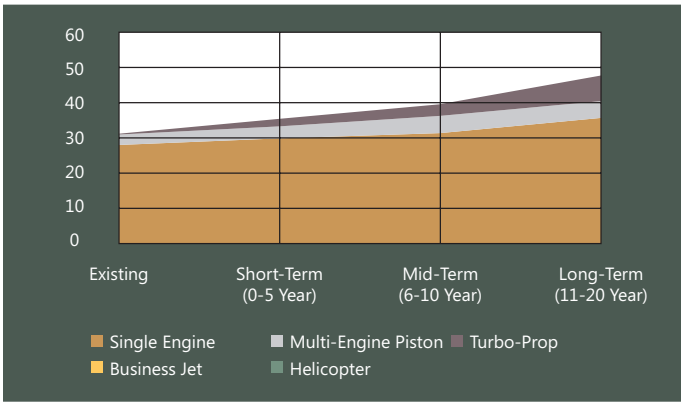
Source: Lochner

Table 2.3 also summarizes the forecast based aircraft fleet mix for 2H2 through the end of the long-term planning period. Fleet mix is the relative percentage of a particular category of the based aircraft population and is dependent on specific operational and physical characteristics.

GENERAL AVIATION OPERATIONAL DEMAND

Over the past several years, recessions and economic cycles in the nation have historically affected aviation operations in general, and specifically have impacted general aviation operations more severely than air carrier operations. However, as previously stated, with more general aviation aircraft being utilized for business purposes, the fluctuations should have somewhat less of an effect upon overall general aviation activity.

Exhibit 2.1
Preferred Based Aircraft



Generally, there is a direct relationship between based aircraft and annual operations, especially due to the national trend of more aircraft being utilized for business purposes and less for pleasure or recreation. Because based aircraft and annual operations have historically followed similar trends and growth rates, this analysis will compare the two and draw conclusions as to the potential estimated activity at the facility. The relationship between the two, known as operations per based aircraft (OPBA), will be examined whereby the estimated increase in activity – total aircraft operations – will be calculated and established.

The OPBA for 2H2 has averaged approximately 300 since 2000. According to FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, OPBA at non-towered airports are recommended to be calculated based on 250 OPBA for small general aviation airports. For consistency, the existing OPBA for the airport will remain at its current level of 300 throughout the planning period. **Table 2.4** summarizes the forecast of annual operations for 2H2 throughout the 20-year master planning period.

Table 2.4
General Aviation Operations Forecast Scenarios

Forecast Methodology	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
FAA Terminal Area Forecasts	10,875	10,875	10,875	10,875
OPBA	10,875	10,800	11,700	14,100
Scenario One (1.40%)	10,875	11,700	12,500	14,400
Scenario Two (2.35%)	10,875	12,200	13,700	17,300
Scenario Three (2.90%)	10,875	12,600	14,500	19,300

Source: Lochner

In addition to the OPBA, other national forecasts and trends were reviewed prior to developing the general aviation forecasts.

The Low Growth Scenario postulates a forecast based on the average annual general aviation growth rate of 1.4 percent as provided in the *FAA Aerospace Forecasts, 2015-2035*. With a 1.4 percent growth rate, operations increase from the existing level of nearly 11,000 to approximately 14,400 by the year 2037. It is of interest to note this scenario is similar to the OPBA trend.

The Moderate Growth Scenario assumes an average annual growth rate of 2.35 percent, which is based on a combination of the average population growth rate of 0.95 percent for the southwest economic region, including Green County, and the average annual growth rate of 1.4 percent for general aviation as provided in the *FAA Aerospace Forecasts*. Operations for general aviation aircraft in this scenario would increase to 17,300 by the end of the planning period. It is of interest to note this scenario is similar to the OPBA trend.

The High Growth Scenario reflects an average annual growth rate of 2.9 percent, equivalent to the turbine-only growth rate as postulated in the *FAA Aerospace Forecasts*. This rate of 2.9 percent will increase operational activity to approximately 19,300 by the end of the 20-year time frame.

The preferred forecast for general aviation operations is Scenario Two with an average annual growth rate of 2.35 percent, increasing the overall operations number from nearly 11,000 to 17,300. This scenario accounts for the increasing trend of operations by turbine aircraft, in addition to considering the growth in population within the region.

OPERATIONAL FLEET MIX

Given the close correlation of based aircraft to annual operational activity, just as with determining the projected annual operational forecasts based on OPBA, the relationship of both based airplanes and operations can be evaluated to determine an ultimate level of activity (operations) conducted by a particular aircraft category.

Projected operational mix by a certain aircraft category can be determined by highlighting a category's share of the existing based aircraft fleet and apply that figure/percentage to the future operations for each aircraft category. Accordingly, **Table 2.5** and **Exhibit 2.2** reflect the growing percentage of turbine-engine powered aircraft anticipated to operate at the airport, with a corresponding decrease in the percentage of both single- and multi-engine piston. While the percentage of piston-engine operations is decreasing, due to their large numbers in the overall national fleet, they will still provide a majority of the operations.

Table 2.5
Operational Fleet Mix Summary

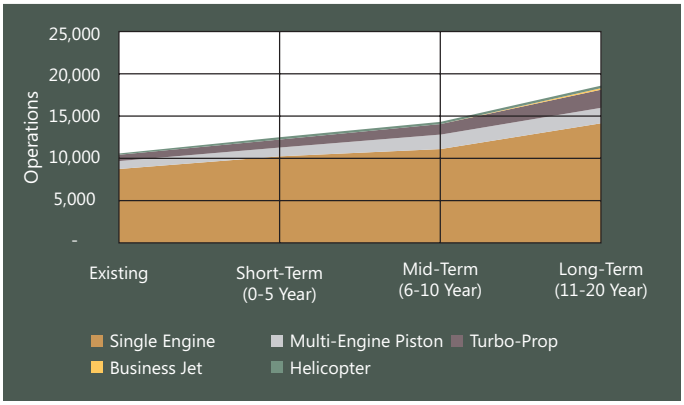
Aircraft Category	Existing	Short-Term (0-5 Years)	Mid-Term (6-10) Years)	Long-Term (11-20 Years)
Single-Engine	9,350	10,500	11,800	14,900
Multi-Engine	650	700	800	1,000
Turbo-Prop	540	600	700	800
Business Jet	0	0	0	200
Helicopter	335	400	400	400
Total Operations	10,875	12,200	13,700	17,300

Source: Lochner.

Note: Projected annual operations rounded to the nearest hundred for planning purposes.

Ultimately, single-engine aircraft are expected to contribute approximately 14,900 total operations or nearly 86 percent of the annual activity at the airport. Multi-engine piston aircraft are expected to contribute approximately six percent of the operational activity, or 1,000 annual operations, while single- and multi-engine turbine airplanes are anticipated to conduct approximately 800 operations and account for approximately five percent of the yearly activity. Business jets are not anticipated to operate at the airport until the long-term period at which time they would contribute approximately 200 operations. Additionally, helicopter operations will contribute nearly three percent of the annual activity, or 400 takeoffs and landings per year.

Exhibit 2.2
Operational Fleet Mix Summary



AIR TAXI OPERATIONS

Air taxi operations are operations conducted by aircraft in accordance with FAR Parts 135 and 121 and are involved with on-demand carriage of passengers, mail, or cargo for revenue purposes (charter operations), air ambulance/medical activity, and can be either scheduled or unscheduled. These aircraft are typically conducted by local and/or itinerant single- or multi-engine turbo-props and/or business jets generally weighing 12,500 pounds with greater than six passenger seats. Due to the current lack of operations

in this area, forecasted air taxi operations have been included in the overall general aviation operations forecasts.

MILITARY OPERATIONS

Typically, military activity at an airport is heavily influenced by several factors. The first is whether the airport or FBO at the field has a fueling contract with the Department of Defense (DOD), the overall funding level of the DOD in general, and the location or proximity of the airport to aviation related military bases or installations. As stated in the inventory chapter, the airport accommodates military traffic throughout the year operating at approximately 300 times per year. In lieu of more definitive information, this same operations level will be utilized throughout the planning period.

LOCAL VERSUS ITINERANT OPERATIONS

Over the past 20 years, the relationship between local versus itinerant operations for the airport was approximately 72 percent local and 28 percent itinerant in nature. The relationship of local versus itinerant operations is expected to be maintained throughout the planning period. These figures coincide with the airport's overall increase in operational activity. **Table 2.6** and **Exhibit 2.3** also summarize the share of local versus itinerant operations expected to be conducted at 2H2.

Table 2.6
Local vs. Itinerant Operations Summary

Operations	Existing	Short-Term (0-5 Years)	Mid-Term (6-10) Years)	Long-Term (11-20 Years)
Local Operations	7,900	8,800	9,900	12,500
Itinerant Operations	2,975	3,400	3,800	4,800
Total Operations	10,875	12,200	13,700	17,300

Source: Lochner.
Note: Projected annual operations rounded to the nearest hundred for planning purposes.

Exhibit 2.3
Local and Itinerant Operations Summary

ANNUAL INSTRUMENT APPROACH DEMAND

Forecasts of annual instrument approaches (AIAs) are generated to provide guidance in determining requirements for installation of NAVAID equipment and/or establishment of instrument approach procedures. Based on the volume of 1) approaches conducted in instrument conditions (AIAs) and 2) operations (approaches and departures) conducted during instrument meteorological conditions (IMC), the type and timing of future NAVAIDs can be determined. Technological and equipment improvements (airborne, as well as, ground based) will also affect NAVAID installation and published instrument approaches. **Table 2.7** summarizes the forecast of annual instrument approaches for the airport throughout the 20-year planning period.

Table 2.7
Annual Instrument Approach Summary

Operational Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Total Itinerant Operations*	2,975	3,400	3,800	4,800
Percent IFR Rated Pilots[1]	51.2%	50.8%	50.8%	49.9%
Percent IMC Conditions**	7.5%	7.5%	7.5%	7.5%
Total IMC Operations***	228	259	290	359
Total Annual Instrument Operations (AIA)	**114**	**130**	**145**	**180**

Source: Lochner

[1] Based on information provided in Table 30, FAA Aerospace Forecasts, Fiscal Years 2015-2035.

(*) Total itinerant operations include air taxi and military.

(**) Total IMC operations include arrivals and departures in instrument weather conditions (Ceiling <1,000' and visibility <3 miles)

(***) Total AIA's represent the projected number of annual operations in instrument weather conditions.

The AIA forecast considers the existing and projected total IMC operations at the airport compared to the percentage of instrument rated pilots, as well as, percent of instrument flight conditions in the area. This analysis will determine a projected annual instrument approach estimate for 2H2. Currently, the airport experiences approximately 114 annual instrument approaches. Ultimately, these operations are expected to increase to 180 AIAs by the conclusion of the long-term planning period.

SUMMARY

Table 2.8 summarizes the forecasts of projected aviation activity at 2H2 throughout the 20-year planning period.

2H2 is expected to experience an increase in the based fleet by 16 aircraft and average 2.0 percent annual fleet growth throughout the planning period. The ultimate based fleet mix includes 35 single-engine, five multi-engine pistons, and seven turbo-props.

Annual operations are anticipated to experience an overall increase in operational activity by 2.35 percent to total approximately 17,300 annual operations. Local and itinerant operations will comprise a 72/28 percent split of the overall 2037 activity, with local operations equaling 12,500 and itinerant operations equaling 4,800 by the end of the planning period. Lastly, at the conclusion of the master planning period, 2H2 is expected to experience approximately 359 IMC operations and nearly 180 AIAs per year.

The demand forecasts, combined with the existing conditions information, will be used to identify the airport's short-term and long-range airfield and terminal area facility needs. The next chapter, Facility Requirements, identifies the types and extent of airside and landside facilities needed to adequately accommodate the based aircraft and operational demand identified in this chapter.

Table 2.8
Demand Forecast Summary

Forecast Element	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Preferred Based Aircraft Demand				
Single-Engine	28	30	31	35
Multi-Engine Piston	3	4	5	5
Turbo-Prop	0	2	3	7
Business Jet	0	0	0	0
Helicopter	0	0	0	0
Total Based Aircraft	**31**	**36**	**39**	**47**
Annual Operational Demand				
Local Operations	7,900	8,800	9,900	12,500
Itinerant Operations	2,975	3,400	3,800	4,800
Total Operations	**10,875**	**12,200**	**13,700**	**17,300**
Operational Fleet Mix				
Single-Engine	9,350	10,500	11,800	14,900
Multi-Engine Piston	650	700	800	1,000
Turbo-Prop	540	600	700	800
Business Jet	0	0	0	200
Helicopter	335	400	400	400
Total Annual Operations	**10,875**	**12,200**	**13,700**	**17,300**
Instrument Approach Demand				
Total IMC Operations	228	259	290	359
Total Annual Instrument Operations (AIAs)	**114**	**130**	**145**	**180**

Source: Lochner

Facility Requirements

In efforts to quantify an airport's future development needs, it is necessary to quantify the forecasted aviation activity into specific physical requirements. This chapter analyzes the types and quantities of facilities and/or the required improvements to existing facilities needed to accommodate the projected demand safely and efficiently. For those components determined to be deficient, the type, size, or amount of facilities required to meet the demand is identified. Two separate analyses are included: airside and landside.

AIRFIELD DESIGN AND PLANNING STANDARDS

The design standards applied to an airport are based on the type of aircraft with the most demanding Runway Design Code (RDC) expected to regularly use the airport facility, with regular use being defined as that aircraft, or family of aircraft, that will perform at least 500 annual operations at the airport.

CRITICAL DESIGN AIRCRAFT

The RDC, as described in FAA Advisory Circular 150/5300-13A, *Airport Design*, Change 1, is a coding system to help identify and determine the appropriate design criteria for an individual airport. The RDC correlates airport design and geometry to that of the operational and physical characteristics of the critical design aircraft. The identified critical design aircraft directly influences pertinent safety criteria relating to runway length, runway width, separation distances, building setbacks, and safety area dimensions which surround both the runway(s) and taxiway(s).

The RDC consists of three components. The first component, depicted by a letter, is the aircraft approach category (AAC), and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the airplane design group (ADG), and relates to either the aircraft wingspan or tail height (physical characteristics); whichever is most restrictive of the largest aircraft expected to operate on the runway and taxiways adjacent to the runway. The third component relates to the designated, or planned, visibility minimums expressed by runway visual range (RVR) values in feet.

For example, a Beech King Air 200 with an approach speed of 103 knots and wingspan of 54.5 feet operating at an airport with ¾-mile visibility minimums would exhibit an RDC of B-II-4000, while a large business jet such as the Gulfstream VI, with an approach speed of 145 knots and wingspan of 77.8 feet would exhibit and RDC of D-II-4000. **Table 3.1** illustrates the RDC criteria.

Table 3.1
Runway Design Code (RDC) Criteria

Aircraft Approach Category (AAC)	
Approach Category	**Approach Speed**
A	< 91 Knots
B	91 - < 121 Knots
C	121 - < 141 Knots
D	141 - < 166 Knots
E	> 166 Knots

Airplane Design Group (ADG)		
Design Group	**Tail Height (ft)**	**Wingspan (ft)**
I	< 20 feet	< 49 feet
II	20 - < 30 feet	49 < 79 feet
III	30 - < 45 feet	79 - < 118 feet
IV	45 - < 60 feet	118 - < 171 feet
V	60 - < 66 feet	171 - < 214 feet
VI	66 - < 80 feet	214 - < 262 feet

Visibility Minimums	
RVR (ft)	**Instrument Flight Visibility Category (statute mile)**
Visual	Visual Only
5000	> 1-mile
4000	< 1-mile but > ¾-mile
2400	< ¾-mile but > ½-mile
1600	< ½-mile but > ¼-mile
1200	< ¼-mile

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*, Change 1

Table 3.2
Future Critical Aircraft – Piper Seneca (PA-34)

Characteristics	Specifications and Performance
Airport Reference Code (ARC)	B-I
Wing Span	38' 9"
Length	28' 6"
Height	9' 9"
Seating (Crew + pax)	1 + 5/6
Maximum Takeoff Weight (MTOW)*	4,750 pounds
Maximum Landing Weight (MLW)**	3,397 pounds
Approach Speed	61 knots
Balanced Field Takeoff Length	2,180'
Landing Distance	1,400'
Maximum Range Performance***	828 miles

Source: Piper Aircraft.
(*) MTOW, sea level, standard temperature, and departure flaps.
(**) Max. landing weight, sea level, standard temperature, and approach over 50 foot obstacle.
(***) Full fuel and available payload

As presented in the preceding chapter, the critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 operations (combination of 250 takeoffs and landings) per year at an airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design and safety area standards, as well as, structural, and equipment needs for the airfield and terminal area facilities. Based on all applicable information and conversations with the airport, the existing Piper Seneca (PA-34) will remain as the most demanding aircraft for the airport, exuding the airport with a B-I RDC.

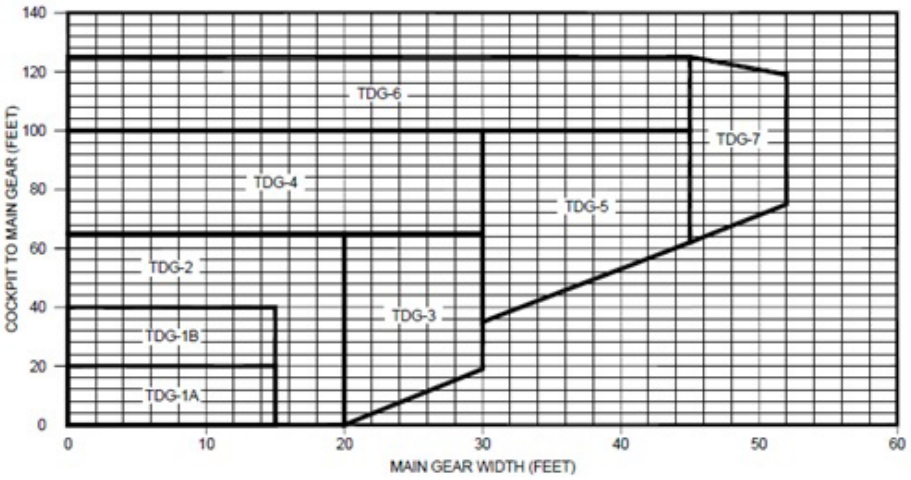
TAXIWAY DESIGN GROUP

Similar to runways, taxiways are also required to be designed to certain limitations and offers a set of criteria referred to as Taxiway Design Group (TDG). TDG is based on guidance that establishes requirements based on overall Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG) for all aircraft operating at the airport. This criteria helps to establish design guidance for fillets and edge safety margins to help limit pilot error and use a consistent taxi method throughout the airport. **Table 3.3** is based on the information provided in FAA Advisory Circular 150/5300-13A, Airport Design, with regards

to the essential requirements for taxiway design and the associated design groups. The airport currently falls within the 1A/1B TDG for design criteria.

Table 3.3
Taxiway Design Group (TDG) Criteria

Item	Taxiway Design Group							
	1A	1B	2	3	4	5	6	7
Taxiway Width	25′	25′	35′	50′	50′	75′	75′	82′
Taxiway Edge Safety Margin	5′	5′	7.5′	10′	10′	15′	15′	15′
Taxiway Shoulder Width	10′	10′	15′	20′	20′	30′	30′	40′



PEAKING CHARACTERISTICS

Another primary consideration for facility planning at 2H2 relates to peak hour, also referred to as design level activity. The traffic demands imposed on an airport exhibit variations based on an annual, monthly, daily, and hourly basis. This operational characteristic is important to understand because some facilities should be sized to accommodate the peaks in activity, for example, the airfield, aircraft apron and/or terminal building.

PEAK HOUR OPERATIONS

Forecasts were developed for peak month, day, and hour operations. The number of general aviation operations occurring during the peak month and hour were estimated based on discussions with the city and airport tenants. Peak operations at 2H2 occur during the months of July and/or August when there are an estimated 80 operations per day on a peak day and the peak month is considered to be July, with 15 percent of the annual operations. An estimated 15 percent of these 80 peak day operations occur during the peak hour, or 12 operations per peak hour. These trends are expected to continue through the forecast period. **Table 3.4** presents peak factors for the 20-year planning period.

PEAK HOURLY PASSENGERS

Planning for the proper space allowances for terminal building facilities, passenger circulation and auto parking facilities requires hourly volumes of activity consistent with the peak day and peak hour baseline of activity at an airport. **Table 3.4** also summarizes the peak hour passenger activity estimates throughout the planning period.

Table 3.4
Operational/Passenger Peaking Factors

Forecast Methodology	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Annual Operational Demand	10,875	12,200	13,700	17,300
Peak Month Operations	1,600	1,800	2,100	2,600
Peak Month-Average Day	53	60	70	87
Peak Day Operations	80	90	105	131
Peak Hour Operations/ Passengers	**12**	**14**	**16**	**20**

Source: Lochner

The projected peak hour passenger totals are expected to reflect peak day and peak hour operational trends. Currently, the airport is estimated to experience 12 peak hour passengers. Ultimately, 20 peak hour passengers are anticipated to access the terminal building under normal operating conditions.

AIRFIELD DIMENSIONAL STANDARDS

The determination of airfield and airspace requirements includes 1) an assessment of the airport's ability to accommodate projected activity levels, 2) evaluation of its compliance with FAA safety standards and recommended design guidelines, and 3) a determination of design standards for new facilities and/or the improvement of existing facilities. The standard dimensional criteria for airport facilities are contained within FAA AC 150/5300-13, *Airport Design*, Change 1 and FAA AC 150/5325-4C, *Runway Length Requirements for Airport Design*.

Airfield components include runway requirements such as dimensional criteria, length, width, and pavement strength, as well as taxiway requirements, airfield marking and lighting needs. Airspace needs include approach surface slope, approach type, and approach minimums to the runway environment. The criteria are determined by the Runway Design Code (RDC) and the designated or planned instrument approach procedure with the lowest visibility minimums. Because different aircraft types use the various runways, each runway has a specific RDC.

Existing dimensions and the corresponding design criteria applicable to Runway 18-36 are presented in the following **Table 3.5**. As identified, runway design criteria meet or exceed the requisite dimensional standards associated with B-I with approach visibility minimums of visual and/or greater than one mile.

In consideration of the existing and forecast aircraft operational fleet, the dimensional standards analysis indicates that each runway meets the required safety setbacks and should continue to be maintained at their current Runway Design Codes.

Table 3.5
Runway 18-36 Existing and Ultimate Dimensional Standards

Runway Item	Exiting Dimension (RDC B-I, Visual and > 1-mile)	RDC B-I Not-Lower than ¾-mile Visibility Minimums
Runway		
Width	60′	60′
Shoulder Width	10′	10′
Safety Area Width	120′	120′
Safety Area length beyond runway end:		
Runway 18	240′	240′
Runway 36	240′	240′
Object Free Area Width	400′	400′
OFA length beyond runway end		
Runway 18	240′	240′
Runway 36	240′	240′
Obstacle Free Zone Width	250′	400′
Obstacle Free Zone Length beyond runway end		
Runway 18	200′	200′
Runway 36	200′	200′
Taxiway		
Design Group	I	I
Width	25′	25′
Safety Area	49′	49′
Object Free Area	89′	89′
Runway Centerline to		
Holdline	125′	200′
Aircraft Parking Area	200′	250′
Parallel Taxiway Centerline	225′	240′

Source: FAA AC 150/5300-13A, Airport Design, Change 1
RSA – The RSA, centered on the runway centerline, enhances the safety of aircraft which undershoot, overrun, or veer off the runway and provides greater accessibility for firefighting and rescue equipment. Must be free of objects other than frangibly mounted structures fixed by function or greater than three inches in height.
ROFA – Also centered along the runway centerline, an area provided to enhance the safety of aircraft operations by having the area free of objects, with the exception of those that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.
ROFZ – defined as the volume of airspace centered above the runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs necessary for navigation purposes.

RUNWAY LENGTH

The determination of runway length requirements is based on a combination of several factors. Generally, it is premised upon the most demanding aircraft within the general aviation fleet that operate or are projected to operate at an airport, in addition

to airport elevation, mean maximum daily temperature of the hottest month, runway gradient, and balanced field length requirements. Runway length requirements are derived from FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Runway lengths for aircraft (less than 12,500 lbs.) consider performance curves of propeller and some turbo-prop aircraft including maximum takeoff and landing weights; headwind component; optimal flap settings for normal operations; elevation above mean sea level; and mean maximum daily temperature for the airport. The recommended runway length for piston aircraft should accommodate 95 percent of small GA aircraft fleet with less than 10 passenger seats. Additionally, the recommended runway length for turbo-prop aircraft conducting operations at 2H2, and aircraft similar to the type identified as the airport's existing and future critical aircraft, should accommodate 100 percent of the GA fleet with less than 10 passenger seats.

Ultimately, considering the airport's future critical aircraft, which is expected to remain as B-I, the usable length of Runway 18-36 is recommended to extend to 3,600 feet. **Table 3.6** illustrates the airport's length requirements for Runway 18-36 taking into consideration varying operational variables.

In consideration of the category of aircraft that regularly– or are expected to regularly– operate at the airport, the existing runway length of 3,001 feet is deficient to accommodate the operating needs of the general aviation fleet at all useful load percentages. Thus, a review of potentially extending the runway will be assessed in the alternatives chapter.

Table 3.6
Runway Length Requirements Summary

Aircraft Category	
Aircraft with less than ten seats	
95 percent of the fleet	3,600'
100 percent of the fleet	4,200'
Aircraft with more than 10 seats	4,450'
Piper Seneca (PA-34) [1]	2,200'

Source: FAA AC 150/5325-4C, Runway Length Requirements for Airport Design. Lengths based on AMSL elevation of 1,433', 90 degrees F, 500 NM stage length, and a maximum difference in runway elevation of nine feet.

[1] Actual performance charts were unavailable. Based on general information specification sheets.

RUNWAY WIDTH

The current width of 60 feet meets the required design standards for the type of accommodated aircraft. Therefore, widening of the runway is not necessary.

RUNWAY STRENGTH

The required pavement strength is an estimate based on average levels of activity and is expressed in terms of aircraft landing gear type and geometry (i.e., load distribution). The pavement design strength is not the maximum allowable weight of a particular aircraft. Limited operations by heavier aircraft than the critical aircraft may be permissible.

As identified in the Inventory chapter, Runway 18-36 has an existing gross weight bearing capacity of 12,500 pounds single wheel, which is more than adequate to accommodate the aircraft that commonly utilize the runway.

RUNWAY PROTECTION ZONES

A runway protection zone (RPZ) functions to enhance the protection of people and property on the ground beyond the end of the runway. This is achieved through airport control of the RPZ areas. Trapezoidal in shape, the RPZ is centered on the extended runway centerline and begins 200 feet beyond the end of the area usable for takeoff or landing. RPZ dimensions are a function of the RDC, aircraft size, and the lowest visibility minimums associated with a runway end. When a runway end accommodates a different landing threshold from the takeoff threshold, two RPZs will be associated with this particular runway end in terms of an approach RPZ and departure RPZ. **Table 3.7** presents the RPZ dimensions.

Table 3.7
Runway Protection Zone Dimensions

Item	Width at Inner Edge	Length	Width at Outer Edge	Airport Controls Entire RPZ
Existing RPZ Dimensions				
Runway 18	500′	1,000′	700′	No
Runway 36	500′	1,000′	700′	No
Required RPZ Dimensions				
Visual and not lower than 1-mile, small aircraft only	250′	1,000′	450′	
Visual and not lower than 1-mile, A and B aircraft	500′	1,000′	700′	
Visual and not lower than 1-mile, C and D aircraft	500′	1,700′	1,010′	
Not lower than ¾-mile, all aircraft	1,000′	1,700′	1,510′	
Lower than ¾-mile, all aircraft	1,000′	2,500′	1,750′	

Source: FAA AC 150/5300, Airport Design, Change 1.

RUNWAY INSTRUMENTATION, LIGHTING, AND MARKING

Electronic Landing Aids

For the past several years, the FAA has been transitioning from the common ground based navigation technology to satellite based Global Positioning System (GPS) technology. GPS has proven to be a reliable advancement in navigation and is part of the FAA's overall mission to provide approach capabilities to every runway in the airspace system. The continued development of Wide Area Augmentation Systems (WAAS) has further improved the technology by improving GPS accuracy and allowing for very precise Localizer Performance with Vertical Guidance (LPV) approaches. Since WAAS precludes the need for ground based navigation equipment, cost and maintenance for the infrastructure is reduced without sacrificing approach capabilities that may be affected by signal reflection from aircraft, hangars, or other structures.

Currently, both runway ends support one-mile LNAV approaches and seem adequate to support the proposed operations forecast. Thus, it is not anticipated improvements or lower visibility minimums will be required over the 20-year planning period.

Visual Landing Aids

Currently, Runway 18-36 is equipped with Medium Intensity Runway Lights (MIRL), and offer no other visual guidance systems. Any runway accommodating any type of approach should at least have some type of visual guidance system such as a Precision Approach Path Indicator (PAPI). It is recommended Runway 18-36, at a minimum, be supplied with such a visual guidance system for additional safety when approaching either runway end.

Marking

Runway 18-36 currently has non-precision instrument markings on both runway ends. These markings should remain intact to coincide with the one-mile approach.

Runway End Identifier Lights (REIL)

REILs include high intensity, photo strobe lights used for rapid identification of the thresholds during night and inclement weather conditions. Currently, the airport does not accommodate REILs. Due to the location of the airport, REILs are not necessary for operating at the airport. However, if light pollution from surrounding areas increases, it is recommended the airport sponsor review the potential and cost of installation to increase the visibility of the airport during those times when conditions require the need.

Airport Beacon

The airport beacon provides visual airport identification and location during nighttime operations, as well as during inclement weather conditions. It is recommended the beacon be maintained in its current location for the foreseeable future and replaced when necessary during the planning period.

TAXIWAYS

The taxiway system exists to serve as a defined area to accommodate the movement of aircraft to and from the runway, as well as to serve as a transit system between the airside terminal area. Currently, the airport is provided with a connector from the runway and terminal area, in addition to turnarounds on each runway end. It is recommended, when funding allows, construction of a full-length parallel taxiway be provided to improve safety and efficiency of the airport. This new parallel should, at a minimum, have centerline markings and reflectors. However, it should be the ultimate goal of the airport to achieve edge lighting for each taxiway and connector as funding allows.

LANDSIDE FACILITY REQUIREMENTS

The airport's landside or terminal area facilities are those facilities that support the airside facilities, but are not actually a part of the aircraft operating area and typically include the passenger terminal building, auto parking area, aircraft hangars, aircraft parking apron, as well as support facilities including fuel storage capabilities, Airport Rescue and Fire Fighting (ARFF), and aircraft maintenance.

PASSENGER TERMINAL BUILDING

The primary objective of the terminal building is to achieve an acceptable balance between passenger convenience, facility operational efficiency, capital investment, and aesthetics. A well-conceived terminal building should allow passengers and visitors to transition from the surface transportation mode to the air transportation mode with a minimum of inconvenience. Potential expansion of the terminal building should be planned, designed, and developed by taking into consideration allowable funding levels that consider construction costs, as well as operational and maintenance costs.

The recommended terminal functional areas including square footage and parking facilities were determined by referring to FAA AC 150/5360-13. *Planning and Design for Airport Terminal Facilities*, as well as FAA AC 150/5390-9, *Planning and Design of Terminal Facilities at Non-Hub Locations*. **Table 3.8** summarizes the terminal building spatial needs throughout the 20-year master plan period.

Table 3.8
Terminal Building Needs Summary

Operational Activity/ Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Annual Operational Demand	10,875	12,200	13,700	17,300
Peak Month Operations	1,600	1,800	2,100	2,600
Peak Month-Average Day	53	60	70	87
Peak Day Operations	80	90	105	131
Peak Hour Operations/ Passengers	12	14	16	20
Square Feet/Peak Hour Passenger			150	
Terminal Building Spatial Needs (sq. ft.)	**1,800**	**2,100**	**2,400**	**3,000**
Existing Passenger Terminal Space Available			6,300	
Terminal Building Space Surplus (sq. ft)	4,500	4,200	3,900	3,300

Source: Lochner; FAA AC 150/5360-13 and FAA AC 150/5360-9.
Peak month and peak hour passenger activity is assumed to be 15 percent of the annual activity for 2H2.

The existing passenger terminal building at 2H2 provides approximately 6,300 square feet of space. The methodology contained in AC 150/5360-13 is based on passenger activity during the peak hour and the demand that is placed on the facility. A rule-of-thumb guideline from this Advisory Circular indicates that for long-term passenger terminal planning purposes, the building area should provide approximately 150 square feet per peak hour passenger. Utilizing this rule-of-thumb guideline, a terminal building of approximately 1,800 square feet would be required in the short-term and increasing to 3,000 square feet by the end of the planning period. Based on the current size, the existing terminal building is adequate to meet the demands over the 20-year time frame. Thus, no expansion is necessary.

However, due the conflict of the terminal within the future proposed taxiway object free area, long-term development should account for relocation of the terminal building to avoid this conflict. Chapter 4, *Alternatives Analysis* will provide options for alleviating this issue.

TERMINAL AREA AUTO PARKING

Public auto parking facilities were described in Chapter 1, *Terminal Area Facilities*. Planning guidelines contained in AC 150/5360-9 indicate vehicle parking requirements are closely related to annual enplanements. Additionally, FAA AC 150/5360-13 indicates that an increase of 15 percent in the number of parking spaces should be provided to minimize the amount of time necessary to find a parking space. In determining the future public auto parking needs, 1.5 spaces are allotted per peak hour passenger. **Table 3.9** summarizes the ultimate auto parking needs during normal airport operating conditions.

Table 3.9
Auto Parking Needs Summary

Operational Activity/ Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Peak Hour Passengers	12	14	16	20
Parking Spaces/Peak Hour Passenger	1.5 parking spaces			
Total Parking Demand (Stalls)	18	21	24	30
Square Footage/Parking Stall	400 square feet			
Total Parking Area Demand (sq. ft)	7,200	8,400	9,600	12,000
Existing Auto Parking Facilities	10 Stalls/4,000 sq. ft.			
Parking Stall (Deficit)	**(8)**	**(11)**	**(14)**	**(20)**
Parking Area (Deficit) (sq. ft)	**(3,200)**	**(4,400)**	**(5,600)**	**(8,000)**

Source: Lochner; FAA AC 150/5360-9.

Currently, calculations show the terminal building's auto parking facilities are deficient based on technical assumptions according to FAA airport planning guidelines. Terminal area auto parking currently has a deficit of eight parking stalls and nearly 3,200 square feet of space. This deficit is expected to increase as demand increases resulting in a nearly 8,000 square foot and 20 parking stall deficit at the conclusion of the planning period. Based on this evaluation the available auto parking facilities need to be expanded to serve passenger demand.

AIRCRAFT STORAGE REQUIREMENTS

Aircraft based at Jerry Sumners Sr. Aurora Municipal Airport are stored in various areas around the airfield, which range from apron tie-downs to T-hangar structures. With the current number of 31 aircraft expected to increase to 47 by the end of the planning period, additional facilities will be necessary to accommodate the storage demands.

Based Aircraft Apron Storage

Based aircraft tie-downs are usually provided for those aircraft owners and operators that do not require or desire to pay the cost for long-term hangar storage, accommodate lower activity, and have lower turnover with size and type or aircraft. Space calculations for these areas are typically based on 360 square yards of apron for each aircraft tie-down. This space allotment provides for aircraft parking and circulation between the rows of tie-downs.

Itinerant Aircraft Apron Storage

Itinerant apron storage is provided for transient aircraft owners and operators requiring short-term or temporary storage, provide higher levels of activity, and have higher turnover with various aircraft. Calculation of this storage requirement option allots 500 per square yard for small single- and multi-engine aircraft and 1,600 square yards for turbo-prop and business jet aircraft. This additional space allotment over that of based aircraft is due to the typical itinerant pilot not being conditioned or familiar with the airport and its maneuvering or circulation patterns and the overall increase in overall aircraft size.

Hangar Storage

A storage hangar typically consists of three walls, a roof, and a large door and serves to keep parked aircraft out of the elements. Storage hangars can be built to any size and dimension to meet the needs of the airport, tenant, and aircraft type.

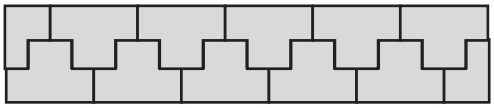
T-Hangars

T-hangars come in two types: standard and nested. Standard T-hangar configurations produce a longer and narrower building and work well where existing infrastructure or available property is not wide enough for nested T-hangars while nested T-hangar configurations produce a shorter and wider building than the standard T-hangar. Nested T-hangars optimize the developable space and reduce the required taxi-lane pavements and allows for the construction of a larger rectangular unit or "pod" on the ends of the building for larger aircraft. Nested T-hangars are the most common hangar types.

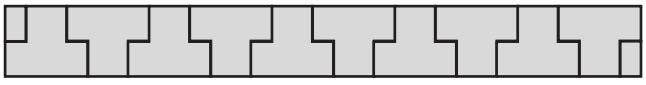
T-hangars are typically constructed for single-engine and smaller twin-engine aircraft or those aircraft with a wingspan up to 79 feet. Single- and twin-piston engine aircraft generally require approximately 1,250 square feet of storage space.

Clear Span/Box Hangars

These type of hangars typically accommodate a single aircraft as stand-alone structures and are typically occupied by larger and more costly aircraft. Sizes can range from 60' x 60' up to 120' x 120' and at times, could double as a community type storage unit.



10 UNIT NESTED T-HANGAR LAYOUT



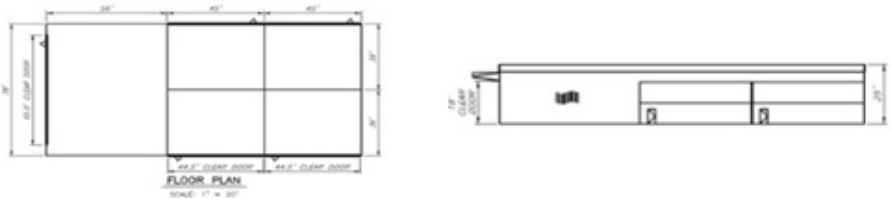
10 UNIT STANDARD T-HANGAR LAYOUT

Corporate/Conventional Hangar

A corporate hangar is usually a clear span/box hangar with the addition of dedicated space such as an office, restroom, conference room, break room, and lobby area. These type of hangars work well when there is a local FBO present or aircraft manager that oversees the hangar.

Executive Hangar

Executive hangars are hangars constructed when a corporate/conventional hangar is too big and a T-hangar is too small and are typically a single structure divided into as little as two and up to six storage units. These hangars most often accommodate large multi-engine piston and small twin-engine turbo-prop aircraft. Executive hangars provide flexibility for an airport that does not need hangar space to accommodate large aircraft but needs to house aircraft too large for a standard T-hangar. These hangars are usually custom sized and offer expansion capabilities.



Tables 3.10 and **3.11** present the type of facilities and the number of units or area needed in order to meet the forecast demand for each development phase. It is expected that most of the owners and operators of newly based aircraft at the airport will desire hangar storage facilities. It should be noted that the actual number, size, type, and location of future hangars will depend on user needs, market conditions, and financial feasibility at the time demand occurs.

Table 3.10
Hangar Area Needs Summary

	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Total Based Aircraft	31	35	39	47
Aircraft Hangar Need		32	35	42
Hangar Area Requirement				
T-Hangars (sq. ft.)	20,300	35,900	37,400	43,140
Executive Hangars (sq. ft.)	6,800	4,375	7,800	17,625
Corporate/Conventional Hangars (sq. ft.)	–	–	–	–
Total Hangar Area (sq. ft.)	**27,100**	**40,275**	**45,200**	**60,765**

Source: Lochner

While the airport currently provides approximately 27,000 square feet of aircraft storage space, based on the predicted increase in based aircraft, the airport will need to increase storage capacity by an additional 40,000 square feet in the long-term and 13,000 in the short-term.

Due to the current size of the apron, the airport offers less area than the forecasted need over the 20-year time frame. As demand and funding dictates, it is recommended the airport increase the overall area of the apron to accommodate the needs of the airport's users. It is recommended these areas be striped and properly marked to eliminate any potential confusion, in addition to allowing a proper aircraft maneuvering flow between the airside access points and the parking aprons.

TERMINAL AREA FACILITY REQUIREMENTS SUMMARY

Table 3.12 summarizes the airport's terminal area facility requirements throughout the planning period.

Table 3.12
Terminal Area Facility Requirements Summary

Operational Activity/Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Terminal Building Requirements				
Annual Operational Demand	10,875	12,200	13,700	17,300
Peak Month Operations	1,600	1,800	2,100	2,600
Peak Month-Average Day	53	60	70	87
Peak Day Operations	80	90	105	131
Peak Hour Passengers	12	14	16	20
Terminal Building Spatial Needs (sq. ft.)	1,800	2,100	2,400	3,000
Passenger Terminal Space Available (sq. ft.)		6,300		
Terminal Building Space Surplus (sq. ft)	4,500	4,200	3,900	3,300
Auto Parking Requirements				
Peak Hour Passengers	12	14	16	20
Parking Spaces/Peak Hour Passenger		1.5		
Existing Auto Parking Facilities		10 Stalls/4,000 sq. ft.		
Parking Stall (Deficit)	(8)	(11)	(14)	(20)
Parking Area (Deficit) (sq. ft)	(3,200)	(4,400)	(5,600)	(8,000)
Hangar Requirements				
Total Based Aircraft	31	36	39	47
Aircraft Hangar Need		32	35	42
Hangar Area Requirement				
T-Hangars (sf)	20,300	35,900	37,400	43,140
Executive Hangars (sf)	6,800	4,375	7,800	17,625
Corporate/Conventional Hangars (sf)	–	–	–	–
Total Hangar Area (sf)	**27,100**	**40,275**	**45,200**	**60,765**
Apron Requirements				
Based Aircraft Apron				
Tie Downs	6	4	4	5
Apron Area (sy)	3,855	1,200	1,400	1,700
Itinerant Aircraft Apron				
Single- and Multi-engine Apron Area (sy)	–	2,700	3,300	4,300
Turbo-prop and Business Jet Apron Area (sy)	–	980	1,200	1,500
Total Apron (sy)	**3,855**	**4,200**	**5,900**	**7,500**

Source: Lochner

SUPPORT AND OTHER FACILITY REQUIREMENTS

In addition to the aircraft storage and vehicular access and parking facilities described above, other support facilities at 2H2 that have quantifiable requirements and are vital for the safe and efficient operation of the airport include fueling facilities.

FUEL STORAGE

Fuel storage requirements are typically based upon keeping a two-week supply of fuel during an average month. Generally, fuel tanks should be adequately sized to accept a full-refueling tanker, which typically equates to 8,000 gallons, while maintaining a reasonable level of fuel in existing fuel storage tanks. Additionally, as operations increase, fuel storage requirements can be expected to increase proportionately. By increasing the ratio of gallons sold per operation, an estimate of future fuel storage needs can be calculated as a two-week supply during the peak month of operations. Based on the current storage levels of 8,500 gallons for 100LL, the airport has adequate storage capacity to meet aviation demand during the short- and mid-term planning periods.

Table 3.13 summarizes peak fueling reserves throughout the planning period and shows that over the course of the planning period, the airport should plan to accommodate Jet-A fuel storage either through an above ground tank or by way of a mobile fueling storage dispenser.

Table 3.13
Fuel Storage Needs Summary

Operational Activity/ Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
100LL Fueling Operations				
Average Day of the Peak Month Operations	80	90	105	131
Two-Weeks of Operations	1,120	1,260	1,470	1,834
Gallons per Operation	4.2	4.6	5.1	5.6
Fuel Storage (gallons)	4,700	5,800	7,500	10,300
Jet-A Fueling Operations				
Average Day of the Peak Month Operations	–	3	4	8
Two-Weeks of Operations	–	44	62	114
Gallons per Operation	–	10.0	11.0	12.1
Fuel Storage (gallons)	–	440	700	1,400

Source: Lochner

FUEL TRUCK PARKING AREA/SPILL CONTAINMENT

As part of any future Spill Prevention Control and Countermeasure Plan (SPCC) for the airport, a fuel spill containment berm is recommended to be developed around future fuel truck parking areas to protect local groundwater sources from potential contamination arising from a fuel spill or leakage. This berm would be approximately eight inches in height with a bentonite clay core. The berm would be also constructed on the down gradient side of the aircraft apron in order to ensure that any fuel spills would be directed to the berm and prevent petroleum products form contaminating groundwater or soils in the area.

A concrete/gravel fuel truck parking area is recommended to accommodate mobile fuel truck operations. The fuel truck parking area is recommended to be located immediately adjacent to the parking apron.

SUMMARY

Now that the needs of the airport have been determined, the next step of the master plan process is to determine the preferred airfield and terminal area development alternatives which best meet the operational needs of current and projected airport demand. The remaining elements of the master plan will be dedicated to highlighting future capital development, timing, cost, and potential environmental impacts associated with these improvements.

Development Concepts and Alternatives Analysis

The previous chapter of the Master Plan, *Facility Requirements*, determined the potential airside, landside, and support facility needs of the airport throughout the 20-year master plan period. This chapter will identify development alternatives that will allow the airport to accommodate projected aviation demand. The focus of this chapter is to evaluate the merits and deficiencies of potential capital development for airfield and terminal area alternatives proposed for the airport.

The development alternatives are intended to serve as the formulation of a development concept rather that the presentation of a final design recommendation. While the assessment of runway and terminal area improvements are based on economical, operational, and practical judgment, the most favorable development option should be the one most compatible with the city's goals and objectives regarding planning initiatives, as well as social, political, and environmental considerations.

Lastly, the preferred development alternatives, based on favorable assessment of factors involved with airport expansion, should be those having the greatest potential for implementation.

DEVELOPMENT GOALS

Development goals are established for purposes of directing the master plan and establishing continuity in the future development of the airport. These goals take into account several categorical considerations relating to the needs of the facility, both in the short term and the long term, including safety, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While all of these concepts are project oriented, some represent more tangible activities than others; however, all are deemed important and appropriate to the future of the airport.

The following goals are intended to guide the preparation of this Master Plan and direct the future development of 2H2:

- ✈ Plan the airport to accommodate the forecast aircraft fleet safely, with facilities appropriately sized to accommodate projected forecast demand;
- ✈ Program facilities to be constructed when demand dictates (construction is market driven, not forecast driven);
- ✈ Ensure future development of the airport will continue to accommodate a variety of general aviation

activities, ranging from small general aviation users to large corporate aviation operators;

- ✈ Enhance the self-sustaining capability of the airport and ensure the financial feasibility of all future development;
- ✈ Encourage protection of existing public and private investment in land and facilities;
- ✈ Provide effective direction for the future development of the airport through the preparation of a rational plan and adherence to the adopted development program;
- ✈ Ensure appropriate zoning measures are in place to encourage land use compatibility.

To accommodate the projected demand through the 20-year planning period, various development alternatives have been identified for evaluation relative to the previously specified planning issues and are presented in the following development plan analysis. It is important to note that a final Recommended Development Plan will be prepared based on the analysis of these planning issues, and the recommended plan will likely represent a combination of the various development concepts presented.

AIRSIDE DEVELOPMENT CONCEPTS

The alternatives for 2H2 resulted from examining the demand forecasts and facility requirements to accommodate projected aviation activity throughout the planning period. Goals and objectives of the city pertaining to airfield terminal area improvements were also considered.

The city was presented with a total of five alternative development options which included a 'no action' option, two options to expand the airfield, and two options involving further expansion of the terminal area. The following discussion will highlight the development alternatives intended to meet short- and long-term aviation demand at the airport.

'NO ACTION' ALTERNATIVE

The 'No Action' Alternative involves maintaining the airport in its current condition while not developing plans for future improvements based on current and/or future demand. This alternative would result in the inability of the airport to provide increased safety and operational improvements to based aircraft owners, transient users, and current on-field businesses throughout the 20-year planning period.

Given the airport's role with the Missouri system of airports, the recommended airport projects will concentrate on improving the runway and taxiway system, as well as expanding the terminal area to improve services for small business and recreational aircraft operators. These improvements will ensure the airport remains capable of supporting the local economy and transportation needs by providing a direct link to statewide and national air transportation systems. The 'No Action' Alternative would limit the airport's ability to adequately serve its users while potentially impacting its operational capabilities in the future.

Terminal area needs throughout the planning period are expected to include hangar development and reconfiguration of the aircraft apron, and tie-down parking spaces to serve anticipated local and transient users. These improvements are based on estimated facility demands which show a need to expand the airport's terminal area to accommodate both existing and future users.

Given these reasons, and the city's intent to likely invest in expanding the airport's airfield and terminal area facilities, the No Action Alternative is not considered a reasonable or plausible option for 2H2.

EXPAND THE EXISTING AIRPORT SITE

Airport expansion involves continued investment in the facility's airfield and terminal area components needed to accommodate the operational and based aircraft demand discussed in the *Demand Forecasts* chapter. Furthermore, airfield and terminal expansion are recommended to coincide with the needs identified in the *Facility Requirements* chapter.

The development alternatives evaluated as part of this analysis present a broad range of expansion options and are discussed in the following passages. In evaluating the feasibility of expanding the airport, considerations pertaining to the airfield and terminal area are important in determining the need and practicality of expanding the airport.

Pertinent airfield expansion considerations are as follows:

- ✈ Maintain RDC B-I planning in the short term with the capability to protect for, and implement, B-II planning standards in the future, including runway length and width, safety areas, and taxiway dimensional requirements
- ✈ Improve and expand the airport's taxiway system, which is intended to serve both runway ends
- ✈ Plan for expansion of Runway 18-36.

Pertinent terminal area expansion considerations are as follows:

- ✈ Development of additional T-hangars
- ✈ Expansion of the aircraft parking apron and reconfiguration of the tie-downs to accommodate larger turbine aircraft
- ✈ Relocate fuel storage and dispensing tanks.

AIRFIELD EXPANSION ALTERNATIVES

The two airfield expansion options considered the development alternative's attributes and were presented to the city for evaluation and consideration. The following discussion highlights the critical elements of each development alternative generated during the alternatives evaluation.

AIRFIELD ALTERNATIVE 1

Alternative One involves improvements to Runway 18-36. This includes maintaining the runway's width of 60 feet but increasing the length 599 feet for a total length of 3,600 feet. Additionally, this alternative proposes the development of a full-length parallel taxiway 3,600 feet in length and 35 feet wide, which will be situated 240 feet from the runway centerline.

Due to the proposed runway extension, Lawrence Road would need to permanently close. This closure would account for safety and object free area requirements, the acquisition of approximately 6.6 acres on the north and 7.4 acres on the south side of the airport, and provide the requirement for the airport to own the area within the associated Runway Protection Zones (RPZ) for each end. These areas should be owned free and clear by the city; avigation easements are no longer allowable as an alternative for land use control measures. This alternative coincides with the previously approved master plan and airspace evaluation.

AIRFIELD ALTERNATIVE 2

Alternative Two, similar to Alternative One, provides improvements to Runway 18-36. This alternative postulates a 998 foot runway extension to the north and a 100 foot extension to the south, providing an overall length of 4,000 feet. Additionally, to accommodate the increase in larger aircraft and a reference code to B-II, runway width is proposed to increase to 75 feet from the current 60 feet. Along with the additional runway expansions, this alternative proposes the development of a full-length parallel taxiway 4,000 feet in length and 35 feet wide, which will be situated 240 feet from the runway centerline.

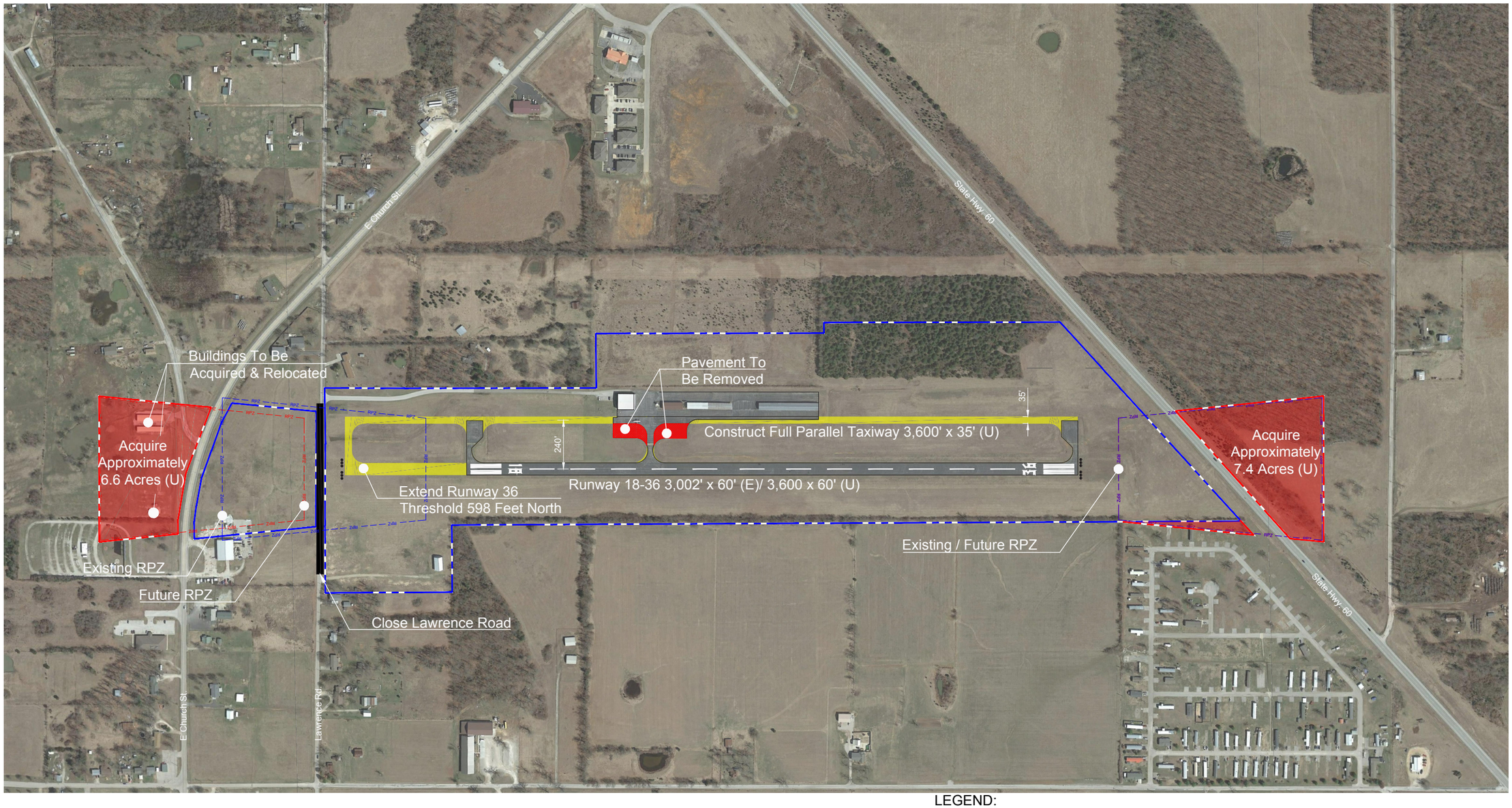
Due to the proposed runway extension, Lawrence Road would need to permanently close, and Business Highway 60 (E Church St.) would need to also close or be relocated, due to FAA guidelines and requirements for no future proposed roads allowed within RPZs and or runway safety areas. This closure would account for safety and object free area requirements, the acquisition of approximately 12.8 acres on the north and 10.6 acres on the south side of the airport, and provide the requirement for the airport to own the area within the associated RPZ for each end.

The two airside alternatives can be seen in the following figures, **Exhibit 4.1** and **Exhibit 4.2**.

JERRY SUMNERS SR AURORA MUNICIPAL AIRPORT (2H2)

AURORA, MISSOURI

Exhibit 4.1 - Airside Alternative 1



LEGEND:

- Proposed Pavements
- Future Land Aquisitions
- Existing Property Line
- Future Property Line

N

250 0 250 500

Scale in Feet

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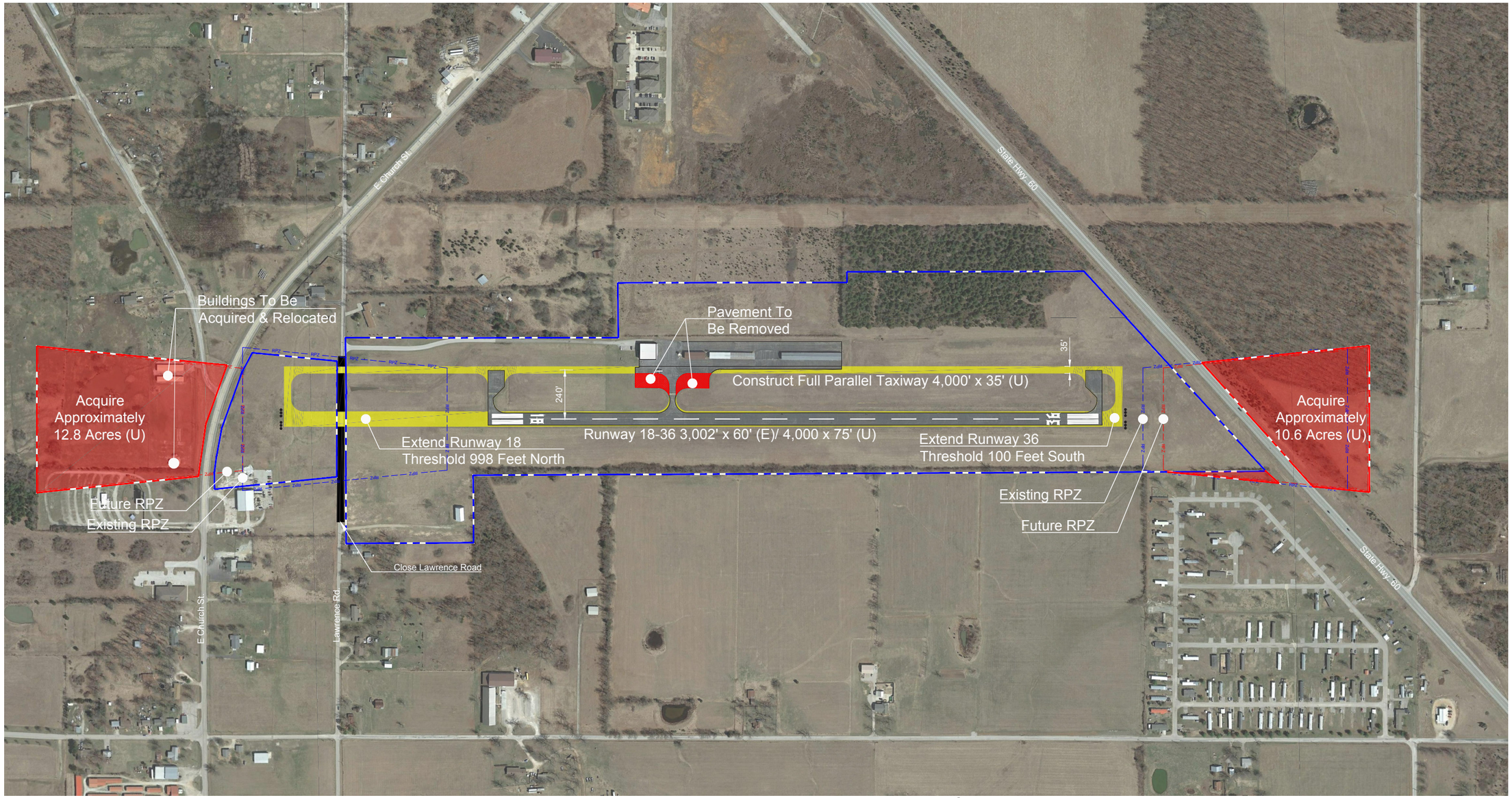
Drawing Name: I:\KAC\PR\J0000093\43\01\AP\DWG\Development Alts\Landside Alternatives.dwg Mar 17,2018 - 5:05pm



LEGEND:

- Proposed Pavements
- Future Land Aquisitions
- Existing Property Line
- Future Property Line

N

250 0 250 500

Scale in Feet

JERRY SUMNERS SR AURORA MUNICIPAL AIRPORT (2H2)

AURORA, MISSOURI

Exhibit 4.2 - Airside Alternative 2

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TERMINAL DEVELOPMENT CONCEPTS

According to the forecasted based aircraft counts and the facility requirement projections presented in the previous chapter, alternative development options have been evaluated that will accommodate the projected aviation demand for the 20-year period and beyond. It should be noted that the future development of aircraft storage facilities will be demand dictated. Thus, the number, size, and location of these facilities will vary depending on the demand for a specific type, and the development plans must be flexible to accommodate a variety of user groups. Additionally, there are important development guidelines an airport sponsor should consider when making hangar placement determinations at the airport.

- Each executive hangar should be supplied with taxiway access that is separated from vehicle access and parking. This is most efficiently accomplished when a row of hangars is developed and provided with taxiway access on one side and vehicle access and parking on the other side.
- Each T-hangar should be nested and developed with taxiway access to both sides of the hangar, when opportunity is available. Controlled vehicle access should be provided to the taxiway/apron area near the T-hangar and a public access parking area should be provided near the T-hangar facility to accommodate both users and visitors.

Typically, the airside spacing between the hangars is dictated by the clear width door design of the hangars, with a 79-foot Taxilane Object Free Area (TOFA) width specified for Airplane Design Group (ADG) I aircraft, which compares to a 115-foot TOFA spacing for ADG II aircraft. Based upon input received from the Airport Sponsor, coupled with the projected aircraft storage improvements that will be needed to serve the aviation users, the following hangar development options have been identified and are presented in the two alternative illustrations. Again, it is important to recognize the ultimate build-out of the various aviation development areas presented far exceeds that which is projected for the 20-year planning period of this study.

TERMINAL ALTERNATIVE ONE

Primary features of Terminal Alternative One include:

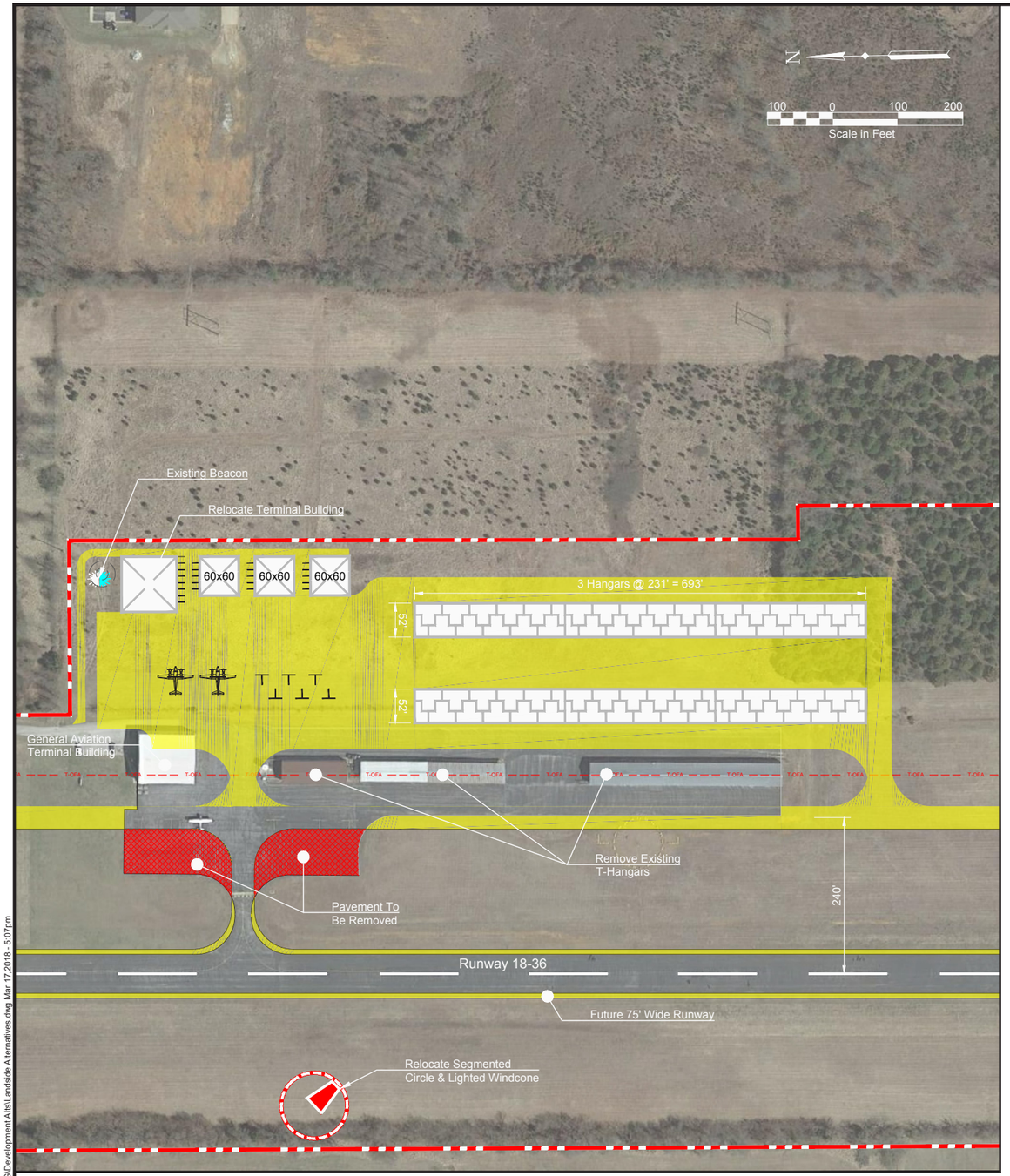
- Relocation of existing aircraft storage hangars to the east outside the Taxiway Object Free Area
  - Three 60′ x 60′ box hangars
  - Two T-hangar structures accommodating 60 T-hangar units
  - One FBO/General Aviation Terminal building
- Security fencing.
- Reconfiguration of the tie-down area to accommodate parking spaces of larger turbine aircraft.
- Removal of pavement with the current apron that would coincide with the newly constructed parallel taxiway.
- Relocate segmented circle/wind sock to the west side of the runway.
- Removal of trees to accommodate wind sock.

TERMINAL ALTERNATIVE TWO

Primary features of Terminal Alternative Two include:

- ✈ Relocation of existing aircraft storage hangars to the east outside the Taxiway Object Free Area
  - Eight 60′ x 60′ box hangars
  - Two 75′ x 75′ Corporate type hangars
  - Five T-hangar structures accommodating 40 T-hangar units
  - One FBO/General Aviation Terminal building
- ✈ Controlled access security gate and fencing.
- ✈ Reconfiguration of the tie-down area to accommodate parking spaces of larger turbine aircraft.
- ✈ Removal of pavement with the current apron that would coincide with the newly constructed parallel taxiway.
- ✈ Relocate segmented circle/wind sock to the west side of the runway.
- ✈ Removal of trees to accommodate wind sock.

A summary of the proposed landside alternatives are described below and can viewed in **Exhibits 4.3**.



Alternative 1

Box Hangar Units =	3
T-Hangar Units =	60
Executive Hangar Units =	0
Total	63

LEGEND:

Proposed Pavement

Existing Property Line

Alternative 2

Box Hangar Units =	8
T-Hangar Units =	40
Executive Hangar Units =	2
Total	50

LEGEND:

Proposed Pavement

Existing Property Line

JERRY SUMNERS SR AURORA MUNICIPAL AIRPORT (2H2)

AURORA, MISSOURI

Exhibit 4.3 - Terminal Area Alternatives

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ENVIRONMENTAL ANALYSIS OF IMPROVEMENT ALTERNATIVES

FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementation Instructions for Airport Actions, requires the evaluation of airport development projects as they relate to specific environmental impact categories by outlining types of impacts and the thresholds at which the impacts are considered significant. For some impact categories, this determination can be made through calculations, measurements, or observations. However, other impact categories require that the determination be established through correspondence with appropriate federal, state, and/or local agencies. A complete evaluation of the impact categories identified in FAA Order 5050.4B and Order 1050.1F, *Environmental Impacts: Policies and Procedures*, is required during an Environmental Assessment or Environmental Impact Statement.

Table 4.1 provides an overview of each category as it applies to the environs surrounding 2H2. The table includes a brief description of each category and the potential effect that the implementation of the Master Plan projects at the airport may have on the resources identified in the environmental category. Future development plans at 2H2 should take into careful consideration those environmental issues that are known to exist in the vicinity of the airport. Early identification of these environmental factors may help to avoid impeding development plans in the future.

It is important to note that, due to the similarity among the three alternatives presented previously in this chapter, **Table 4.1** applies to each alternative.

Table 4.1
Environmental Inventory

Category	Threshold	In Airport Environment
Air Quality	2H2 is located in Lawrence County, Missouri. Lawrence County is not currently listed as being a nonattainment area for 8-hour ozone. According to FAA Order 1050.1F, there is no single, universal criterion for deciding whether an ambient pollutant concentrations analysis (or "NAAQS analysis") is necessary for Federal actions. However, a review of a project to identify any unusual circumstances, such as intense emission sources in close proximity to areas where the public has access, might indicate a need for further analysis. In addition, reviewing agencies may specifically request a NAAQS analysis if concerns exist regarding sensitive receptors surrounding the Federal action or if measured ambient concentrations of regulated pollutants are very close to violating a NAAQS in the immediate vicinity of the Federal action. Based on the nature of a project and consultation with state and local air quality agencies, additional analysis is not required at this time.	No
Biological Resources	The following aquatic species are listed by the US Fish and Wildlife Service (USFWS) as being endangered, threatened, or candidate species in Lawrence County: Neosho mucket and the Ozark cavefish. As the proposed project does not directly involve work in a waterbody, these species are not expected to be impacted by the proposed project. Three bat species, the gray bat, Indiana bat, and Northern long-eared bat, are listed as being endangered or threatened in Lawrence County. Habitat for nesting or roosting is not located within the proposed project area. Additionally, there are no critical habitats located within the project area. Therefore, the Proposed Action is not anticipated to impact the threatened, endangered, or candidate species of Lawrence County.	Yes

Category	Threshold	In Airport Environment
Climate	The proposed improvements are not anticipated to significantly increase airfield operations at 2H2, or traffic patterns/volume traveling to or from the airport. As such, greenhouse gases are not expected to increase as a result of the improvements being assessed in this document. Therefore, no further analysis regarding climate change is required.	No
Coastal Resources	As 2H2 is located inland, coastal resources would not be impacted by improvements to the airport.	No
Department of Transportation Act, Section 4(f)	The intent of the Section 4(f) statute and the policy of the FAA is to avoid the use of significant public parks, recreation areas, wildlife and waterfowl refuges and historic sites as part of a project, unless there is no feasible and prudent alternative to the use of such land. There are no known properties protected by Section 4(f) within or near the Proposed Action areas. Furthermore, there are no known Section 4(f) properties in the vicinity of the airport. Construction of the proposed project will not directly or constructively 'use' a Section 4(f) resource.	No
Compatible Land Use	The surrounding land is utilized for agricultural and rural residential purposes, as well as some light industrial land uses. The proposed development alternatives will not alter the operational use of 2H2 as an airport; thus, the use will continue to be compatible with adjacent properties. The City of Aurora has signed a Land Use Assurance Letter to preserve and protect the airport from incompatible land use.	No
Construction Impacts	Future improvements to 2H2's infrastructure may involve disturbances of the land on and adjacent to airport property. During construction of recommended improvements, noise, soil erosion, and pollutant runoff may temporarily increase. Soil erosion and pollutant runoff will be minimized by employing Best Management Practices (BMPs) during construction. Proper BMPs will be prepared specifically for the project prior to construction, and future projects will comply with guidelines set forth in FAA AC 150/5370-10G, Standards for Specifying the Construction of Airports.	Yes
Farmlands	The soils on existing airport property and on land in the vicinity of the airport are classified as prime farmland. However, the Proposed Action items that entail additional development on existing airport property will not be directly impacting prime farmland, as the airport property has not been used for agricultural purposes since the late 1950s. Additionally, land being acquired as part of the Proposed Action will be maintained as the RPZ, and will not be developed.	No
Hazardous Materials, Solid Waste, and Pollution Prevention	The Environmental Protection Agency maintains an inventory of toxic releases, water permit compliance, hazardous waste handling processes, and air emission status. One location, Sceptre Air, is located on the airport property and is listed as being in the Resource Conservation and Recovery Act Information System (RCRA). No known hazardous materials were historically known to be located in the vicinity of 2H2.	No

Category	Threshold	In Airport Environment
Historical, Architectural, Archeological, and Cultural Resources	According to the Missouri Department of Natural Resources (MDNR) State Historic Preservation Office (SHPO) Archaeology Viewer and National Register Sites Database, there are no resources eligible for the National Register of Historic Places (NRHP) within the vicinity of the Proposed Action. Furthermore, the MDNR Archeology Viewer did not indicate any archaeological sites of interest within the vicinity of the Proposed Action. An Environmental Assessment (EA) was conducted for 2H2 in 2008; this EA assessed land that encompasses the Proposed Action or was adjacent to it. SHPO coordination conducted as part of the EA indicated that no cultural resources sites were located within the vicinity of the Proposed Action.	No
Land Use	Airport improvement projects discussed in this document would not adversely impact land uses surrounding the airport property.	No
Light Emissions and Visual Impacts	The specific lighting and aesthetic impacts imposed by future airport developments will be evaluated on a case-by-case basis.	No
Natural Resources and Energy Supply	Reasonably foreseeable projects at 2H2 are not anticipated to significantly alter energy supply or requirements or disproportionately consume natural resources. As ground and airport activity increases, it is anticipated that consumption of automobile gasoline and aviation fuel may also increase, but this will not significantly impact regional energy supplies.	No
Noise and Compatible Land Use	According to FAA Order 1050.1F, noise analysis is required on a per-project basis for airports whose forecast operations exceed 90,000 annual propeller operations or 700 annual jet operations. Operations at 2H2 do not exceed this threshold; therefore, a noise assessment would not likely be required for future airport improvement projects that increase operations or capacity.	No
Secondary (Induced)	In accordance with FAA Order 1050.1F, the potential for induced or secondary effects directly attributable to the alternatives under consideration must be evaluated prior to construction of proposed development. If road closures occur during airport development or due to development, these must be coordinated with the City, County, and/or Missouri Department of Transportation. Although immeasurable, it can be induced that airport development increases 2H2's economic benefit to the region.	No
Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks	Socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s). Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. These issues, as well as potential health and safety risks to the general population, would be evaluated in detail during subsequent environmental documentation.	No
Visual Effects	Visual effects deal broadly with the extent to which the proposed action or alternative(s) would either: 1) produce light emissions that create annoyance or interfere with activities; or 2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Visual effects can be difficult to define and assess because they involve subjectivity. Neither of the identified alternatives or options would involve significant light emission effects or changes to visual resources and visual character.	No

Category	Threshold	In Airport Environment
Water Resources	No wetlands or other jurisdictional water bodies are located within or in the vicinity of the proposed project area. The nearest jurisdictional waterbodies are located approximately 0.20 mile east and west of Runway 18-36.	No
	The Proposed Action is located outside of the 100-year floodplain. The Proposed Action area is located on two FEMA panels: 29109C0454D and 29109C0452D, effective August 2, 2012.	
	There are no rivers designated on the National Wild and Scenic Rivers System located in the vicinity of 2H2.	

Source: FAA Order 1050.1F, Environmental Impacts: Policies and Procedures and FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.

SUMMARY

The proposed development alternatives for 2H2 are intended to present the airport with a variety of options for future facility expansion and culminate with the airport solidifying an overall Recommended Development Plan. Following a careful assessment of the proposed alternatives, the Sponsor has determined the Recommended Development Plan to be a combination of Airside Alternative One and Terminal Area Alternative Two. Airside Alternative Two is considered too ambitious and costly, as the likelihood to relocate or close Business Highway 60 is unachievable and Terminal Area Two provides the optimal layout for a systematic layout for future growth opportunities.

As previously mentioned, the ultimate build-out or initial construction of the development areas will be demand driven and would not be constructed until the market dictates the need for additional aircraft facilities. The following chapter, *Capital Improvement Program*, will evaluate the individual projects at the airport over the 20-year time frame and associate a proposed cost and funding source.

Capital Improvement Program

The implementation plan is intended to establish a strategy that integrates the necessary improvements to satisfy the forecast aviation demand at 2H2, while also providing guidance on what will be required to demonstrate the airport sponsor's ability to fund the identified improvement projects. The overall concept is to maximize the opportunities to receive federal and state grants, within the context of, and in recognition of, the amount of local funds available for capital needs.

IMPLEMENTATION SCHEDULE AND PROJECT LIST

A list of capital improvement projects (CIP) has been assemble from the facility requirements documentation previously presented. The project list has been coordinated with city staff, airport personnel and the MoDOT Aviation Division. The projects have been placed into three phases: short-term (0-5 years); intermediate-term (6-10 years); and long-term (11-20 years); however, there is plenty of flexibility within the phases to provide the airport sponsor for the need to alter projects over time and re-prioritize as conditions, funding, and markets warrant.

FUNDING SOURCES

Financing the airport's CIP can be accomplished through a variety of resources by utilizing a combination of federal, state, and local funding methods. These include the FAA's Airport Improvement Program (AIP) administered by the MoDOT Block Grant Program; Missouri Aviation Trust Fund administered by MoDOT; as well as revenue bonds, private investments, airport revenues, and budgeted allocations from the city.

FEDERAL GRANTS

Originally authorized by the *Airport and Airway Improvement Act of 1982*, the AIP is funded through the Airport and Airway Trust Fund that was enacted by legislation in 1970. This fund receives its funding from aviation-generated user fees including passenger and facility fees, fuel, and cargo taxes. Although the AIP has been reauthorized several times and the funding formulas have been periodically revised to reflect changing national priorities, the program has essentially remained the same. The AIP provides apportionment, entitlement, and discretionary funding grants to be used for eligible projects at public use airports. 2H2 is eligible to participate and compete for the varying AIP funds as described below.

AIP DISCRETIONARY GRANTS

The FAA also provides discretionary grants on a 90 percent/10 percent basis to airports. This funding source is over and above entitlement funding, and is provided to airports for projects that have a high federal priority for enhancing safety, security, and capacity of the airport that would be difficult to fund otherwise. The dollar amounts of individual grants vary and can be significant in comparison to entitlement funding. Discretionary grants are awarded at the FAA's sole prerogative and grant applications are evaluated based on need, the FAA's project priority ranking system, and the FAA's assessment of a project's significance within the national airport and airway system.

Table 5.1
AIP Eligible and Ineligible Projects

Eligible Projects	Ineligible Projects
Aircraft Hangars (Non-Primary Airports)*	Development that Exceeds FAA Standards
Airfield Drainage	Development for Exclusive Use
Airfield Lighting and Signage	Improvements for Commercial Enterprises
Apron Construction and Rehabilitation	Industrial Park Development
Airport Planning Studies	Landscaping
Environmental Studies	Maintenance Equipment and Vehicles
Fuel Farms (Non-Primary Airports)*	Marketing and Business Plans
General Aviation Terminal Buildings*	Office Equipment
Land Acquisition	Airport Operating Costs
Certain NAVIADS (e.g. REILS, PAPIs)	FBO Support Areas
Runway Construction and Rehabilitation	
Safety Area Improvements	
Taxiway Construction and Rehabilitation	
Weather Observation Systems (AWOS)	

(*) These items are eligible for AIP funds; however, they are considered low priority and can only compete for funds when all airfield facility needs are met and in compliance with FAA planning criteria.

NON-PRIMARY ENTITLEMENTS

Non-primary entitlement funds (NPE) are specifically for general aviation airports included within the latest published National Plan of Integrated Airports System (NPIAS) that show a justified need for airfield and terminal area improvements. Under current legislation, any fiscal year in which the total amount of system-wide apportionments from the AIP and Aviation Trust Fund exceed $3.2 billion, NPE funds in the amount of $150,000 per fiscal year, or 20 percent of the five-year NPIAS improvements, whichever is less, will be allocated to 2H2. NPE funds are available during the initial year of allocation, as well as the next three fiscal years. Unused entitlement funds expire after four years unless the city obligates the funds under a grant or transfers the funds to another NPIAS airport. The AIP participation rate of non-primary entitlement funds is currently 90 percent with the remaining 10 percent of the costs to be funded through city revenues and/or third party investments.

APPORTIONMENT FUNDS

State apportionment funds are those AIP funds remaining after the deduction of the NPE program funds. These funds are then distributed by FAA formula calculations for use in the 50 states. The AIP participation rate for apportionment funds is currently 90 percent of grant eligible projects with the remaining 10 percent of the costs to be funded through the city or local revenues and/or third party investments.

STATE AVIATION TRUST FUND

The Missouri State Aviation Trust Fund is the primary state-funded source for capital improvement and maintenance projects on public-use general aviation airports in Missouri. Eligible projects include

airfield and terminal area improvements, which exclude revenue producing facilities such as hangars, fuel, and terminal buildings. Projects must be included within the current five-year State Transportation Improvement Program (STIP). The trust fund is funded with aviation fuel taxes collected by the state of and has an annual cap of $10 million. The trust fund portion of grants for eligible improvement projects is 90 percent while the remaining 10 percent of improvement costs are to be funded through local revenue sources.

STATE TRANSPORTATION ASSISTANCE REVOLVING (STAR) FUND

The STAR Fund was created by the Missouri General Assembly and is administered by the Missouri Transportation Finance Corporation (MTFC) in an effort to assist with the planning, development and construction of non-highway transportation facilities. The MTFC provides STAR loans at a maximum of $500,000 to $550,000 per grant depending on the fund's reserve. STAR loans received from the MTFC are to be amortized over a period of 10 years or less and offer competitive interest rates. The typical interest rate for a 10-year STAR loan is approximately three percent.

THIRD PARTY FINANCING

Third party financing may be appropriate in the case where the city would use a developer or tenant to finance construction projects. In this case, the third party would lease the structure for a period of years to the tenant paying the ground lease. According to the terms of the agreement, the city would receive ownership of the asset upon expiration of the lease. This method of financing preserves the city's cash to fund higher priority projects. Examples of projects that are funded in this manner include: T-hangars, private and/or corporate clear span hangars, and FBO/maintenance hangars.

BONDS

A variety of bonds can be issued to support airport development projects.

General Obligation (GO) Bonds

GO Bonds are backed by the creditworthiness and taxing power of the municipality operating at the airport. They usually bear low interest rates because of their high degree of security. However, state laws may limit a municipality's overall debt, and competition from other community financing requirements, may preclude their use for an airport project. Some states have an exemption from the debt limitation rule for general obligation bonds because they are used for a revenue-producing improvement project.

Revenue Bonds

Revenue Bonds pledge the revenues of an airport sponsor to the repayment of debt service. These are the most common sources of funding at larger commercial service airports. Revenue Bonds are popular because they do not burden the taxpayer or affect the bonding capacity of the municipality. However, their use is limited to airports with a sufficient operating surplus to cover the debt service. Project net revenues must exceed debt service requirements by at least 1.25 times and up to 2.0 times, depending on the strength of the bond issue and the underlying assumption with respect to the market risk for the bonds. Interest rates are dependent on the coverage ratio, but in any case, will be higher than for general obligation bonds.

Special Facility Revenue Bonds

Special Facility Revenue Bonds are normally issued by the airport sponsor for the construction of a facility for a third party and backed by the revenues generated from that facility. Examples of facilities include maintenance hangars, terminal buildings, and air cargo terminals.

Industrial Development Bonds (IDB)

IDBs can be issued by states, local government, or an airport authority to fund the construction of improvements to an airport industrial park or other facilities that may attract business and increase aeronautical or non-aviation related lease revenues at the airport.

LOCAL FUNDS

The remaining portion of project costs would be expected to be funded largely from local sources including airport revenues. The local share of project costs are typically derived from surplus revenue generated at the airport or with the budgeted allocations from the city's general fund to the airport account.

As a condition of accepting AIP funding grants, the city is required to maintain a fee structure that, given the circumstances of the airport, allows it to be as financially self-sustaining as possible. This also includes the ability and willingness to assess fair and reasonable fees for use of the facility.

2H2 benefits the community through rapid, accessible, and convenient transportation, as well as economic activity generated by the airport. These benefits are diffused throughout the region, thereby providing a common welfare to the region. Also, the airport encourages the exchange of goods and services supporting the notion that the airport is a business enterprise and should be self-sustaining. With the assistance of AIP funds, coupled with fair and equitable fees and charges, the CIP can be carried out in a financially feasible manner that will benefit both the airport and its users.

The following paragraphs include a discussion on the types of airport revenues to fund airport improvements.

City or Private Owned T-hangar Revenue

Rental rates for T-hangars can be established based on an appraisal rate or rate per square foot. The appraisal rate formula involves appraising the value of the land at the facility. The rate would be a percentage of the appraised value of that portion of land supporting the structure sufficient to equal the appraised value and to allow debt service obligations. Conversely, a rate per square foot can be a fixed rate or tied to the value of the land appraisal. For both methods, regular appraisals are recommended so that rates can reflect the increase in the value of the land as the facility grows. Additionally, as maintenance and operational costs increase, lease agreements are recommended to include escalation clauses to recover these cost for improvements and amortization. Where the structure is owned by a private entity, the tenant is recommended to be responsible for maintenance of the structure, as well as a specific amount of land adjacent to the structure.

Clear Span Hangar Revenue

The rental rate for these facilities can be based on an appraisal rate or rate per square foot. Additionally, various hangar rental rates can be based on the structure's locational advantages on the airport and its rental rates adjusted accordingly. Escalation clauses within the lease agreements are recommended in order to recover maintenance and operational costs, as well as amortization. Maintenance clauses, as discussed above, are also recommended as part of these lease agreements.

On-Airport Industrial/Commercial Business Revenue

Airport property is not to be released, transferred, or sold for private, industrial, or commercial uses. The city is recommended to lease land for such uses to desirable tenants in order to provide continuous income for the airport. As is common for most general aviation airports, commercial/industrial facility charges include a fixed rate (appraisal or rate per square foot) plus a percentage of sales. Percentage

of sales most general applies to commercial business, including restaurants or aircraft maintenance providers that deal in sales, while industrial establishments, not relying on local sales for revenue, provide fixed rate fees plus operational and maintenance costs through escalation clauses as part of the lease agreement. These rate structures allow the airport to benefit from the success of the businesses located there. The businesses recoup revenues due to the airport providing the necessary facilities which enable their business to be successful. Additional improvements to the airport, as provided by the city, will only enhance each firm's business outlook. In essence, the businesses are sharing in the cost of improvements in proportion to the financial success they experience as a result of the city's investment in the airport. Maintenance clauses, as well as insurance clauses (if applicable), are also recommended as part of these lease agreements.

Businesses located at the airport, now and in the future, are recommended to abide by established minimum performance standards, included as part of the lease agreement, which ensure that necessary services are provided and that the quality of services adequately promotes the airport's image.

Terminal Building Lease Revenue

Aviation service providers that might occupy space in the terminal building are recommended to be charged a fixed rate (per square foot) plus a percentage of sales fee structure, as is common for general aviation airports. Maintenance and escalation clauses, as well as minimum performance standards, are recommended to be included as part of a lease agreement.

Landing Fee Revenue

It is permissible for the city to establish landing fees by utilizing a compensatory model of rates and charges determination. In this approach, the user (large aircraft weighing in excess of 12,500 pounds maximum gross weight) is charged based on their actual use of the facility from which they derive a benefit. A fee is levied against the user to cover the corresponding expenses to maintain and operate the facility. The rate of the landing fee is based on the aircraft operator's prorated share of occupancy or usage. This share of usage may be based on the total weight of the aircraft or annual operational activity. A landing fee for large aircraft operators might be classified under an alternative term such as a ramp fee. It should be noted, these types of fess are not common at most general aviation airports.

Fuel Flow Revenue

As is common for many general aviation airports, fuel flowage revenue includes either a fixed fee per gallon of fuel dispensed or a percentage of total sales. An alternative method for determining an appropriate fuel royalty/flowage fee might include instituting a graduated percentage of gross fuel revenue collection method in lieu of a fixed fuel flowage fee to allow for seasonal variations, economic conditions, or supply and demand. As with any other commercial businesses based at the airport, fuel flowage fees are necessary because the proprietor derives a benefit from airport operation and should compensate the city accordingly.

Aircraft Parking/Tie-Down Revenue

A fixed fee for aircraft tie-downs is recommended to be administered on a daily, weekly, monthly, and annual basis. The fixed fee may take into account the size of aircraft based on it prorated share or occupancy of the aircraft apron.

Agricultural Leases

The city should receive fair market value for agricultural uses of airport property. The city is also entitled to receive the same rate as similar farmland in the area. Lease terms are recommended to last no longer than

five years. Two- to three-year terms are preferred because they allow the city to reassess the impact of the agricultural use on airport operations and development. Upon renewal of a lease, rates should be adjusted to reflect the fair market value of the land. All agricultural leases are recommended to contain an escape clause that allows the city to terminate the lease should the land be needed for aeronautical purposes. Finally, lease rates are generally based on a fixed price per acre of land.

It must be noted that existing federal grant assurances stipulate that all revenue generated at the airport will be expended exclusively for the operating costs of the airport including maintenance and improvement projects and debt service obligations. Federal grant assurances expressly forbid revenue generated on airport property from being transferred to any other city account and/or department.

COST ESTIMATES

Cost estimates for individual projects have been prepared for improvements that have been identified as necessary during the 20-year planning period. Facility costs have been formulated using unit prices extended by the size of the particular facility and tempered with specific considerations related to the region, the airport, and the development site. These estimates are intended for planning purposes only and should not be construed as construction costs estimates, which can only be compiled following the preparation of detailed engineering plans and specifications. All cost estimates presented in this report are based on the most recent 2015 costs.

The estimates are presented by the total cost for each development project that is part of the total cost anticipated to have AIP funding, that part to be borne by the City of Aurora, and that portion expected from private individuals or businesses. In addition to the local funds, the local share can include sources such as state or local economic development funds, regional commissions and organizations, and other units of local government.

As presented in **Tables 5.2**, **5.3** and **5.4**, the cost estimates for the 20-year planning period amount to approximately $10,786,000. The anticipated FAA share is $9,707,900 and the local funding is approximately $1,078,100. Of the local share, approximately $498,800 is expected to be spent on projects that will generate revenue and are typically funded by tenants or private developers. The projects listed in the cost tables below are eligible for NPE with some restrictions as there are some projects that will rank higher than others; therefore, those projects with higher project ranking will receive funding priority.

As identified in the following tables, the federal share includes expenditures of $2,600,100 during the short-term period (0-5 year) and $7,107,800 during the intermediate- and long-term period (6-20 year). This equates to an average annual expenditure of approximately $485,400 in federal dollars to fund the 20-year development plan. Most of these projects are only eligible for NPE and local funding resources. Currently, the airport only receives $150,000 per year in NPE; therefore, the timeline established will not be met without significant local funding. However, the projects are retained in the short-term for NPIAS planning purposes.

Of the local share, approximately $288,900 is required during the short-term period (0-5 year) and $789,200 during the intermediate- and long-term period (6-20 year). For the entire 20-year planning period, an estimated $53,900 per year will be required from local funding mechanisms.

Table 5.2
Short-Term (0-5 Years) Development Plan Project Costs

Project ID	Project Description	Total Cost	Federal	Local
A1	Install PAPI-2 for Runway 18-36	$139,000	$125,100	$13,900
A2	Remove Obstructions	$100,000	$90,000	$10,000
A3	Design T-Hangar (8-unit) & Taxilanes	$125,000	$112,500	$12,500
A4	Construct T-Hangar (8-Unit) & Taxilanes (Phase I)	$1,210,000	$1,089,000	$121,000
A5	Remove Shade T-Hangars (North)	$24,000	$21,600	$2,400
A6	Design Apron Improvements	$100,000	$90,000	$10,000
A7	Construct Terminal Area Apron	$694,000	$624,600	$69,400
A8	Rehabilitate Connector Taxiways and Remove Apron Pavement	$54,000	$48,600	$5,400
A9	Install AWOS	$250,000	$225,000	$25,000
A10	Acquire Land for BRL (west airfield)	$150,000	$135,000	$15,000
A11	Relocate Segmented Circle and Windcone	$43,000	$38,700	$4,300
	Short-Term CIP Costs	**$2,889,000**	**$2,600,100**	**$288,900**

Source: Lochner

Table 5.3
Intermediate-Term (6-10 Years) Development Plan Project Costs

Project ID	Project Description	Total Cost	Federal	Local
B1	Install Perimeter Fencing	$424,000	$381,600	$42,400
B2	Design/Construct Parallel Taxiway (3,001' x 25')	$100,000	$90,000	$10,000
B3	Design/Construct T-Hangar (8-Unit) & Taxilanes (Phase II)	$900,000	$810,000	$90,000
B4	Remove Shade T-Hangars (South)	$900,000	$810,000	$90,000
B5	Construct Clear Span Hangar (75' x 75'); Auto Parking and Apron Access	$46,000	$41,400	$4,600
B6	Acquire Land for Runway 36 Runway Protection Zone (2.5 acres)	$989,000	$890,100	$98,900
B7	Rehabilitate Runway 18-36 (3,001' x 60')	$290,000	$261,000	$29,000
	Intermediate Term CIP Costs	**3,649,000**	**3,284,100**	**364,900**

Source: Lochner

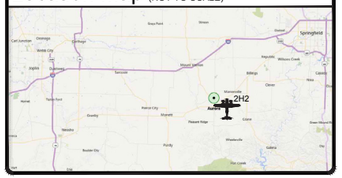
Table 5.4
Long-Term (11-20) Years Development Plan Project Costs

Project ID	Project Description	Total Cost	Federal	Local
C1	Environmental Assessment for Runway Expansion	$100,000	$90,000	$10,000
C2	Close E Highland Dr.	$55,000	$50,000	$5,000
C3	Design/Construct/Expand Runway 18-36 (3,600' x 60')	$1,000,000	$900,000	$100,000
C4	Overlay Runway 18-36 (3,001' x 60')	$554,000	$498,600	$55,400
C5	Land Acquisition for Runway Expansion (3.5 acres)	$250,000	$225,000	$25,000
C6	Design/Construct T-Hangar (8-Unit) & Taxilanes	$900,000	$810,000	$90,000
C7	Construct Clear Span Hangar (75' x 75'); Auto Parking and Apron Access	$989,000	$890,100	$98,900
C8	Expand Terminal Area Parking	$114,000	$102,600	$11,400
C9	Update Airport Beacon & Electrical Vault	$36,000	$32,400	$3,600
C10	Update Airport Master Plan	$250,000	$225,000	$25,000
	Long-Term CIP Costs	**$4,248,000**	**$3,823,700**	**$424,300**

Source: Lochner

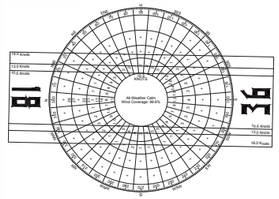
Exhibit 5.1 illustrates the phased development of 2H2's preferred capital improvement plan. The projects highlighted in **Tables 5.2**, **5.3** and **5.4** coincide with the improvements highlighted within the Phased Development Plan.

Location Map (NOT TO SCALE)



Vicinity Map (NOT TO SCALE)

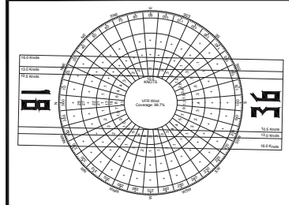
All Weather Wind Rose



Runway	Crosswind Component/ Corresponding ARC 10.5 Knots (A-I & B-I)	13.0 Knots (A-II & B-II)	16.0 Knots (A-III, B-III, C-I to D-III)
Runway 18-36	99.6	99.8%	99.9%

Source: National Climatic Data Center (NCDC), Integrated Surface Hourly/Integrated Surface Data (ISH/ISD) Wind Data Inventory; Springfield-Branson National Airport (SGF), Springfield, MO (2005-2014).

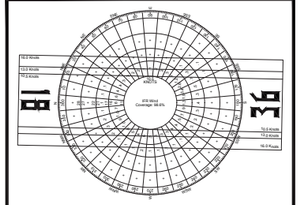
VFR Wind Rose



Runway	Crosswind Component/ Corresponding ARC 10.5 Knots (A-I & B-I)	13.0 Knots (A-II & B-II)	16.0 Knots (A-III, B-III, C-I to D-III)
Runway 18-36	99.7%	99.9%	100%

Source: National Climatic Data Center (NCDC), Integrated Surface Hourly/Integrated Surface Data (ISH/ISD) Wind Data Inventory; Springfield-Branson National Airport (SGF), Springfield, MO (2005-2014).

IFR Wind Rose



Runway	Crosswind Component/ Corresponding ARC 10.5 Knots (A-I & B-I)	13.0 Knots (A-II & B-II)	16.0 Knots (A-III, B-III, C-I to D-III)
Runway 18-36	98.6%	99.8%	100%

Source: National Climatic Data Center (NCDC), Integrated Surface Hourly/Integrated Surface Data (ISH/ISD) Wind Data Inventory; Springfield-Branson National Airport (SGF), Springfield, MO (2005-2014).

Airport Data

AIRPORT INFORMATION	EXISTING	ULTIMATE
Airport Elevation- Mean Sea Level (MSL)	1,433.6'	Same
Airport Reference Code (ARC)	B-I	B-I (Small)
Critical Aircraft	Piper PA-34 'Seneca'	Piper PA-34 'Seneca'
Airport Reference Point (ARP)	36-57-44.30 N, 93-41-43.20 W	36-57-47.22 N, 93-41-43.07 W
Instrument Approach Procedures	RNAV(GPS) & VOR/DME-A	RNAV(GPS)
Mean Maximum Air Temperature	90.5° F (July)	Same
Weather Reporting System	None	AWOS-III
Airport Electronic Aids	None	Same
NPIAS Category	General Aviation	Same
MOSASP Equivalent Service Role	Business	Same
Range and Township/Sections	T25N, R25W/17 and 8	Same
FAA Site Number	11530.1	Same
County	Lawrence	Same
Total Acreage (Fee Simple & Easements)	103.93 +/-	168.33 +/-

NGS Survey Monuments

PID NO.	DESIGNATOR	COORDINATES	MARKER	ELEV. (MSL)
PACS GF0944	ETHRIDGE	36-57-44.21 N, 93-41-40.25 W	I	1,429.0'
SACS GF0945	ETHRIDGE AZ MK	36-57-32.04 N, 93-41-38.50 W	I	1,427.0'

Source: NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/cgi-bin/airports.pl?TYPE=PACSAC); PACS-Primary Airport Control Station; SACS-Secondary Airport Control Station; I- Metal Rod

Runway End Coordinates

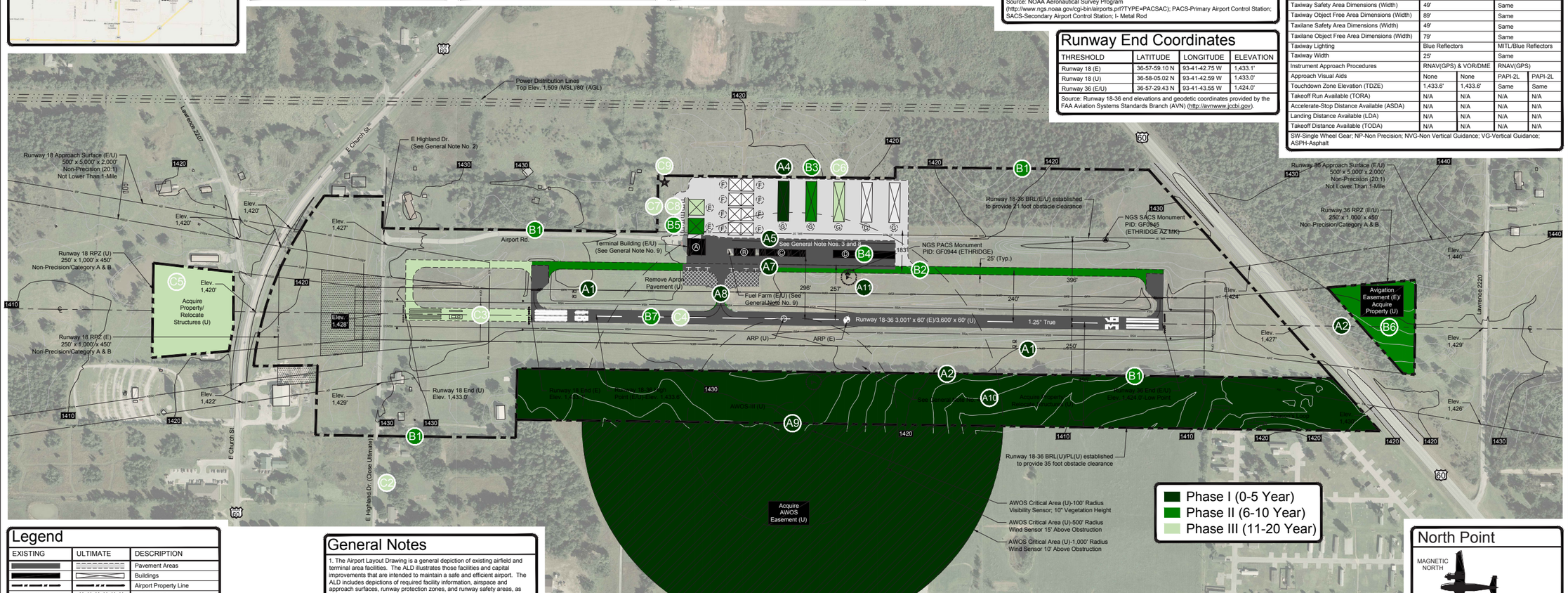
THRESHOLD	LATITUDE	LONGITUDE	ELEVATION
Runway 18 (E)	36-57-59.10 N	93-41-42.75 W	1,433.1'
Runway 18 (U)	36-58-05.02 N	93-41-42.59 W	1,433.0'
Runway 36 (E/U)	36-57-29.43 N	93-41-43.55 W	1,424.0'

Source: Runway 18-36 end elevations and geodetic coordinates provided by the FAA Aviation Systems Standards Branch (AVN) (http://avnwww.jccbi.gov).

Runway Data

RUNWAY DETAILS	RUNWAY 17-35 EXISTING 18	36	ULTIMATE 18	36
Airport Reference Code (ARC)	B-I		B-I (Small)	
Runway Design Code (RDC)	B-I-5000		Same	
Percent (%) Wind Coverage (10.5 Knots)	99.5%		**Same**	
Runway Azimuth	181.2° True	1.2° True	Same	Same
Runway Dimensions	3,001' x 60'		3,600' x 60'	
FAR Part 77 Approach Use Type	C	C	Same	Same
Aeronautical Survey Required for Approach	NVG	NVG	VG	VG
Approach Visibility Minimums	1-Mile	1-Mile	Same	Same
Approach Slope	20:1	20:1	Same	Same
Runway Safety Area (RSA)	3,481' x 120'		4,080' x 120'	
Runway Object Free Area (OFA)	3,481' x 250'		4,080' x 250'	
Runway Obstacle Free Zone (OFZ)	3,401' x 250'		4,000' x 250'	
Runway Pavement Strength (Thousands of lbs.)	12,500 (Utility)		Same	
Runway Pavement Material	ASPH		Same	
Runway Markings	NP	NP	Same	Same
Runway Gradient	0.3%	-0.3%	Same	Same
Runway Lighting	MIRL		MIRL/REILs	
Taxiway Design Group (TDG)	TDG-1A/1B		Same	
Taxiway Safety Area Dimensions (Width)	49'		Same	
Taxiway Object Free Area Dimensions (Width)	89'		Same	
Taxilane Safety Area Dimensions (Width)	49'		Same	
Taxilane Object Free Area Dimensions (Width)	79'		Same	
Taxiway Lighting	Blue Reflectors		MITL/Blue Reflectors	
Taxiway Width	25'		Same	
Instrument Approach Procedures	RNAV(GPS) & VOR/DME		RNAV(GPS)	
Approach Visual Aids	None	None	PAPI-2L	PAPI-2L
Touchdown Zone Elevation (TDZE)	1,433.6'	1,433.6'	Same	Same
Takeoff Run Available (TORA)	N/A	N/A	N/A	N/A
Accelerate-Stop Distance Available (ASDA)	N/A	N/A	N/A	N/A
Landing Distance Available (LDA)	N/A	N/A	N/A	N/A
Takeoff Distance Available (TODA)	N/A	N/A	N/A	N/A

SW-Single Wheel Gear; NP-Non Precision; NVG-Non Vertical Guidance; VG-Vertical Guidance; ASPH-Asphalt



Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Buildings
		Airport Property Line
		Easement(s)
BRL 35'	Same	Building Restriction Line (BRL)
RSA	RSA(U)	Runway Safety Area (RSA)
OFA	OFA(U)	Object Free Area (OFA)
RPZ	RPZ(U)	Runway Protection Zone (RPZ)
OFZ	OFZ(U)	Obstacle Free Zone (OFZ)
AS	AS(U)	Part 77 Approach Surface
	Same	Rotating Beacon
		PAPI-4L
		Wind Cone/Segmented Circle
		Runway Threshold Lighting
		Airport Reference Point (ARP)
x x	xx xx	Fenceline
		AWOS-III

Obstacle Free Zone (OFZ) Penetrations

There are no existing OFZ object penetrations.

Threshold Siting Surface Penetrations

There are no known existing TSS object penetrations.

Modifications to Design Standards

None required.

General Notes

1. The Airport Layout Drawing is a general depiction of existing airfield and terminal area facilities. The ALD illustrates those facilities and capital improvements that are intended to maintain a safe and efficient airport. The ALD includes depictions of required facility information, airspace and approach surfaces, runway protection zones, and runway safety areas, as well as, basic airport and runway data tables. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. Potential extension of Runway 18-36 to the north will require E Highland Dr. to be closed west of Airport Road. This is necessary to accommodate the runway's safety (RSA) and object free areas (OFA).

3. Due to the proximity of the airport's terminal building and T-Hangars to Runway 18-36, these structures penetrate the airport's FAR Part 77 Transitional Surfaces. Therefore, the terminal building is recommended to be fitted with red obstruction lighting. However, because the T-Hangars will be relocated during the short-term planning period (0-5 year), obstruction lights for these buildings will be at the discretion of the city and MoDOT.

4. Due to the proximity of the treeline to the east and west of Runway 18-36, these obstacles penetrate the airport's FAR Part 77 Primary and Transitional Surfaces. Therefore, these trees are recommended to be removed during the short-term planning period (0-5 year).

5. Per FAA AC 150/5300-13A, paragraph 313, the runway meets line of sight requirements.

6. NAVD88 vertical control datum used for vertical control surveying.

7. Airport Reference Point coordinates reflect GEO83A calculations, in North American Datum (NAD83).

8. Ultimate tie downs are not depicted on this drawing as they are to be placed where the existing hangars currently are. These tie downs will be shown once the completion of the removal and relocation of the existing hangars occurs.

9. In the event the parallel taxiway is built, the terminal building and fuel farm would likely be required to be relocated outside of the Taxiway Object Free Area (TOFA). The future location of the terminal building and fuel farm will be determined once development of the taxiway is imminent.

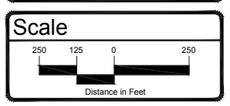
Buildings

EXISTING	ULTIMATE	DESCRIPTION
A	Same	Terminal Building/Clear Span Hangar
B	Relocate	T-Hangar(s)
C	Relocate	T-Hangar(s)
D	Relocate	T-Hangar(s)
--	E	75' x 75' Clear Span Hangar(s)
--	F	60' x 60' Clear Span Hangar(s)
--	G	8-unit T-Hangar(s)

MoDOT Approval Stamp

North Point

Scale



Sponsor Approval Stamp

For Approval by:

CITY OF AURORA, MISSOURI

Signed by: _____ Dated: _____

Donna Reed
City Clerk/Airport Administrator

LOCHNER
16105 W 113th Street | Suite 107 | Lenexa, Kansas 66219
P 816.945.5840 | F 816.945.5841 | www.hwlochner.com

JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

AIRPORT LAYOUT DRAWING
Exhibit 5.1 - Phased Development Plan

HWL PROJECT NO.	00009343
AGENCY PROJECT NO.	MoDOT No. 13-091B-2
DRAWN BY	MAW
CHECKED BY	MAW
DESIGNED BY	CTM/MAW
REVISIONS	DATE
SUBMITTAL DATE	12/29/2017

SHEET 1 OF 1

Drawing Name: I:\KAC\PRJ\00000\9343\01\AP\DWG\ALP Update\2H2 ALP Update_Phased Development Plan.dwg Mar 17,2018 - 3:17pm

Airport Layout Plans

The Airport Layout Plan (ALP) drawings for 2H2 depict the current and proposed facility expansion necessary for the safe and efficient utilization of the airport while at the same time accommodating projected aviation demand. The proposed capital improvements depicted within the ALP are derived from the master plan's findings and recommendations from the aviation demand forecasts, facility requirements and development alternatives.

The primary functions of the ALP that define its purpose include:

- An approved ALP is necessary in order for the airport to receive financial assistance from the FAA under the terms of the Airport and Airway Improvement Act of 1982 (AIP) and/or grants from the Missouri State Aviation Trust Fund. The city is required to keep the ALP current and follow the preferred development concept, which reflect grant assurance requirements of the AIP.
- An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP also provides a guideline by which the city can ensure that airport improvements are implemented in accordance with the FAA's design standards and safety requirements.
- The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a point of reference for considerations regarding land use proposals, land acquisition and budgetary allocations and planning improvements at the airport. It also allows MoDOT and FAA to anticipate long-term operational and maintenance needs for the facility. The approved ALP will also enable the city to protect the airport's airspace surfaces, thereby preserving the facility's airspace infrastructure.
- The ALP is a working tool to be utilized by the city, including city personnel, airport management staff, and airport board members, as well as airport stakeholders.

Lastly, the approved ALP provides detailed information for the city regarding applicable Federal Aviation Regulations (FAR), airport design criteria, airfield and terminal area facilities, airspace structure and land use, terminal area characteristics, obstructions to air navigation and existing and/or future property interests.

AIRPORT LAYOUT DRAWING

The Airport Layout Drawing (ALD) depicts existing and ultimate airfield and terminal area development based on proposed capital improvement recommendations for the short, intermediate and long-term planning periods. The ALD illustrates those capital improvements that are intended to maintain a safe and operationally efficient facility. The proposed improvements are intended to ensure the airport remains capable of accommodating current and projected aviation demand throughout the 20-year planning period. The ALD includes depictions of required facility information, airspace and approach surfaces, runway protection zones, and runway safety areas, as well as basic airport and runway data tables.

The ALD and discussion provided in the following passages describes the major elements of the preferred airport development concept. The Title Sheet is also included for reference as to the number and name of each sheet within the ALP set.

RUNWAY SYSTEM

The airfield layout consists of a single paved runway, Runway 18-36 situated in a north-south orientation. Runway 18-36 is expected to be extended to 3,600 feet at some point within the planning period and remain capable of accommodating 100 percent of the general aviation aircraft fleet weighing less than 12,500 pounds. Runway 18-36 is also expected to continue to serve primarily small single- and twin-engine piston aircraft weighing less than 12,500 pounds.

TAXIWAY SYSTEM

The taxiway system consists of 25-foot turnarounds at each runway end. Ultimately, Runway 18-36 is recommended to be served by a 25-foot wide full parallel taxiway. The future parallel taxiway centerline is recommended to be situated 240 feet from the runway centerline. The future taxiway system is recommended to be equipped with medium intensity taxiway lighting (MITL).

NAVAIDS AND AIRFIELD LIGHTING

Runway 18-36 is a non-precision runway capable of accommodating (RNAV) GPS approach procedures to both runway thresholds. The GPS approaches to both thresholds allow lateral and vertical navigation LNAV approach procedures with minimum visibilities not less than 1-mile and minimum descent altitudes of 630 feet AGL. These approaches will likely remain intact for the duration of the planning period.

A future four-box PAPI visual guidance system serving both ends of Runway 18-36 is also recommended for installation within the planning period.

TERMINAL AREA DEVELOPMENT

Ultimately, the airport's terminal area will experience significant operational improvements and redevelopment. These changes are expected to include relocating the terminal building, construction and demolition of new T-hangar structures, new stand-alone box (executive-type) hangars ranging in size from 60' x 60' to 75' x 75', and additional apron area for aircraft parking and maneuvering.

In order to increase the operational efficiency and address taxiway object free area encroachment issues of the terminal building, the existing facility is recommended to be relocated beyond this conflicting area. Reconfiguration of the auto parking facilities will accompany the terminal building improvements.

Finally, reconfiguration of the aircraft parking apron to increase aircraft storage needs will be conducted in the area previously occupied by the shade hangars.

LAND ACQUISITION

The preferred development concept is expected to involve the acquisition of approximately 2.5 acres in fee simple located to the south of U.S. Highway 60 and within the Runway 36 RPZ. Approximately 3.5 acres located north of Business Highway 60, and inside the Runway 18 RPZ, are also recommended for purchase. According to FAA guidelines, RPZs are to be free and clear of any structure, property or places of public assembly.

In addition, nearly 64 acres of easements and fee simple property located to the west of the airport are recommended for acquisition to protect the airport's airspace surfaces and accommodate clear areas for the proposed AWOS facility.

AIRSPACE DRAWING

2H2's airspace drawing is based on FAR Part 77, Objects Affecting Navigable Airspace. The provisions of FAR Part 77 have been enacted to protect the airport's airspace infrastructure from objects and structures that represent an obstruction to air navigation in an effort to control the heights of objects in the vicinity of the airport. When penetrated, these imaginary surfaces identify an object as an obstruction or hazard to air navigation. The Airspace Drawing depicts the airport's Part 77 surfaces and provides plan and profile views as they relate to the airport and the surrounding area. This airspace drawing is based specifically on the planned runway lengths, as well as planned instrument approach procedures for each runway end. Runway 18-36 is depicted as having 34:1 non-precision instrument approaches.

INNER PORTION OF THE APPROACH SURFACE DRAWING

These drawings are intended to provide a detailed view of the inner portion of the Part 77 approach surfaces. The Inner Portion of the Approach Surface Drawing(s) provides a large scale profile and plan view of the inner approach surfaces for each runway end and facilitates identification of roadways, utilities, railroads, structures and existing, as well as potential property interests. The inner approach drawings also detail the size and location of the Runway Safety Areas (RSA), Object Free Area (OFA), Runway Protection Zones (RPZ), Obstacle Free Zones (OFZ), and illustrate the existing and future location of the runway thresholds. Lastly, the inner approach surface drawings are based on the planned length and the type of approach established for each runway approach end.

RUNWAY CENTERLINE PROFILE DRAWING

The Runway Centerline Profile Drawing includes a plan and profile view of the existing and ultimate runway alignment which delineates the runway's line-of-sight attributes including runway end elevations, effective runway gradient, section gradient, touchdown zone elevations (TDZ) and runway high and low point elevations.

TERMINAL AREA DRAWING

The Terminal Area Drawing presents the terminal area's existing and future configuration.

GENERAL AVIATION TERMINAL BUILDING

The existing terminal building, co-located with the Aurora Aviation FBO, is situated along the north side of the aircraft apron. Given its location within the appropriate taxiway object free area, the terminal building is considered to be non-standard based on design criteria and should be moved further east to

accommodate such criteria. Additionally, until relocation, this structure penetrates FAR Part 77 surfaces; thus, should be lighted until such time that it can be relocated.

AIRCRAFT APRON

From an operational and spatial standpoint, the airport's 3,855 square yard parking apron is insufficient to accommodate peak hour transient demand throughout the planning period. Ultimately, the apron is recommended to be expanded to 7,500 square yards which will feature reconfigured tie-down spaces. The future apron is expected to be capable of accommodating various size single- and smaller twin-engine aircraft tie-downs.

HANGAR FACILITIES

Given the projected based aircraft demand, 42 nested T-hangars totaling nearly 60,000 square feet of space and 10 box hangars totally nearly 40,000 square feet of space are recommended for development throughout the planning period. Construction for both hangar types will take place to the south and east of the terminal building and aircraft apron. Also, given the potential for future based turbo-prop aircraft, eight 3,600 square foot clear span hangars will be proposed for development starting during the 6-10 year planning period.

SUPPORT AND OTHER FACILITIES

The airport's fuel farm is located just north of the most northern shade hangar. The fuel farm consists of one above-ground tank capable of storing 8,500 gallons of 100 LL fuel. Should the need and/or demand arise, the city and/or the FBO would be recommended to acquire a 500 to 1,000 gallon capacity fuel truck to dispense Jet-A for locally based and/or transient turbine aircraft. Acquisition of the fuel truck would be accompanied by the construction of a 30' x 46' fuel truck parking area/spill containment berm. Ideally, this area would be located adjacent to the fuel farm and aircraft apron.

LAND USE DRAWING

The Land Use Drawing depicts the existing and recommended land uses within the existing and ultimate airport property boundary. The main purpose of the land use drawing is to provide the airport sponsor a plan to coordinate land uses conducive to airside development and those landside areas available to be leased for revenue producing purposes. Lastly, the land use drawing provides guidance to local community and county authorities for establishing compatible land uses in the vicinity of 2H2.

According to the forecasted projections, the anticipated operational activity at 2H2 is well below the threshold of 90,000 annual piston operations and/or 700 annual jet operations requiring the need to create a Noise Exposure Map (NEM). Accordingly, based on projected operational activity, the preferred airfield alternative is not expected to create adverse cumulative noise impacts within the immediate vicinity of the airport. Therefore, the 65 DNL noise contour is not depicted on the airport's land use drawing.

PROPERTY MAP

The Property Map presents the existing and ultimate airport property tracts including the acreage of each parcel, how the airport property was acquired (i.e., Federal AIP funds versus local funding), when each tract of land was acquired, and the existing ownership status of proposed property acquisitions. The property map serves as a guide for the city to analyze the current and future utilization of land acquired with Federal and/or state funding grants.

2H2's property consists of 11 tracts totaling 97 acres held as fee simple ownership and three additional

tracts totaling approximately seven acres of avigation easement. As noted above, the preferred development concept is expected to include the acquisition of approximately three acres south of U.S. Highway 60 and another 3.5 acres north of Business Highway 60 (E Church St.) in fee simple ownership. Recommended land acquisition to the west of the airport includes fee simple purchase of land to protect the runway's airspace surfaces and totals nearly 28 acres. The remaining acquisition will consist of easements for the AWOS totaling 36 acres.

40:1 DEPARTURE SURFACE DRAWING

The 40:1 Departure Surface Drawing depicts the plan and profile view of the current and ultimate 40:1 departure surfaces to provide information on existing and potential obstructions to the engine-out departures on instrument procedure for Runway 18-36.

The departure surface for Runway 18 is penetrated by two obstacles – one area of trees and one area due to a power distribution line. The Runway 36 departure surface is penetrated by three obstacles which include multiple stands of trees located south of the runway.

SUMMARY

The recommended development concept, as presented in the following ALP drawings, has been developed in conjunction with the city, airport board and planning advisory committee. This concept was developed based on demand projections and a facility requirements assessment which indicated the need to implement extensive taxiway improvements to serve Runway 18-36; install a PAPI-4 to each runway end; expand the runway to 3,600 feet in length; acquire property north and south of the airport within the RPZ to each runway; acquire fee simple property and easements to the west of the airport; and perform significant terminal area improvements throughout the 20-year planning period.

Airport Layout Plan
for the
Jerry Sumners Sr.
Aurora Municipal Airport (2H2)
Aurora, Missouri
MoDOT No. 13-091B-2

Index of Drawings

LOCHNER
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P 816.945.5840 | F 816.945.5841 | www.hwlochner.com

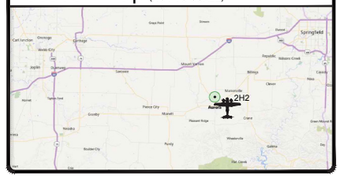
JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

TITLE SHEET

HWL PROJECT NO. 00009343
AGENCY PROJECT NO. MoDOT No. 13-091B-2
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY CTM/MAW
REVISIONS DATE
SUBMITTAL DATE 12/29/2017

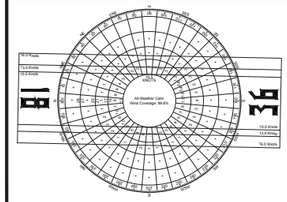
1

Location Map (NOT TO SCALE)



Vicinity Map (NOT TO SCALE)

All Weather Wind Rose



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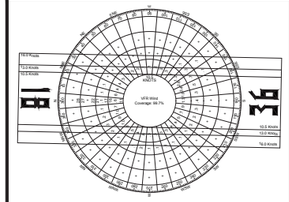
Runway 18-36	99.5%	99.7%	99.9%

Source: National Climatic Data Center (NCDC), Integrated Surface Hourly/Integrated Surface Data (ISH/ISD) Wind Data Inventory; Springfield-Branson National Airport (SGF), Springfield, MO (2005-2014).

VFR Wind Rose



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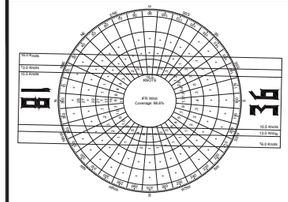

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Source: National Climatic Data Center (NCDC), Integrated Surface Hourly/Integrated Surface Data (ISH/ISD) Wind Data Inventory; Springfield-Branson National Airport (SGF), Springfield, MO (2005-2014).

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Mean Maximum Air Temperature	90.5° F (July)	Same
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MOSASP Equivalent Service Role	Business	Same
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NGS Survey Monuments

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Runway End Coordinates

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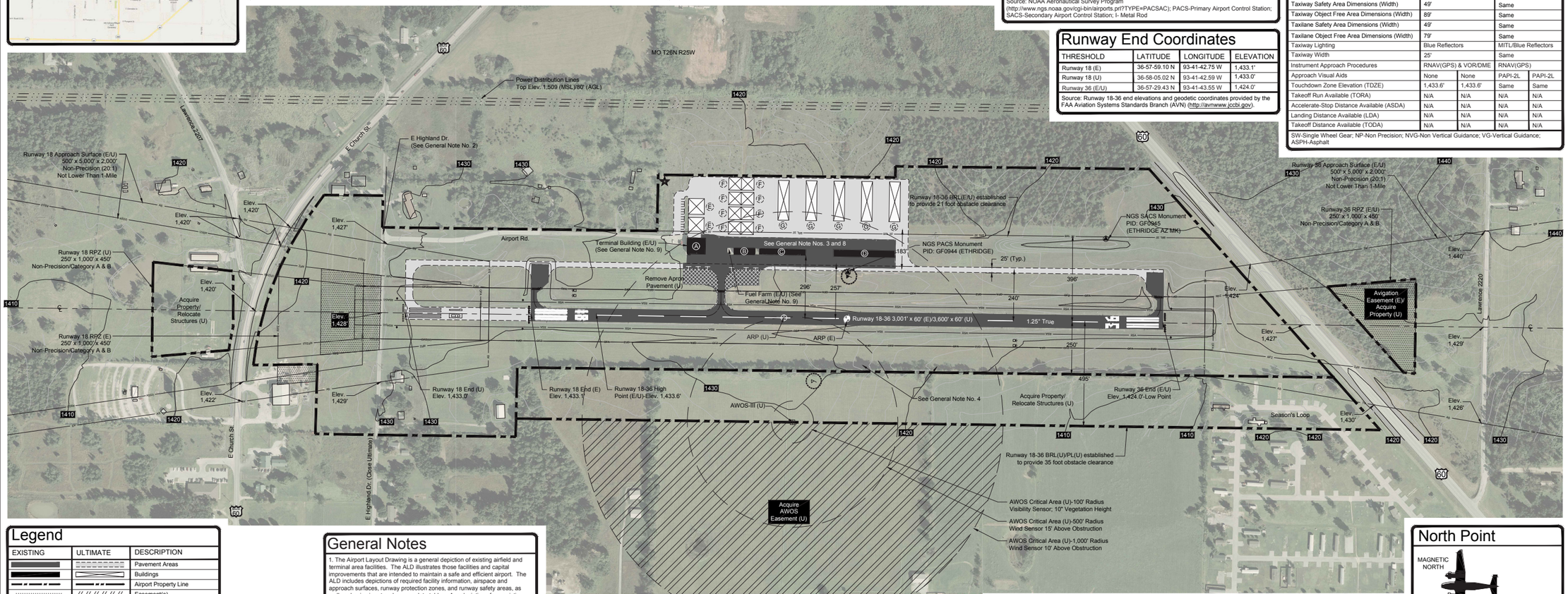
Runway Data

RUNWAY DETAILS	RUNWAY 17-35 EXISTING		RUNWAY 17-35 ULTIMATE	
	18	36	18	36
Airport Reference Code (ARC)	B-I		B-I (Small)	
Runway Design Code (RDC)	B-I-5000		Same	
Percent (%) Wind Coverage (10.5 Knots)	99.5%		Same	
Runway Azimuth	181.2° True	1.2° True	Same	Same
Runway Dimensions	3,001' x 60'		3,600' x 60'	
FAR Part 77 Approach Use Type	C	C	Same	Same
Aeronautical Survey Required for Approach	NVG	NVG	VG	VG
Approach Visibility Minimums	1-Mile	1-Mile	Same	Same
Approach Slope	20:1	20:1	Same	Same
Runway Safety Area (RSA)	3,481' x 120'		4,080' x 120'	
Runway Object Free Area (OFA)	3,481' x 250'		4,080' x 250'	
Runway Obstacle Free Zone (OFZ)	3,401' x 250'		4,000' x 250'	
Runway Pavement Strength (Thousands of lbs.)	12,500 (Utility)		Same	
Runway Pavement Material	ASPH		Same	
Runway Markings	NP	NP	Same	Same
Runway Gradient	0.3%	-0.3%	Same	Same
Runway Lighting	MIRL		MIRL/REILs	
Taxiway Design Group (TDG)	TDG-1A/1B		Same	
Taxiway Safety Area Dimensions (Width)	49'		Same	
Taxiway Object Free Area Dimensions (Width)	89'		Same	
Taxilane Safety Area Dimensions (Width)	49'		Same	
Taxilane Object Free Area Dimensions (Width)	79'		Same	
Taxiway Lighting	Blue Reflectors		MITL/Blue Reflectors	
Taxiway Width	25'		Same	
Instrument Approach Procedures	RNAV(GPS) & VOR/DME		RNAV(GPS)	
Approach Visual Aids	None	None	PAPI-2L	PAPI-2L
Touchdown Zone Elevation (TDZE)	1,433.6'	1,433.6'	Same	Same
Takeoff Run Available (TORA)	N/A	N/A	N/A	N/A
Accelerate-Stop Distance Available (ASDA)	N/A	N/A	N/A	N/A
Landing Distance Available (LDA)	N/A	N/A	N/A	N/A
Takeoff Distance Available (TODA)	N/A	N/A	N/A	N/A

SW-Single Wheel Gear; NP-Non Precision; NVG-Non Vertical Guidance; VG-Vertical Guidance; ASPH-Asphalt



Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Buildings
		Airport Property Line
		Easement(s)
BRL 35'	Same	Building Restriction Line (BRL)
RSA	RSA(U)	Runway Safety Area (RSA)
OFA	OFA(U)	Object Free Area (OFA)
RPZ	RPZ(U)	Runway Protection Zone (RPZ)
OFZ	OFZ(U)	Obstacle Free Zone (OFZ)
AS	AS(U)	Part 77 Approach Surface
	Same	Rotating Beacon
		PAPI-2L
		Wind Cone/Segmented Circle
		Runway Threshold Lighting
		Airport Reference Point (ARP)
		Fenceline
		AWOS-III

Obstacle Free Zone (OFZ) Penetrations

There are no existing OFZ object penetrations.

Threshold Siting Surface Penetrations

There are no known existing TSS object penetrations.

Modifications to Design Standards

None required.

General Notes

1. The Airport Layout Drawing is a general depiction of existing airfield and terminal area facilities. The ALD illustrates those facilities and capital improvements that are intended to maintain a safe and efficient airport. The ALD includes depictions of required facility information, airspace and approach surfaces, runway protection zones, and runway safety areas, as well as, basic airport and runway data tables. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. Potential extension of Runway 18-36 to the north will require E Highland Dr. to be closed west of Airport Road. This is necessary to accommodate the runway's safety (RSA) and object free areas (OFA).

3. Due to the proximity of the airport's terminal building and T-Hangars to Runway 18-36, these structures penetrate the airport's FAR Part 77 Transitional Surfaces. Therefore, the terminal building is recommended to be fitted with red obstruction lighting. However, because the T-Hangars will be relocated during the short-term planning period (0-5 year), obstruction lights for these buildings will be at the discretion of the city and MoDOT.

4. Due to the proximity of the treeline to the east and west of Runway 18-36, these obstacles penetrate the airport's FAR Part 77 Primary and Transitional Surfaces. Therefore, these trees are recommended to be removed during the short-term planning period (0-5 year).

5. Per FAA AC 150/5300-13A, paragraph 313, the runway meets line of sight requirements.

6. NAVD88 vertical control datum used for vertical control surveying.

7. Airport Reference Point coordinates reflect GEO83A calculations, in North American Datum (NAD83).

8. Ultimate tie downs are not depicted on this drawing as they are to be placed where the existing hangars currently are. These tie downs will be shown once the completion of the removal and relocation of the existing hangars occurs.

9. In the event the parallel taxiway is built, the terminal building and fuel farm would likely be required to be relocated outside of the Taxiway Object Free Area (TOFA). The future location of the terminal building and fuel farm will be determined once development of the taxiway is imminent.

Buildings

EXISTING	ULTIMATE	DESCRIPTION
A	Same	Terminal Building/Clear Span Hangar
B	Relocate	T-Hangar(s)
C	Relocate	T-Hangar(s)
D	Relocate	T-Hangar(s)
--	E	75' x 75' Clear Span Hangar(s)
--	F	60' x 60' Clear Span Hangar(s)
--	G	8-unit T-Hangar(s)

MoDOT Approval Stamp

Sponsor Approval Stamp

For Approval by:

CITY OF AURORA, MISSOURI

Signed by: _____ Dated: _____

Donna Reed
City Clerk/Airport Administrator

North Point

Magnetic Declination: 1° 22' E (2015)
Annual Rate of Change: 0° 6' W

Scale

250 125 0 250

Distance in Feet

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JERRY SUMNERS SR. AURORA MUNICIPAL AIRPORT (2H2)

Aurora, Missouri

AIRPORT LAYOUT DRAWING

HWL PROJECT NO.	00009343
AGENCY PROJECT NO.	MoDOT No. 13-091B-2
DRAWN BY	MAW
CHECKED BY	MAW
DESIGNED BY	CTM/MAW

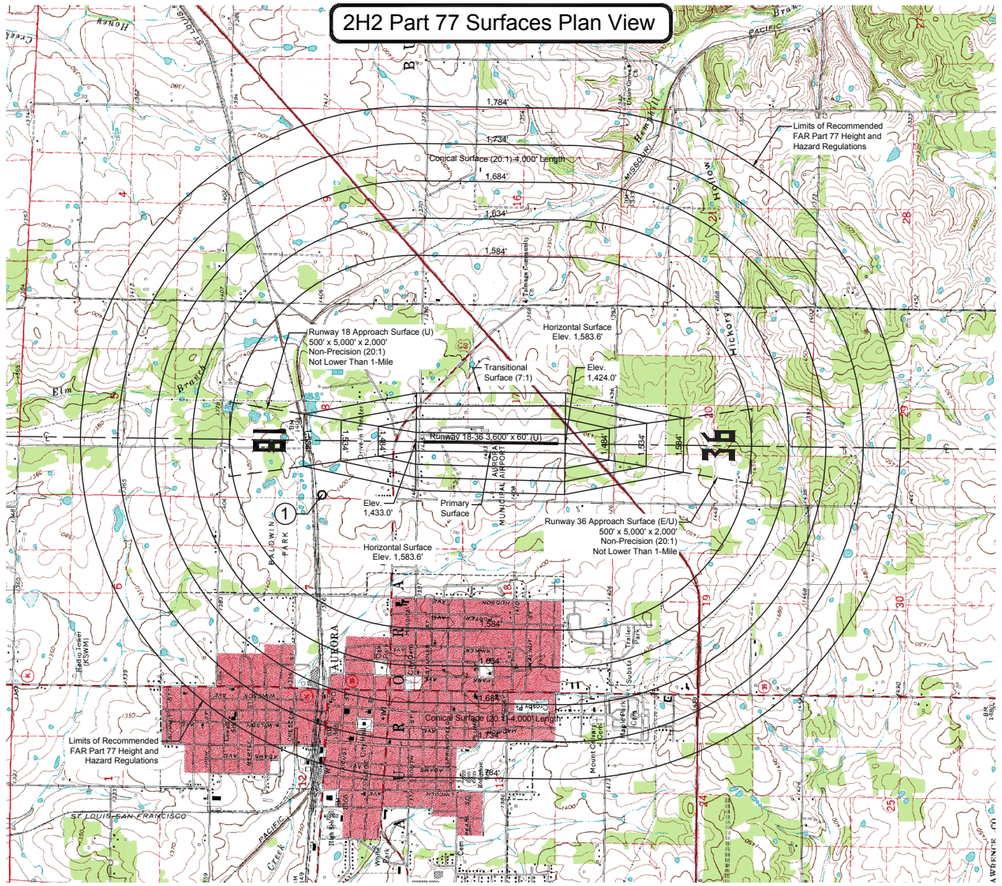
REVISIONS DATE

SUBMITTAL DATE 12/29/2017

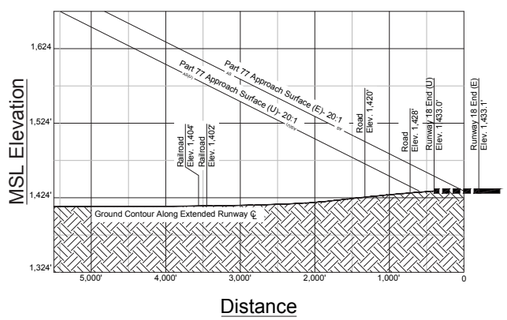
SHEET 2 OF 9

Drawing Name: I:\KAC\PRJ\00000934\3\01\AP\DWG\ALP Update\2H2 ALP Update_2017.dwg Mar 17,2018 - 3:51pm

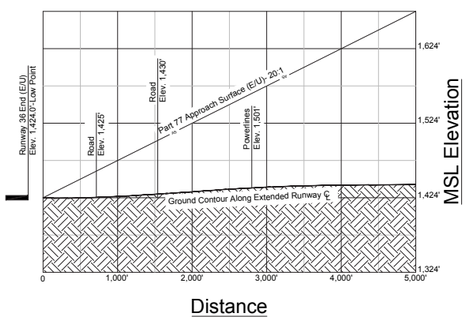
2H2 Part 77 Surfaces Plan View



Runway 18 Approach Profile View



Runway 36 Approach Profile View



Obstruction Data Table

NO.	DESCRIPTION	STUDY NO.	LATITUDE	LONGITUDE	MSL ELEV.	AGL ELEV.	PENETRATION	SURFACE	DISPOSITION
①	Grain Elevator	N/A	36-58-31.43 N	93-42-00.44 W	1,603.2'	1,402'	19.6 feet	Horizontal	Aeronautical Study

General Notes

1. Contour elevation information derived from the following Kansas USGS 7.5 minute topographic quadrangle maps: Aurora, MO.

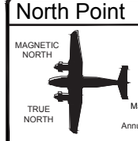
2. Latest AGIS Survey conducted on August 29, 2014.

2. Per Federal Grant Assurances No. 20 and 21, the City of Aurora, in cooperation with Lawrence County, are recommended, at a minimum, to enact height and hazard ordiances based on Federal Aviation Regulation (FAR) Part 77 Surfaces in order to protect and prevent development of airport hazards both on and around the airport and especially in the approach and departures areas of the runway to the extent possible.

3. Refer to the Inner Portion of the Approach Surface Drawings for obstruction information located within the inner 2,000 foot portion of the approach surfaces and beyond the RPZs for Runway 18-36.

4. Refer to sheet 9 for obstruction information and penetrations to the 40:1 Departure Surfaces for Runway 18-36.

North Point



Magnetic Declination:
1° 22' E (2015)
Annual Rate of Change:
0° 6' W

Scale

2,000 1,000 0 2,000

Distance in Feet
Horizontal Scale 1"= 1,000'
Vertical Scale 1"= 100'

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JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

AIRSPACE DRAWING

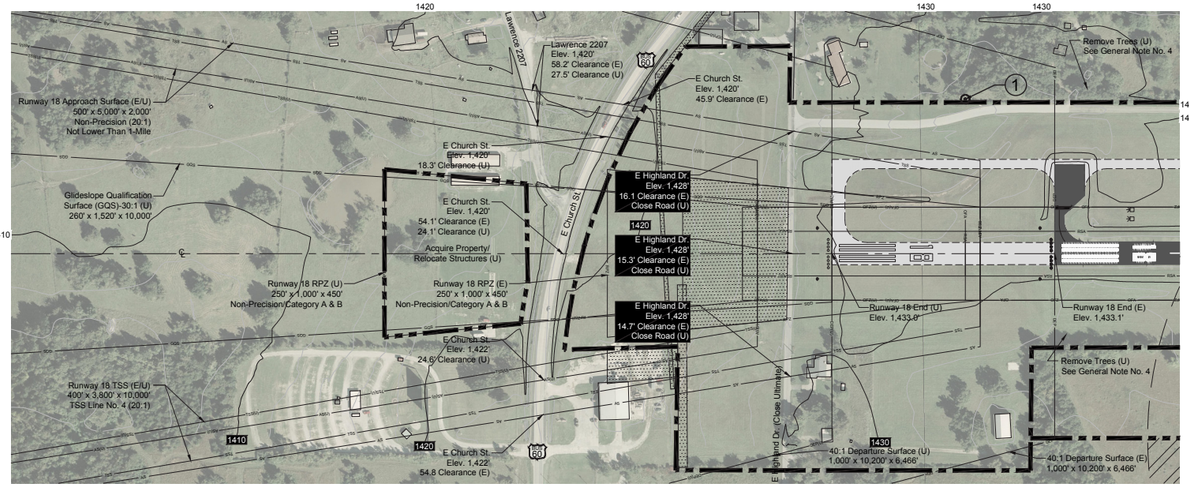
HWL PROJECT NO. 00009343
AGENCY PROJECT NO. MoDOT No. 13-091B-2
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY CTM/MAW

REVISIONS	DATE

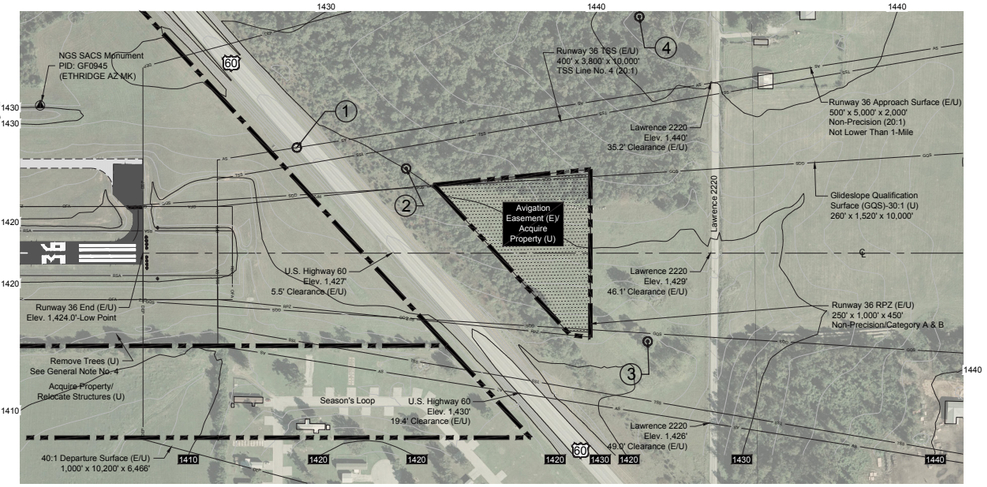
SUBMITTAL DATE 12/29/2017

3

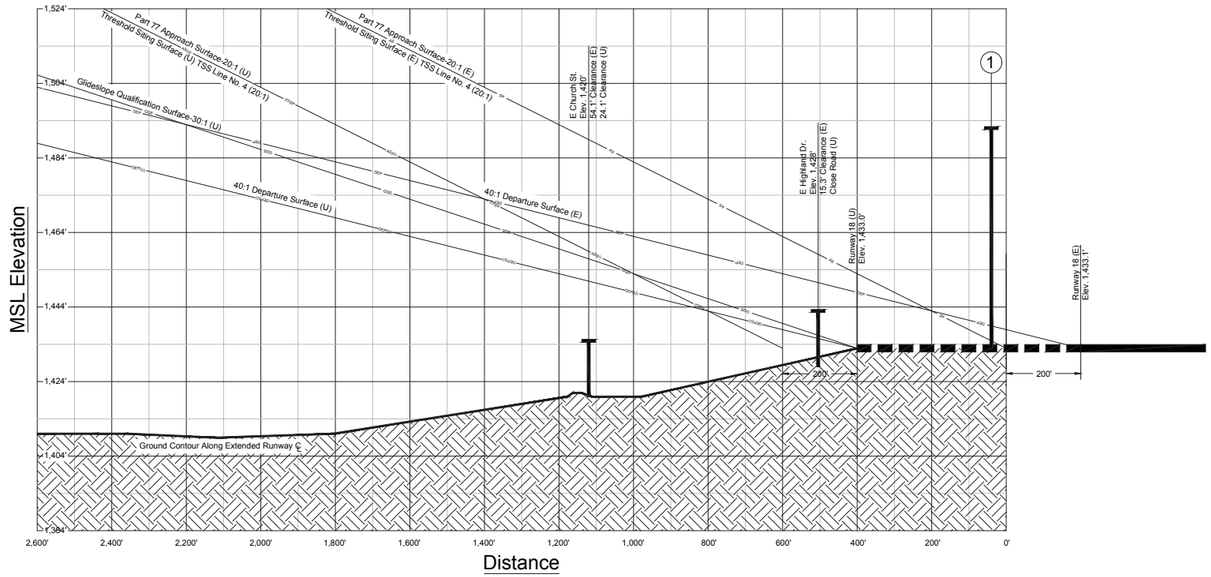
Runway 18 End Plan View



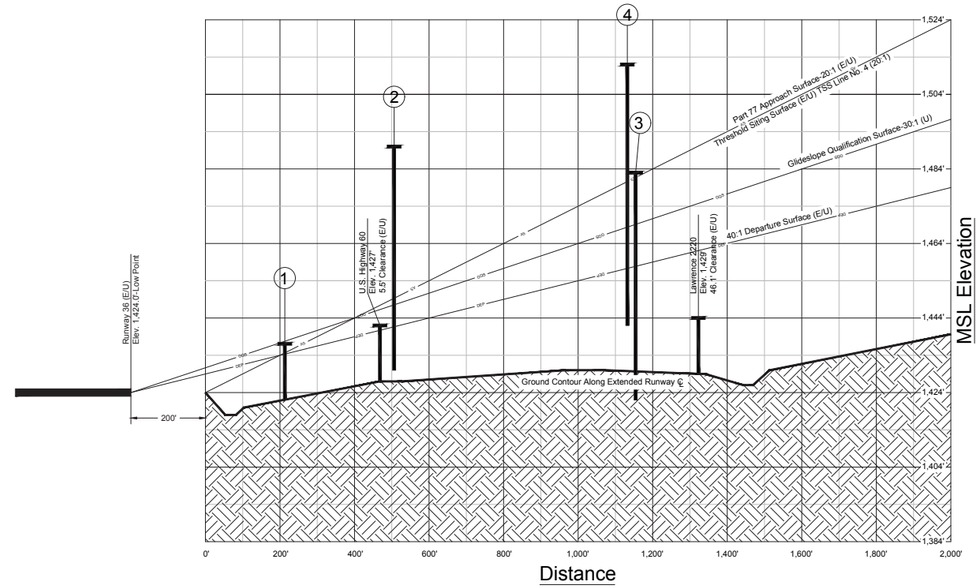
Runway 36 End Plan View



Runway 18 End Profile View



Runway 36 End Profile View



Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
	Same	Structures
		Airport Property Line
RSA	RSA (U)	Runway Safety Area (RSA)
OFA	OFA (U)	Object Free Area (OFA)
RPZ	RPZ (U)	Runway Protection Zone (RPZ)
OFZ	OFZ (U)	Obstacle Free Zone (OFZ)
AS	AS (U)	Approach Slope Surface
TSS	TSS (U)	Threshold Siting Surface
DEP	DEP (U)	40:1 Departure Surface
		Runway Threshold Lighting
		PAPI-4L
		Runway End Indicator Lights (REIL)
x x	xx xx	Fenceline
	Same	Traverse Way/Significant Object

Runway 18 Obstruction Data Table

ITEM	DESCRIPTION	DEND	DCL	TOP ELEV.	PENETRATION	SURFACE	LIGHTING	MITIGATION
1	Numerous Trees	240 feet	414 feet L	1,492' MSL	35.5 feet	Transitional	None	Remove

DEND- Distance from Runway End; DCL- Distance from Runway Centerline; VGSI- Vertical Guidance Slope Indicator

General Notes

1. The IPASD is a general representation of existing conditions within the inner portion of the approach slope surface pertaining to traverse ways, runway safety area dimensions, terrain relief and structure location. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet. The existing calculated clearances over U.S. Highway 60, Lawrence 2220, E Highland Dr. and U.S. Business 60 (E Church St.) reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.

3. Potential extension of Runway 18-36 to the north will require E Highland Dr. to be closed west of Airport Road. This is necessary to accommodate the runway's safety (RSA) and object free areas (OFA).

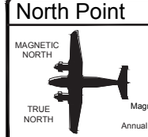
4. Due to the proximity of the treeline to the east and west of Runway 18-36, these obstacles penetrate the airport's FAR Part 77 Primary and Transitional Surfaces. Therefore, these trees are recommended to be removed during the short-term planning period (0-5 year).

Runway 36 Obstruction Data Table

ITEM	DESCRIPTION	DEND	DCL	TOP ELEV.	PENETRATION	SURFACE	LIGHTING	MITIGATION
1	U.S. Highway 60	412 feet	216 feet R	1,424' MSL	4.5 feet	Approach/TSS	None	Install VGSI
2	Numerous Trees	706 feet	173 feet R	1,490.4' MSL	41.1 feet	Approach/TSS	None	Remove/VGSI
3	Numerous Trees	1,354 feet	237 feet L	1,482.5' MSL	0.8 foot	Approach/TSS	None	Remove/VGSI
4	Numerous Trees	1,331 feet	635 feet R	1,512.4' MSL	33.5 feet	Transitional	None	Remove/VGSI

DEND- Distance from Runway End; DCL- Distance from Runway Centerline; VGSI- Vertical Guidance Slope Indicator

North Point



Magnetic Declination:
1° 22' E (2015)
Annual Rate of Change:
0° 6' W

Scale

200 100 0 200

Distance in Feet
Horizontal Scale 1"= 200'
Vertical Scale 1"= 20'

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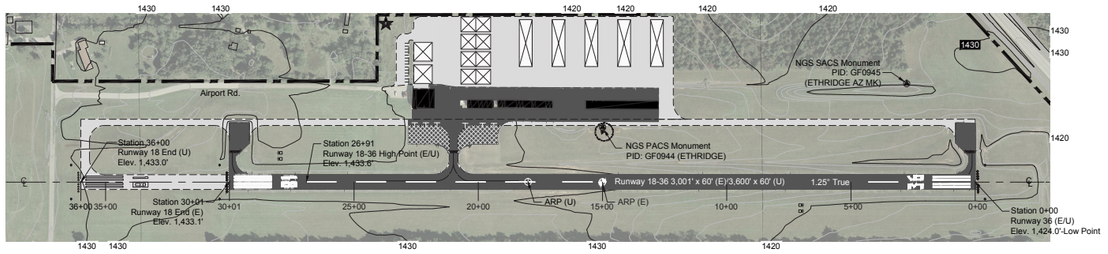
JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

RUNWAY 18-36 INNER PORTION OF THE APPROACH SURFACE DRAWING

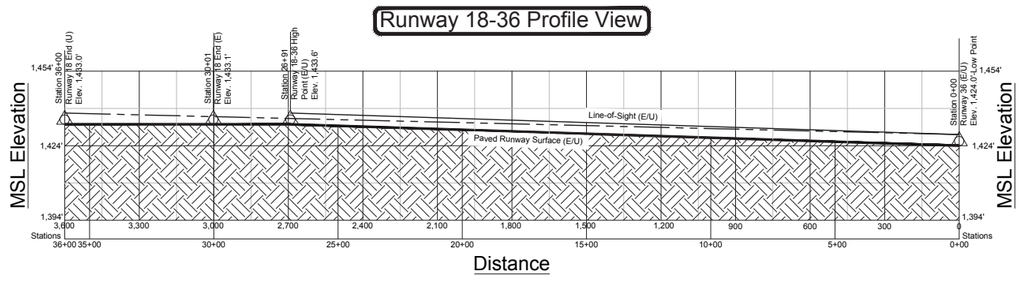
HWL PROJECT NO.	00009343
AGENCY PROJECT NO.	MoDOT No. 13-091B-2
DRAWN BY	MAW
CHECKED BY	MAW
DESIGNED BY	CTM/MAW
REVISIONS	DATE
SUBMITTAL DATE	12/29/2017

Drawing Name: I:\KAC\PR.0000009343\01\AP\DWG\ALP Update\2H2 ALP Update_2017.dwg Mar 17,2018 - 3:23pm

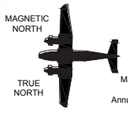
Runway 18-36 Plan View



Runway 18-36 Profile View



North Point



Magnetic Declination:
1° 22' E (2015)
Annual Rate of Change:
0° 6' W

Scale

Distance in Feet
Horizontal Scale 1"= 300'
Vertical Scale 1"= 30'

Effective Gradient

Existing Runway Grade: 0.3%
Ultimate Runway Grade: 0.3%

General Notes

1. The centerline profile is a general representation of existing runway conditions pertaining to grade changes, elevations and terrain contours. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. Per FAA AC 150/5300-13A, paragraph 313, the runway meets line of sight requirements.

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Property Line
★	Same	Rotating Beacon
⊙	Same	Wind Cone/Segmented Circle
⊕	⊕	Airport Reference Point (ARP)

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JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

RUNWAY CENTERLINE PROFILE DRAWING

HWL PROJECT NO. *00009343*
AGENCY PROJECT NO. *MoDOT No. 13-091B-2*
DRAWN BY *MAW*
CHECKED BY *MAW*
DESIGNED BY *CTM/MAW*
REVISIONS DATE

SUBMITTAL DATE *12/29/2017*

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Property Line
BRL 35'	Same	Building Restriction Line (BRL)
★	Same	Rotating Beacon
x x	xx xx	Fenceline
Ⓨ	Ⓨ	Wind Cone/Segmented Circle
	⊕	Airport Reference Point (ARP)

General Notes

1. The terminal area drawing is a general representation of existing conditions within the airport's terminal area complex pertaining to apron geometry, tie-down locations, dimensions, terrain relief, taxiway and taxilane location and configuration, as well as structure location. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. Due to the proximity of the airport's terminal building and T-Hangars to Runway 18-36, these structures penetrate the airport's FAR Part 77 Transitional Surfaces. Therefore, the terminal building is recommended to be fitted with red obstruction lighting. However, because the T-Hangars will be relocated during the short-term planning period (0-5 year), obstruction lights for these buildings will be at the discretion of the city and MoDOT.

3. Due to the proximity of the treeline to the west of Runway 18-36, these obstacles penetrate the airport's FAR Part 77 Primary and Transitional Surfaces. Therefore, these trees are recommended to be removed during the short-term planning period (0-5 year).

4. Ultimate tie downs are not depicted on this drawing as they are to be placed where the existing hangars currently are. These tie downs will be shown once the completion of the removal and relocation of the existing hangars occurs.

5. In the event the parallel taxiway is built, the terminal building and fuel farm would likely be required to be relocated outside of the Taxiway Object Free Area (TOFA). The future location of the terminal building and fuel farm will be determined once development of the taxiway is imminent.

Terminal Area Design Criteria

	AIRPLANE DESIGN GROUP (ADG)	
TERMINAL AREA STANDARD	GROUP I	GROUP II
Runway ℄ to Parallel Taxiway ℄ Separation	225'	240'
Taxiway ℄ to Fixed or Movable Object	44.5'	65.5'
Taxiway ℄ to Parallel Taxiway ℄ Separation	69'	105'
Taxiway Object Free Area Width	89'	131'
Taxiway Safety Area Width	49'	79'
Taxiway Wingtip Clearance	10'	26'
Taxiway Width	25'	35'
Taxilane Object Free Area Width	79'	115'
Taxilane ℄ to Parallel Taxilane ℄ Separation	64'	97'
Taxilane ℄ to Fixed or Movable Object	39.5'	57.5'

Buildings

EXISTING	ULTIMATE	DESCRIPTION	FUTURE ACTION	TOP ELEV. (MSL)
Ⓐ	Same	Terminal Building/Clear Span Hangar	Retain	1,458.4'
Ⓑ	--	T-Hangar(s)	Relocate	1,450.1'
Ⓒ	--	T-Hangar(s)	Relocate	1,445.0'
Ⓓ	--	T-Hangar(s)	Relocate	1,446.9'
--	Ⓔ	75' x 75' Clear Span Hangar(s)	Construct	1,446.0' (est.)
--	Ⓕ	60' x 60' Clear Span Hangar(s)	Construct	1,444.0' (est.)
--	Ⓖ	8-unit T-Hangar(s)	Construct	1,446.0' (est.)

North Point

MAGNETIC NORTH

TRUE NORTH

Magnetic Declination:
1° 22' E (2015)
Annual Rate of Change:
0° 6' W

Scale

100 50 0 100

Distance in Feet

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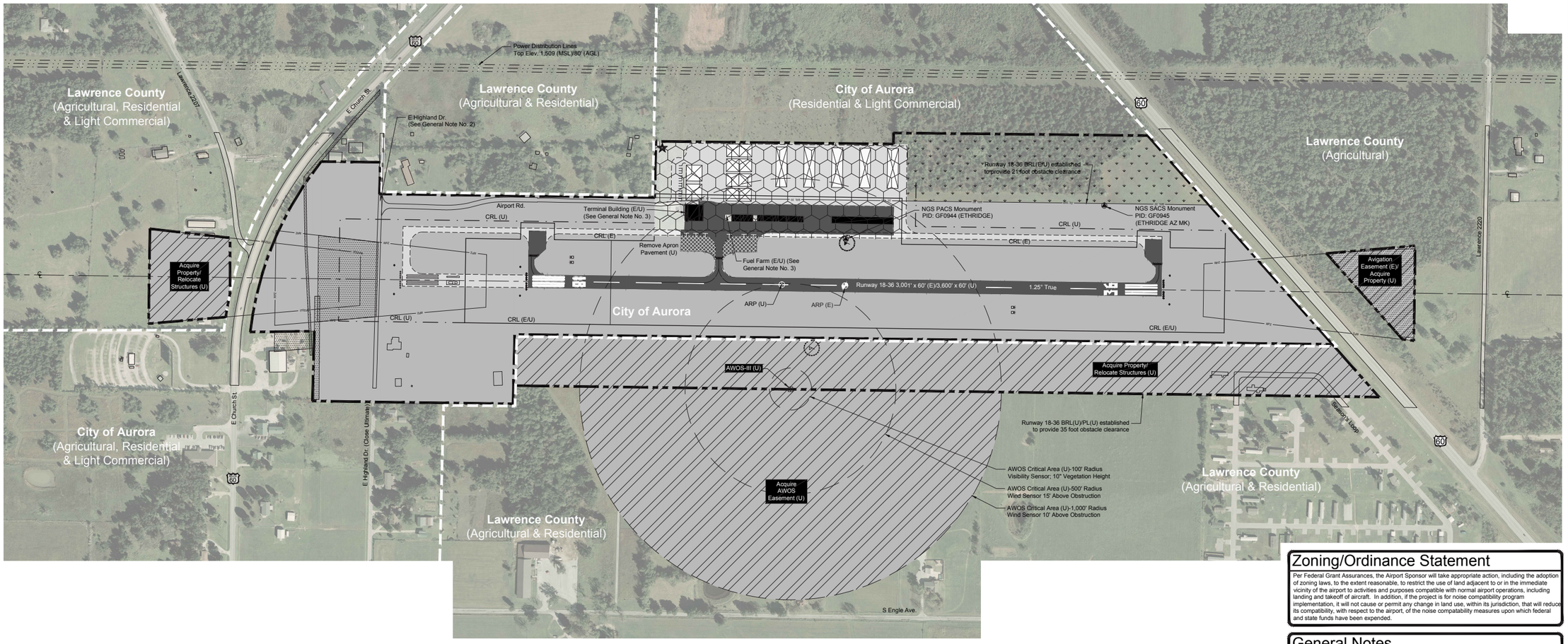
JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

TERMINAL AREA DRAWING

HWL PROJECT NO.	00009343
AGENCY PROJECT NO.	MoDOT No. 13-091B-2
DRAWN BY	MAW
CHECKED BY	MAW
DESIGNED BY	CTM/MAW
REVISIONS	DATE
SUBMITTAL DATE	12/29/2017

SHEET 6 OF 9

Drawing Name: I:\KAC\PRJ\00009343\01\AP\DWG\ALP Update\2H2 ALP Update_2017.dwg Mar 17 2018 - 3:30pm



North Point

MAGNETIC NORTH

TRUE NORTH

Magnetic Declination:
1° 22' E (2015)
Annual Rate of Change:
0° 6' W

Scale

250 125 0 250

Distance in Feet

Land Use Legend

HATCH TYPE	LAND USE DESCRIPTION
	Existing Aviation Operations Area
	Ultimate Aviation Operations/Land & Easement Acquisition Area
	Existing/Ultimate Terminal Operations Area
	Agricultural and Open Space
	City Limits Boundary

Crop Restriction Line Criteria

CRL STANDARD	AIRCRAFT APPROACH CATEGORY and AIRPLANE DESIGN GROUP	
	CATEGORY A & B AIRCRAFT	
	GROUP I	GROUP II
Distance in Feet from Runway ℄ to Crop (Visual & >3/4-mile)	200'	250'
Distance in Feet from Runway End to Crop (Visual & >3/4-mile)	300'	400'
Distance in Feet from ℄ of Taxiway to Crop	45'	66'
Distance in Feet from Edge of Apron to Crop	40'	58'

Zoning/Ordinance Statement

Per Federal Grant Assurances, the Airport Sponsor will take appropriate action, including the adoption of zoning laws, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatability measures upon which federal and state funds have been expended.

General Notes

1. Existing and future aviation operational activity does not rise to the threshold required to complete an ultimate noise exposure map (NEM) as recommended by the FAA. Accordingly, no significant airport/aircraft noise impacts are anticipated.

2. Potential extension of Runway 18-36 to the north will require E Highland Dr. to be closed west of Airport Road. This is necessary to accommodate the runway's safety (RSA) and object free areas (OFA).

3. In the event the parallel taxiway is built, the terminal building and fuel farm would likely be required to be relocated outside of the Taxiway Object Free Area (TOFA). The future location of the terminal building and fuel farm will be determined once development of the taxiway is imminent.

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
	Same	Easements
		Airport Property Line
BRL 35'	Same	Building Restriction Line (BRL)
RPZ	RPZ(U)	Runway Protection Zone (RPZ)
CRL(E)	CRL(U)	Crop Restriction Line (CRL)
	Same	Rotating Beacon
		Lighted Wind Cone/Segmented Circle

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**JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)**
Aurora, Missouri

LAND USE DRAWING

HWL PROJECT NO. 00009343
AGENCY PROJECT NO. MoDOT No. 13-091B-2
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY CTM/MAW

REVISIONS	DATE

SUBMITTAL DATE 12/29/2017

SHEET 7 OF 9

Drawing Name: I:\KAC\PR.I00000934\03\01\AP\DWG\ALP Update\2H2 ALP Update_2017.dwg Mar 17,2018 - 3:38pm

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Airport Property Line
	Same	Tract Boundaries
		Land Acquisition- Ultimate
RPZ	RPZ(U)	Runway Protection Zone (RPZ)
		Buildings

General Notes

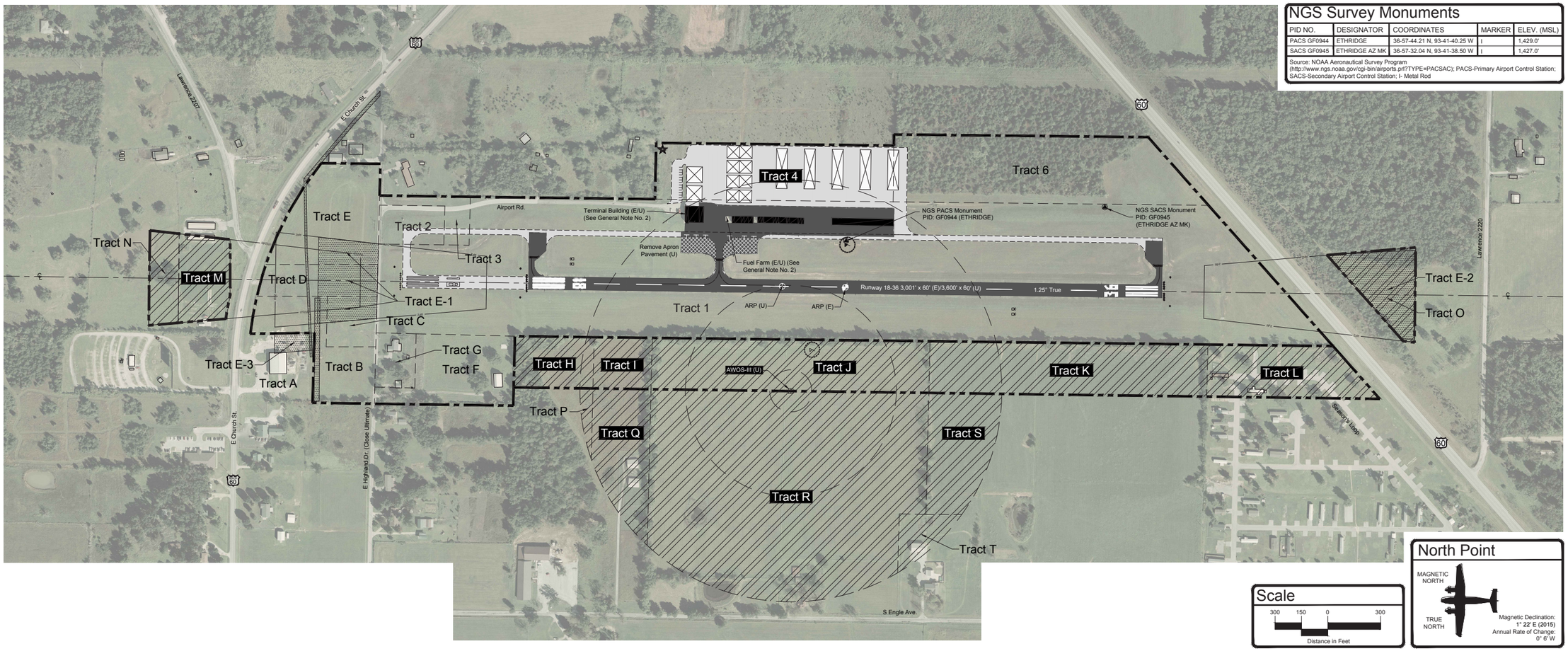
1. The property map is a general representation of the existing and ultimate property tracts including the acreage of each tract, how the airport property was acquired (i.e., Federal AIP funds, military/ government surplus, local funding, etc.), when each tract of land was acquired, and relevant information of proposed property acquisitions. The property map serves as a guide for the airport sponsor to show existing and future features (runways, RPZs, NAVAIDS, etc.) that would indicate a potential aeronautical need for property acquisition. Any deviations from existing property information compared to conditions detailed in this drawing are unintentional.

2. In the event the parallel taxiway is built, the terminal building and fuel farm would likely be required to be relocated outside of the Taxiway Object Free Area (TOFA). The future location of the terminal building and fuel farm will be determined once development of the taxiway is imminent.

NGS Survey Monuments

PID NO.	DESIGNATOR	COORDINATES	MARKER	ELEV. (MSL)
PACS GF0944	ETHRIDGE	36-57-44.21 N, 93-41-40.25 W	I	1,429.0"
SACS GF0945	ETHRIDGE AZ MK	36-57-32.04 N, 93-41-38.50 W	I	1,427.0"

Source: NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/cgi-bin/airports_prl?TYPE=PACSAC); PACS-Primary Airport Control Station; SACS-Secondary Airport Control Station; I- Metal Rod



Scale

300 150 0 300

Distance in Feet

North Point

MAGNETIC NORTH

TRUE NORTH

Magnetic Declination: 1° 22' E (2015)
Annual Rate of Change: 0° 6' W

Ultimate Property Data

TRACT	ACRES	CURRENT OWNER	PROPERTY INTEREST	PARCEL ID NUMBER
H	2.1	Harvest Fellowship	Fee Simple	204017000000024000
I	1.5	Harvest Fellowship	Fee Simple	204017000000024002
J	7.4	King, D.E. & Betty Jean	Fee Simple	204017000000032000
K	7.4	Fauchner, William & Kathryn M. Trust	Fee Simple	204017000000034001
L	4.0	Ranrob Properties, LLC	Fee Simple	204017000000035002
M	2.2	Coryell, Samuel E.	Fee Simple	203008000000016001
N	1.4	McCann, David J. Sr. & Rosalee	Fee Simple	203008000000016000
O	2.4	Community Mercy Health Springfield	Fee Simple	204017000000037000
P	0.3	Harvest Fellowship	AWOS Easement	204017000000024000
Q	3.6	Harvest Fellowship	AWOS Easement	204017000000024002
R	27.2	King, D.E. & Betty Jean	AWOS Easement	204017000000032000
S	3.8	Fauchner, William & Kathryn M. Trust	AWOS Easement	204017000000034001
T	1.1	Francisco, Bruce J. & Candice R.	AWOS Easement	204017000000034000
Total	64.4			

Source: 2H2 Exhibit 'A' Property Map dated 08/14/12 and completed by H.W. Lochner, Inc., Kansas City, MO; Lawrence County, MO Assessors Office.

Existing Property Data

TRACT	ACREAGE	PROPERTY INTEREST	PROPERTY OWNER	DATE ACQUIRED	BOOK AND PAGE	GRANTOR	FED. PROJECT NO.
1	62.03+/-	Fee Simple	City of Aurora	January 1965	Bk. 244/256, Pg. 148/93	McGown & Getty	9-23-081-C601
2	1.32	Fee Simple	City of Aurora	November 2005	Bk. 419, Pg. 905	Marshall	AIRE 015-91B
3	0.96	Fee Simple	City of Aurora	September 2005	Bk. 418, Pg. 684	Birchfield	AIRE 015-91B
4	6.92	Fee Simple	City of Aurora	September 2006	Bk. 425, Pg. 321	Benton	AIRE 015-91B
5	Not Used						
6	9.92	Fee Simple	City of Aurora	October 2003	Bk. 406, Pg. 910	H.W.G.W.	N/A
E-1	2.4+/-	Clear Zone Easement	City of Aurora	Oct./Feb. 1965	Bk. 255/281, Pg. 593/357	Getty	9-23-081-C601
E-2	3.78+/-	Clear Zone Easement	McCann, David Sr. & Rosalee	January 1965	Bk. 255, Pg. 186	Murphy	9-23-081-C601
E-3	0.38	Avigation Easement	D.B. Properties Aurora, LLC	January 2009	Bk. 437, Pg. 620	Barton	07-91B-01
A	Not acquired; See Tract E-3						
B	3.12	Fee Simple	City of Aurora	November 2009	Bk. 437, Pg. 621	Barton	07-91B-01
C	1.30	Fee Simple	City of Aurora	November 2009	Bk. 437, Pg. 624	Barton	07-91B-01
D	2.11	Fee Simple	City of Aurora	November 2009	Bk. 437, Pg. 622	Barton	07-91B-01
E	4.77	Fee Simple	City of Aurora	November 2009	Bk. 437, Pg. 623	Barton	07-91B-01
F	3.81	Fee Simple	City of Aurora	December 2011	Bk. 447, Pg. 3582	First State Bank of Purdy	12-091B-1
G	1.11	Fee Simple	City of Aurora	September 2013	Bk. 449, Pg. 4541	Ruble	13-091B-1
Total	103.93						

Source: 2H2 Exhibit 'A' Property Map dated 08/14/12 and completed by H.W. Lochner, Inc., Kansas City, MO; Lawrence County, MO Assessors Office.

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JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

PROPERTY MAP

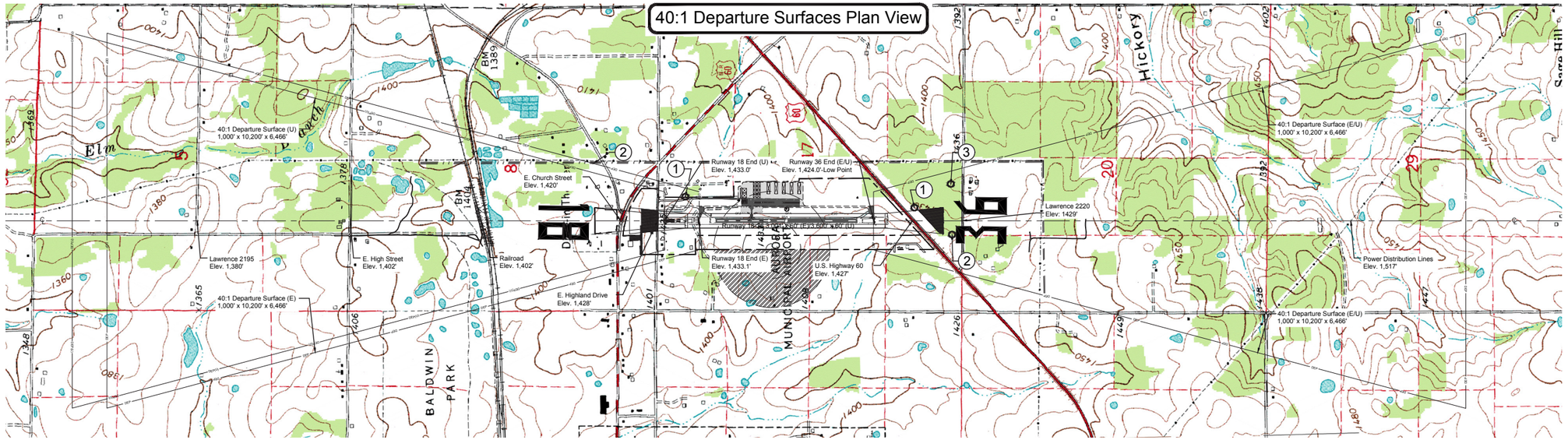
HWL PROJECT NO. 00009343
AGENCY PROJECT NO. MoDOT No. 13-091B-2
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY CTM/MAW
REVISIONS DATE
SUBMITTAL DATE 12/29/2017

8

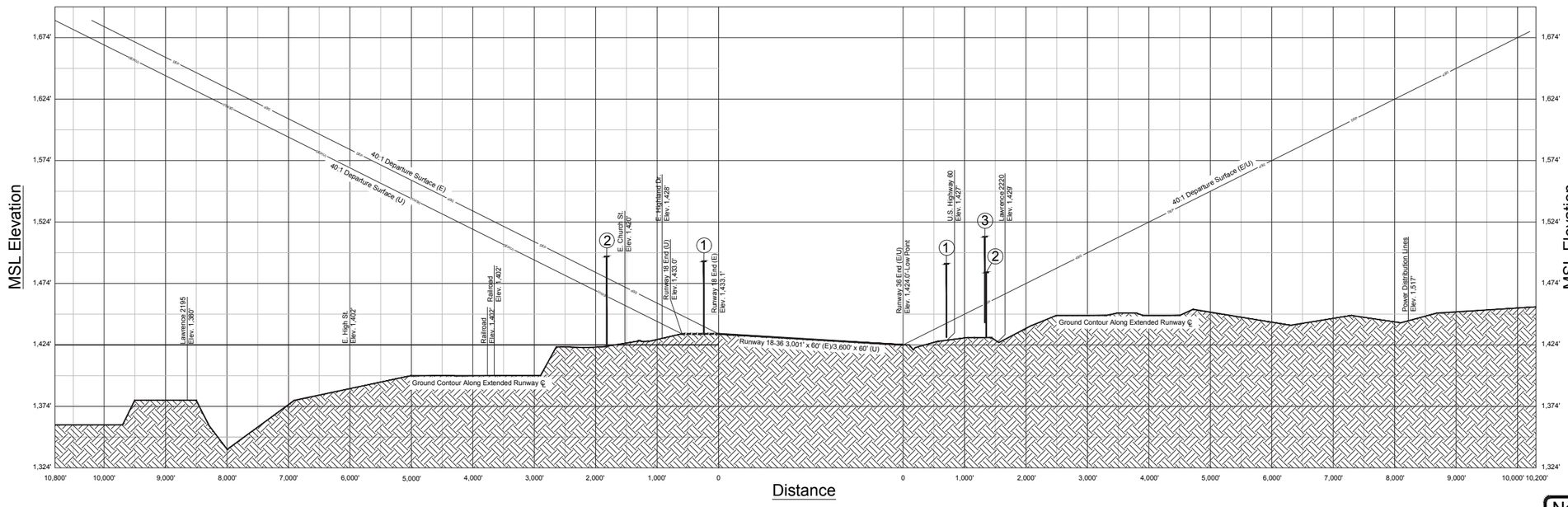
SHEET 8 OF 9

Drawing Name: I:\KAC\PRJ\00009343\01\APLDWG\ALP Update\2H2 ALP Update_2017.dwg Mar 17,2018 - 3:44pm

40:1 Departure Surfaces Plan View



40:1 Departure Surface Profile View



Runway 18 Obstruction Data Table

ITEM	DESCRIPTION	DEND	DCL	TOP ELEV.	PENETRATION	MITIGATION
1	Numerous Trees	240 feet	414 feet L	1,492' MSL	53 feet	Remove
2	Power Distribution Line	1,828 feet	988 feet L	1,496' MSL	17 feet	FAA Aero Study

DEND- Distance from Runway End; DCL- Distance from Runway Centerline.

Runway 36 Obstruction Data Table

ITEM	DESCRIPTION	DEND	DCL	TOP ELEV.	PENETRATION	MITIGATION
1	Numerous Trees	706 feet	173 feet R	1,490.4' MSL	49 feet	FAA Aero Study
2	Numerous Trees	1,354 feet	237 feet L	1,482.5' MSL	25 feet	FAA Aero Study
3	Numerous Trees	1,331 feet	635 feet R	1,512.4' MSL	55 feet	FAA Aero Study

DEND- Distance from Runway End; DCL- Distance from Runway Centerline.

General Notes

1. The Departure Surface Drawing depicts the plan and profile view of the current and ultimate 40:1 departure surfaces. This drawing provides information on existing and potential obstructions to the engine-out departures for instrument procedures established for Runway 18-36. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. Departure Surface penetrations which will require one of two actions and/or mitigations including removal or lowering of the obstruction and/or raising instrument departure minimums.

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Airport Pavement Areas
	Same	Structures
		Airport Property Line
	Same	Significant Object

North Point

MAGNETIC NORTH

TRUE NORTH

Magnetic Declination:
1° 22' E (2015)
Annual Rate of Change:
0° 6' W

Scale

1,000 500 0 1,000

Distance in Feet
Horizontal Scale 1"= 1,000'
Vertical Scale 1"= 50'

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JERRY SUMNERS SR.
AURORA MUNICIPAL AIRPORT (2H2)
Aurora, Missouri

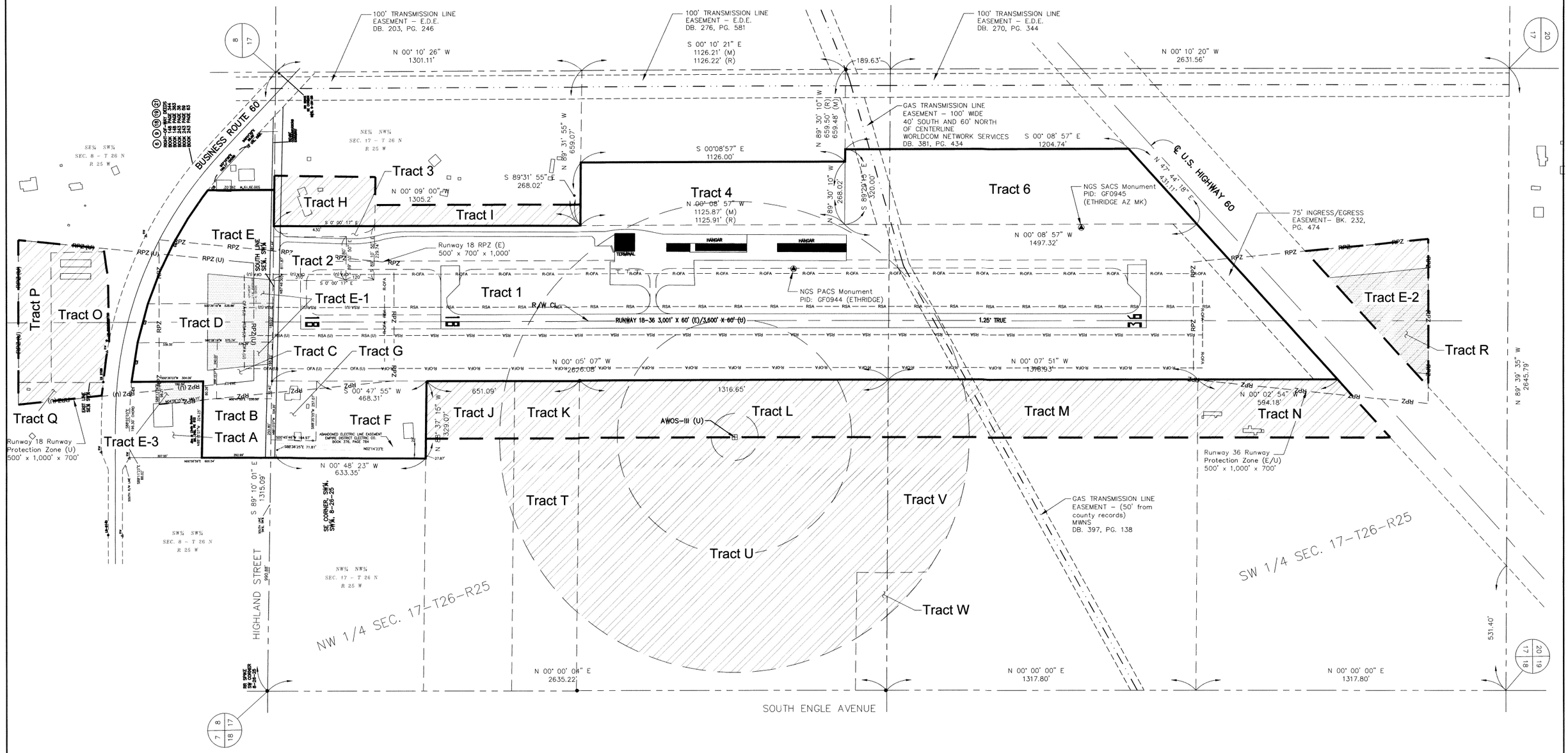
RUNWAY 18-36
40:1 DEPARTURE SURFACE DRAWING

HWL PROJECT NO.	00009343
AGENCY PROJECT NO.	MoDOT No. 13-091B-2
DRAWN BY	MAW
CHECKED BY	MAW
DESIGNED BY	CTM/MAW
REVISIONS	DATE
SUBMITTAL DATE	12/29/2017

SHEET 9 OF 9

Drawing Name: I:\KAC\PR.0000009343\01\AP\DWG\ALP Update\2H2 ALP Update_2017.dwg Mar 17,2018 - 3:46pm

Appendix



LEGEND

- *Ultimate Airport Property Line*
- *Existing Airport Property Line*
- *Tract LInes/Parcel Boundary*
- *Highway/Road Right–of–Way Line*
- *Section Line or 1/4 Section Line*
- *Existing Easement*
- *Land Acquisition Areas*
- RSA — *Runway Safety Area (RSA)*
- RSA(U) — *Ultimate Runway Safety Area (RSA)*
- R–OFA — *Object Free Area (OFA)*
- OFA(U) — *Ultimate Object Free Area (OFA)*
- RPZ — *Runway Protection Zone (RPZ)*
- RPZ(U) — *Ultimate Runway Protection Zone (RPZ)*

MAG. DEC. 1°22' E (2015)

200 0 200 400

Scale in Feet

CITY OF AURORA, MISSOURI
APPROVAL BLOCK

SUBMITTED BY: Dick Boyer

OFFICIAL TITLE: Mayor DATE: 4-20-2016

NO.	DATE	REVISIONS	BY	CHECKED
3	1–9–16	Acquire Property (MoDOT 13–091B–1)	MAW	CVF
2	8–14–12	Acquire Property (MoDOT 12–091B–1)	BRE	MJJ
1	1–20–09	Acquire Property (MoDOT 07–91B–01)	TDH	JMM

CITY OF AURORA, MISSOURI

JERRY SUMNERS SR. AURORA MUNICIPAL AIRPORT

EXHIBIT "A" PROPERTY MAP

LOCHNER

16105 W 113th Street, Suite 107, Lenexa, KS 66219 816.945.5840

DESIGNED BY JMM	DATE 1–6–04	PROJECT NO. AIRE 015–91B	
DRAWN BY TDH	DATE 12–07–05	JOB NO. 2005–0917	
CHECKED BY JMM	DATE 12–09–05	SCALE AS SHOWN	SHEET 1 OF 2

AIRPORT PROPERTY (EXISTING)						
NO.	CURRENT PROPERTY OWNER	ACRES	PROPERTY INTEREST	RECORDED IN	FEDERAL PROJECT NO.	PREVIOUS OWNER
TRACT 1	THE CITY OF AURORA, MISSOURI	62.03+/-	FEE SIMPLE TITLE	BK. 244, PG. 148 BK. 256, PG. 93 Jan. 01, 1965	9-23-081-C601	MCGOWN GETTY
TRACT 2	THE CITY OF AURORA, MISSOURI	1.32	FEE SIMPLE TITLE	BK. 419, PG. 905 Nov. 9, 2005	AIRE 015-91B	MARSHALL
TRACT 3	THE CITY OF AURORA, MISSOURI	0.96	FEE SIMPLE TITLE	BK. 418, PG. 684 Sept. 2, 2005	AIRE 015-91B	BIRCHFIELD
TRACT 4	THE CITY OF AURORA, MISSOURI	6.92	FEE SIMPLE TITLE	BK. 425, PG. 321 Sept. 27, 2006	AIRE 015-91B	BENTON
TRACT 5	NOT USED					
TRACT 6	THE CITY OF AURORA, MISSOURI	9.92	FEE SIMPLE TITLE	BK. 406, PG. 910 Oct. 21, 2003	3-29-SBGP-17(2001)	H.W.G.W.
TRACT A	NOT ACQUIRED, SEE TRACT E-3 (AIRPORT EASEMENTS)					
TRACT B	THE CITY OF AURORA, MISSOURI	3.12	FEE SIMPLE TITLE	BK. 437, PG. 621 Nov. 22, 2009	07-91B-01	BARTON
TRACT C	THE CITY OF AURORA, MISSOURI	1.30	FEE SIMPLE TITLE	BK. 437, PG. 624 Nov. 22, 2009	07-91B-01	BARTON
TRACT D	THE CITY OF AURORA, MISSOURI	2.11	FEE SIMPLE TITLE	BK. 437, PG. 622 Nov. 22, 2009	07-91B-01	BARTON
TRACT E	THE CITY OF AURORA, MISSOURI	4.77	FEE SIMPLE TITLE	BK. 437, PG. 623 Nov. 22, 2009	07-91B-01	BARTON
TRACT F	THE CITY OF AURORA, MISSOURI	3.81	FEE SIMPLE TITLE	BK. 447, PG. 3582 Dec. 30, 2011	12-091B-1	FIRST STATE BANK OF PURDY
TRACT G (U-8)	THE CITY OF AURORA, MISSOURI	1.11	FEE SIMPLE TITLE	BK. 449, PG. 4541 Sept. 2013	13-091B-1	RUBLE
	TOTAL	97.37				

AIRPORT PROPERTY (ULTIMATE)						
NO.	CURRENT PROPERTY OWNER	ACRES	PROPERTY INTEREST	COUNTY PARCEL IDENTIFICATION NUMBER	FEDERAL PROJECT NO.	PREVIOUS OWNER
TRACT H	BIRCHFIELD, DANIEL J. & REBECCA	2.0	FEE SIMPLE TITLE	204017000000025002	---	---
TRACT I	BIRCHFIELD, DANIEL J. & REBECCA	1.8	FEE SIMPLE TITLE	204017000000025000	---	---
TRACT J	HARVEST FELLOWSHIP	2.1	FEE SIMPLE TITLE	204017000000024000	---	---
TRACT K	HARVEST FELLOWSHIP	1.5	FEE SIMPLE TITLE	204017000000024002	---	---
TRACT L	KING, D. E. & BETTY JEAN	7.4	FEE SIMPLE TITLE	204017000000032000	---	---
TRACT M	FAUCHER, WILLIAM & KATHRYN M. TRUST	7.4	FEE SIMPLE TITLE	204017000000034001	---	---
TRACT N	RANROB PROPERTIES LLC	4.0	FEE SIMPLE TITLE	204017000000035002	---	---
TRACT O	CORYELL, SAMUEL, E.	2.8	FEE SIMPLE TITLE	203008000000016001	---	---
TRACT P	Mc CAIN, DAVID J. SR. & ROSALEE	2.1	FEE SIMPLE TITLE	203008000000016000	---	---
TRACT Q	MARKS, DAVID L.	0.6	FEE SIMPLE TITLE	203008000000035000	---	---
TRACT R	COMMUNITY MERCY HEALTH SPRINGFIELD	3.8	FEE SIMPLE TITLE	204017000000037000	---	---
TRACT S	HARVEST FELLOWSHIP	0.3	AWOS EASEMENT	204017000000024000	---	---
TRACT T	HARVEST FELLOWSHIP	3.6	AWOS EASEMENT	204017000000024002		
TRACT U	KING, D. E. & BETTY JEAN	27.2	AWOS EASEMENT	204017000000032000		
TRACT V	FAUCHER, WILLIAM & KATHRYN M. TRUST	3.8	AWOS EASEMENT	204017000000034001		
TRACT W	FRANCISCO, BRUCE J. & CANDICE R.	1.1	AWOS EASEMENT	204017000000034000		
	TOTAL	71.5				

AIRPORT EASEMENTS						
TRACT NO.	CURRENT PROPERTY OWNER	ACRES	PROPERTY INTEREST	RECORDED IN	FEDERAL PROJECT NO.	PREVIOUS OWNER
E-1	THE CITY OF AURORA, MISSOURI	2.4+/-	CLEAR ZONE EASEMENT	BK. 255, PG. 186 Jan. 06, 1965	9-23-081-C601	GETTY
E-2	THE CITY OF AURORA, MISSOURI	3.78+/-	CLEAR ZONE EASEMENT	BK. 255, PG. 593 Oct. 06, 1965 BK. 281, PG. 357 Feb. 19, 1965	9-23-081-C601	MURPHY
E-3	THE CITY OF AURORA, MISSOURI	0.38	AVIGATION EASEMENT	BK. 437, PG. 620 Jan. 22, 2009	07-91B-01	BARTON
	TOTAL	6.56				

OTHER PROPERTY INFORMATION			
PROPERTY INTEREST	COMPANY NAME	ACRES	RECORDED IN
Electric Line Easement Release	Empire District Electric Company	0.29	BK. 449 PG. 2502 April 15th, 2013 (Orig BK. 376 PG. 784 October 12th, 1998)

NGS SURVEY MONUMENTS				
PID NUMBER	DESIGNATOR	COORDINATES	MARKER	ELEV. (MSL)
PACS GF0944	ETHRIDGE	36-57-44.21 N, 93-41-40.25 W	I-METAL ROD	1,429.0'
SACS GF0945	ETHRIDGE AZ MK	36-57-32.04 N, 93-41-38.50 W	I-METAL ROD	1,427.0'

Source: NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/cgi-bin/airports.prl?TYPE=PACSAC)

PACS-Primary Airport Control Station; SACS-Secondary Airport Control Station

NO.	DATE	REVISIONS	BY	CHECKED
3	1-9-16	Acquire Property (MoDOT 13-091B-1)	MAW	CVF
2	8-14-12	Acquire Property (MoDOT 12-091B-1)	BRE	MJJ
1	1-20-09	Acquire Property (MoDOT 07-91B-01)	TDH	JMM

CITY OF AURORA, MISSOURI

JERRY SUMNERS SR. AURORA MUNICIPAL AIRPORT

EXHIBIT "A" PROPERTY MAP

LOCHNER

16105 W 113th Street, Suite 107, Lenexa, KS 66219 816.945.5840

DESIGNED BY JMM	DATE 1-6-04	PROJECT NO. AIRE 015-91B
DRAWN BY TDH	DATE 12-07-05	JOB NO. 2005-0917
CHECKED BY JMM	DATE 12-09-05	SCALE AS SHOWN SHEET 2 OF 2

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