PHILIP BILLARD MUNICIPAL AIRPORT

Airport Master Plan

Final

MTAA

METROPOLITAN TOPEKA AIRPORT AUTHORITY

TOPEKA REGIONAL | BILLARD AIRPORT

AIRPORT & BUSINESS CENTER

AIRPORT MASTER PLAN

for

Philip Billard Municipal Airport
Topeka, Kansas

Prepared for

The Metropolitan Topeka Airport Authority (MTAA)

by

Coffman Associates, Inc.

Approved by MTAA - September 17, 2013
Airport Layout Plan approved by FAA – January 2014

FINAL

JANUARY 2014

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INTRODUCTION

INTRODUCTION

The Federal Aviation Administration (FAA) recommends that airports update their long term planning documents every seven to 10 years, or as necessary to address local changes at the airport. The last Master Plan Update for Philip Billard Municipal Airport was completed in 2002. The Metropolitan Topeka Airport Authority (MTAA) has received a grant from the FAA to update the airport Master Plan. The FAA grant covers 90 percent of the fixed fee project cost with MTAA providing a ten percent match.

Following federal guidelines for consultant selection based on qualifications, MTAA selected Coffman Associates, a national aviation planning firm, to undertake the Master Plan update. After project scope negotiations and an independent review of study costs, a contract was approved by MTAA in September 2012.

The study is designed to provide guidance for future development and provide updated justification for projects for which the airport may request funding participation through federal and state airport improvement programs. Coffman Associates is an airport consulting firm which specializes in master planning and environmental studies. Coffman Associates has worked for numerous airports in the FAA's Central Region, including Kansas.

The Airport Master Plan Update was prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13A, *Airport Design* (as amended), and AC 150/5070-6B, *Airport Master Plans* (2007). The scope of services, budget, and schedule was approved by MTAA, following review by the FAA.

Philip Billard Municipal Airport is a general aviation facility, as defined by the FAA, which is intended to serve the aviation needs of the community. The airport is included in the FAA's *National Plan of Integrated Airport Systems* (NPIAS). As

such, the airport is eligible for federal development grants. MTAA owns and operates the airport, which is located approximately three miles east of the central business district of Topeka, Kansas. The airport provides support to approximately 88 based aircraft. Services and facilities available include: hangar storage, tie-downs, fixed base operator (FBO) services, flight instruction, aircraft maintenance, and fueling. The airport encompasses approximately 920 acres of land.

The airport provides three runways which intersect to form a triangle. Runway 13-31 is 5,099 feet long and 100 feet wide and serves as the primary runway. Runway 18-36 is 4,331 feet long and 75 feet wide and serves as the crosswind runway. Runway 4-22 is 3,001 feet long and 100 feet wide and is the secondary crosswind runway. All three runways are constructed of asphalt. Runways 13-31 and 18-36 are considered to be in good condition and Runway 4-22 is in poor condition.

MASTER PLAN OBJECTIVES

The overall objective of the Airport Master Plan Update is to provide the sponsor with guidance for future development of the airport, meeting the needs of existing and future users, while also being compatible with the environment. The most recent planning effort related to the airport is the 2002 Airport Master Plan. This Airport Master Plan Update will identify and provide justification for new priorities. This plan will be closely coordinated with other existing and on-going planning studies in the area, and with aviation plans developed by the FAA and the state. Specific objectives of the study included:

- Research factors likely to affect air transportation demand in the Topeka area over the next 20 years and develop new operational and basing forecasts.

- Determine projected needs of airport users as it relates to the airside (runways, taxiways, etc.) and the landside facilities (hangar layout and mix).

- Recommend improvements which will enhance the airport's ability to satisfy future aviation needs: runway extensions and/or realignment, increases in weight bearing capacity, upgraded approaches (two-dimensional lateral navigation, vertical navigation, or localizer performance with vertical guidance).

- Establish a schedule of development priorities and a financial program for implementation and analyze potential funding sources, consistent with FAA planning.

- Provide specific recommendations for aviation and non-aviation related land uses on airport property and review existing or proposed land use, economic development, and zoning documents to ensure future compatibility with off-airport development.

- Develop active and productive public involvement throughout the planning process.

MASTER PLAN ELEMENTS AND PROCESS

To achieve the objectives described above, the Airport Master Plan Update was prepared in a systematic fashion pursuant to the scope of services that was coordinated with the airport sponsor and the FAA. The study has eight elements:

1.0 **Study Initiation** - Development of the scope of services, budget, and schedule. A kickoff meeting was held (10.4.2012) with a planning advisory committee (PAC), comprised of various airport stakeholders, at the study's initiation to obtain a more comprehensive understanding of local issues.

2.0 **Inventory** - Inventory of facility and operational data, wind data, environmental data, population and economic data, airport financial data, and new aerial photography and mapping. All of the inventory data was organized into the Phase 1 Draft Report which was distributed to the PAC for review and comment.

3.0 **Forecasts** - Forecasts for based aircraft, operations, and peaking characteristics of the airport over a 20-year period. The forecasts were organized into the Phase 1 draft report and distributed to the PAC for review and comment. The forecasts were delivered to the FAA for review and approval.

4.0 **Facility Requirements** - After establishing the critical design aircraft and physical planning criteria, airport needs were developed for airside and landside facilities. The facility requirements were included in the Phase 1 draft report distributed to the PAC for review and comment. A public information workshop was held (2.7.2013) to encourage citizens to learn about and participate in the master plan development process.

5.0 **Airport Development Alternatives** - Potential airside and landside alternatives were developed for meeting long-term needs. Each of the alternatives was subjected to engineering and environmental analysis and summarized in the Phase 2 draft report. Following distribution of the Phase 2 draft report to PAC members, a review meeting will be held (5.2.2013). A public information workshop was held (5.2.2013) to review all material developed to date.

6.0 **Airport Layout Plans** - Airport layout plans (the technical drawings) were developed to depict existing and proposed facilities. The drawing set was developed to meet the requirements of the FAA Central Region. In addition, noise exposure contours were developed for existing and future conditions to determine the extent of critical noise exposure in the airport vicinity. An environmental overview utilizing guidelines provided in the *National Environmental Policy Act* (NEPA) is included. Land use plans were developed to idenetify the highest and best use of airport property.

7.0 **Financial Management and Development Program** – A 20-year capital improvement program that is phased over time to various demand milestones was developed.

Cost estimates for each project were developed in current (2013) dollars. A third public information workshop was held (7.17.2013) at this stage to encourage citizens to participate in the master plan process.

8.0 **Final Documentation and Public Workshop** – A draft final report was compiled that included appropriate revisions suggested by the PAC and the public throughout the process. The draft report was utilized during the sponsor approval process. This final report includes any remaining minor updates.

STUDY COORDINATION

The study process included local participation through the formation of a PAC. The PAC consisted of federal, state, and local agencies, airport tenants, and other airport stakeholders. The airport sponsor determined the final makeup of the committee. The PAC met four times to discuss draft phase report submittals. A kickoff meeting was held on October 4, 2012, during the initial inventory process. The next PAC meeting was held on February 7, 2013 following the Phase 1 report. The Phase 2 report was followed by a PAC meeting on May 2, 2013. The Phase 3 report was presented on July 17, 2013. The draft phase reports and other study related materials were made available on-line for the duration of the study.

Three "open-house" public information workshops were held to present the preliminary findings to date and to solicit public comment. The MTAA approved the study on September 17, 2013. The ALP was then submitted to the FAA which approved it in January 2014. **Exhibit IA** presents the key study elements, meeting intervals, project schedule, and documentation for the Master Plan Update.

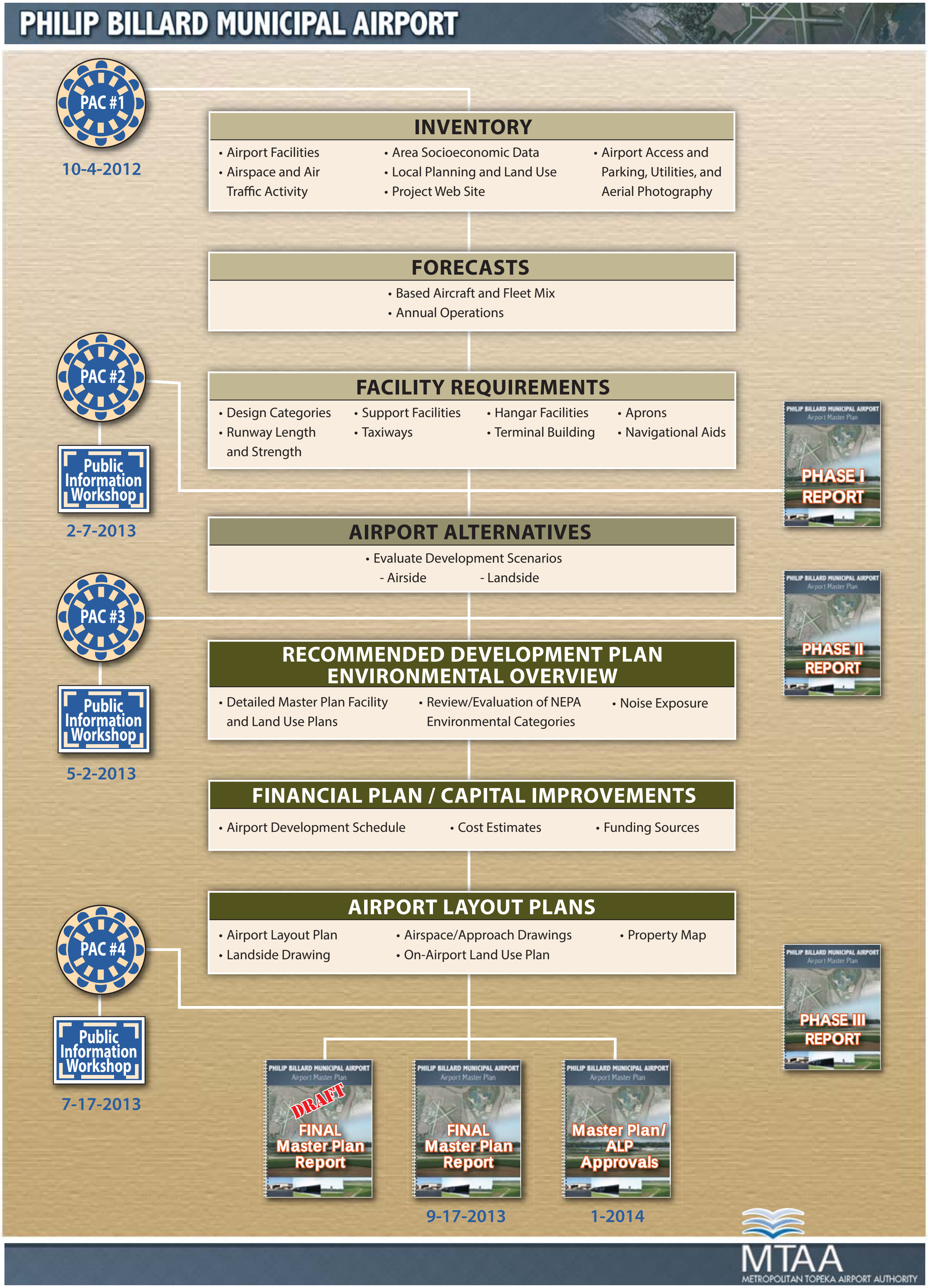

Exhibit IA
PROJECT WORK FLOW

MTAA
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Chapter One

INVENTORY

Chapter One

INVENTORY

The initial step in the preparation of the airport master plan update for Philip Billard Municipal Airport is the collection of information that will provide a basis for the analysis to be completed in subsequent chapters. For the master plan, information is gathered regarding both the airport and the region it serves. This chapter will begin with an overview of the airport history, administration, location, competing airports, and typical weather conditions. This will be followed by a discussion of demographic and socioeconomic factors relevant to the region. A comprehensive overview of the national aviation system for general aviation airports and the role of Philip Billard Municipal Airport in the national system are also presented. Finally, an inventory of the existing facilities at the airport will be discussed.

The information outlined in this chapter was obtained through on-site inspections of the airport and interviews with the airport sponsor, management, tenants, and representatives of various government agencies. Information was also obtained from existing studies and various official internet websites. A general list of document sources is provided at the end of this chapter.

AIRPORT CHARACTERISTICS

It is important in any master plan to establish a baseline understanding of the airport setting, including its location, geography, access to other transportation modes, the airport's role in the national aviation system, the local climate, and the administration of the airport. The following sections will outline these characteristics.

LOCATION AND ACCESS

Philip Billard Municipal Airport is located three miles to the east of downtown Topeka, Kansas. **Exhibit 1A** presents the location of the airport. Topeka is the state capital and the Shawnee County seat. The airport is within the city limits of Topeka. Topeka is located in Northeast-Central Kansas and is approximately 70 miles to the west of the Kansas-Missouri border and Kansas City, Missouri.

Interstate 70 traverses approximately two miles to the south of the airport. To the immediate east is Kansas State Highway (SH) 4, known as the Oakland Expressway. SH 4 connects to U.S. Highway 24 approximately one mile to the north of the airport. To the immediate south of the airport is Seward Road. To the immediate west of the airport is NE Strait Avenue. The airport entrance road, NE Sardou Road, is on the west side of the airport extending from the intersection with NE Strait Avenue.

AIRPORT HISTORY AND DEVELOPMENT

Philip Billard was born to a prominent Topeka family on April 27, 1891. His father, J.B. Billard would serve as mayor of Topeka from 1910 to 1913. At an early age, Philip was fascinated by the new "flying machines." A family friend, A.K. Longren, was an early Topeka aviator and aircraft builder who taught Philip how to fly. Local newspapers documented Billard's frequent flights around the capital.

With America's entry into World War I, Billard volunteered for service as a pilot. He trained in Colorado, California, and New York before being assigned to France as a test pilot and instructor. Billard died tragically on July 14, 1918 when the plane he was flying disintegrated.

A local airport was originally constructed at the current site of the airport in 1929. The City of Topeka purchased the airport in 1937. The airport was officially dedicated on June 13, 1940 and named the Philip Billard Municipal Airport. The airport has been an asset for the community and has seen various improvements through the years.

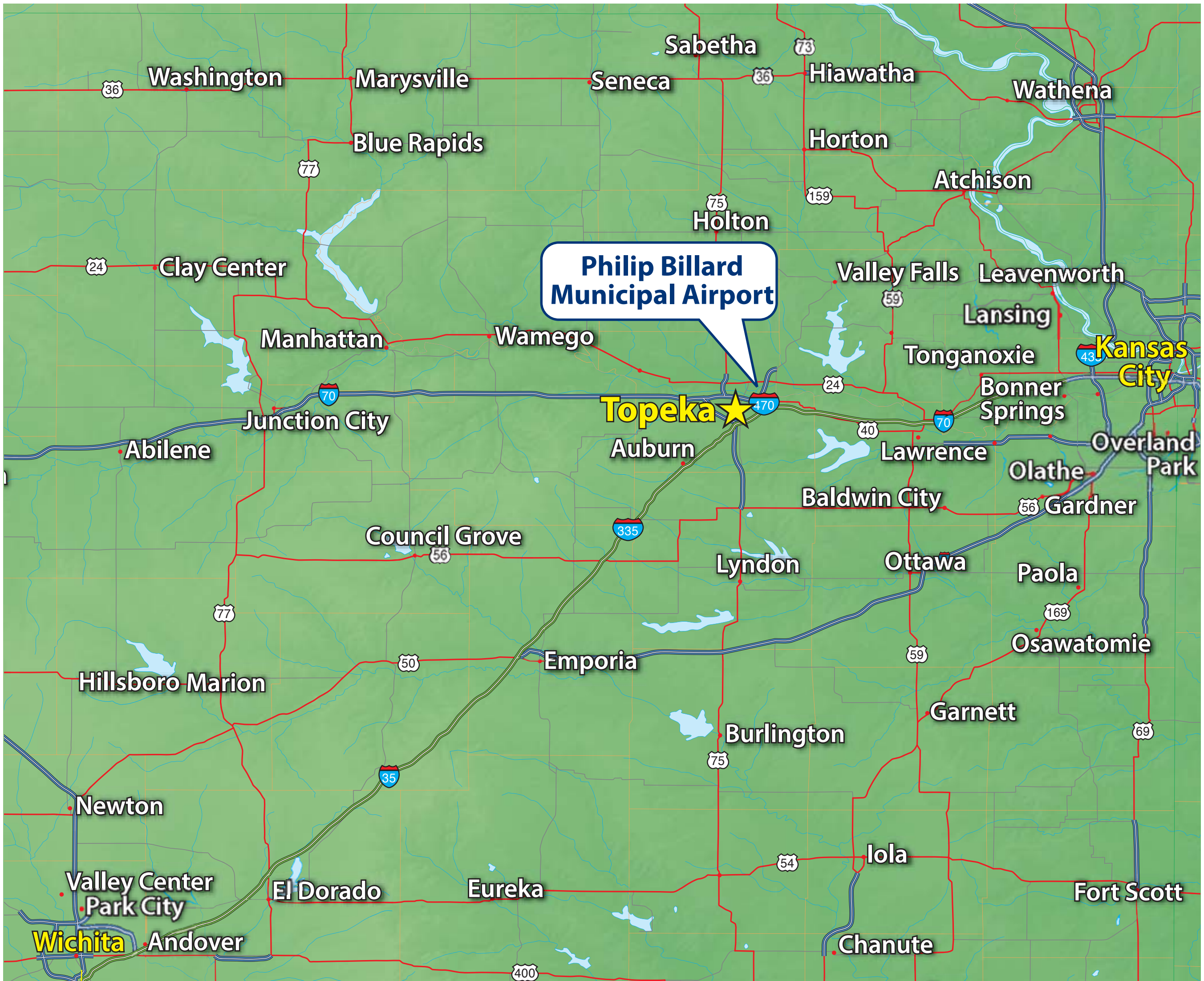
The airport has continued to be improved with significant development grants from both the federal government and the state. **Table 1A** presents the grants received by the airport since 2003. Most of the major pavements at the airport, including the runways, taxiways, and aprons, have had major rehabilitation within the last decade.

Prior to the closure of Forbes Air Force Base (Forbes Field) in 1974, Philip Billard Municipal Airport provided commercial passenger air service. This service was transferred to Forbes Field Airport.

AIRPORT ADMINISTRATION

Philip Billard Municipal Airport is a public use facility owned and operated by the Metropolitan Topeka Airport Authority (MTAA). The MTAA is a quazi-governmental body in that it has taxing authority, and it is charged with operating its assets (which includes Topeka Regional Airport) in accordance with various aviation regulations.

PHILIP BILLARD MUNICIPAL AIRPORT



LOCATION / VICINITY

Exhibit 1A
LOCATION/VICINITY MAP

TABLE 1A
Recent Grant History
Philip Billard Municipal Airport

Year	Grant #	Description	Grant Amount
2003	3-20-0082-09	Rehabilitation of Taxiways A & E	$230,681
2003	3-20-0082-10	Taxiway Lighting System	$624,973
2005	3-20-0082-11	Rehabilitation of Runway 13-31	$1,312,195
2006	3-20-0082-12	Rehabilitation of Runway 18-36	$740,752
2008	3-20-0082-13	Rehabilitation of Taxiways A, B, C, and D	$225,000
2009	3-20-0082-14	Rehabilitation of GA Apron	$20,672
2010	3-20-0082-15	Rehabilitation of Stone Hangar Apron	$149,214
2010	AV-2011-45*	Install Directional Signage	$112,477
2011	3-20-0082-16	Acquisition of Snow Removal Equipment	$133,213
2012	3-20-0082-18	Billard Airport Master Plan Update	$180,205

*All grants from FAA except (*) from KDOT
Source: MTAA/FAA records.

The MTAA was created by Charter Ordinance in 1974 in order to provide direct and professional operation and oversight of both airports. MTAA gains its statutory authority from Kansas Statutes Annotated (K.S.A. 27.327) which permits the creation of an airport authority for the purpose of maintaining public airports.

MTAA is governed by a five member board of directors. Three members shall be registered voters and city residents who are appointed by the mayor with the approval of the city council. Two members shall be Shawnee County residents residing outside the Topeka city limits and appointed by the county commission. Members shall serve three-year terms, but no more than three consecutive terms.

MTAA employs a professional staff, including a President/Executive Director responsible for day-to-day operations of the two airports. There are a total of 39 employees including a dedicated maintenance person for Philip Billard Municipal Airport.

REGIONAL CLIMATE

Weather conditions must be considered in the planning and development of an airport, as daily operations are affected by local weather patterns. Temperature is a significant factor in determining runway length needs, while local wind patterns (both direction and speed) dictate the optimal orientation of the runways.

Topeka has a humid continental climate, with hot, somewhat humid summers and cool to cold, fairly dry winters. Over the course of a year, temperatures range from an average low of about 17 degrees Fahrenheit (F) in January to an average high of nearly 90°F in July. The maximum temperature reaches 90°F an average of 45 days per year and reaches 100°F an average of four days per year. The minimum temperature falls below 0°F for an average of four nights per year, and there are 27 days per year that stay below freezing. Typically, the first fall freeze occurs between the last week of September and the end of October, and the last spring freeze occurs between early April and early May.

The area receives nearly 36 inches (91 cm) of precipitation during an average year with the largest share being received in May and June—the April through June period averages 32 days of measurable precipitation. Generally, the spring and summer months have the most rainfall, with autumn and winter being fairly dry. During a typical year, the total amount of precipitation may be anywhere from 25 to 47 inches (63 to 120 cm). Much of the rainfall is delivered by thunderstorms. These can be severe, producing frequent lightning, large hail, and sometimes tornadoes. There are on average 100 days of measurable precipitation per year. Winter snowfall is light, as is the case in most of the state, not because of lack of sufficiently cold temperatures but as a result of the dry, sunny weather patterns that dominate Kansas winters, which do not allow for sufficient moisture for significant snowfall. Winter snowfall averages almost 20 inches (51 cm), but the median is less than 11 inches (28 cm). Measurable snowfall occurs, on average, 15 days per year, with at least an inch of snow being received on seven of those days. Snow depth of at least an inch occurs an average of 26 days per year. **Table 1B** presents a summary of climate data for Topeka, Kansas.

TABLE 1B
Climate Summary
Topeka, KS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp. Avg. (°F)[1]	37.2	43.8	55.5	66.1	75.3	84.5	89.1	87.9	80.3	68.9	53.1	40.9
Low Temp. Avg. (°F)[1]	17.2	23.0	32.9	42.9	53.4	63.2	67.7	65.4	55.9	44.3	32.1	21.8
Precip. Avg.(in.)[1]	1.0	1.2	2.6	3.1	4.9	4.9	3.8	3.8	3.7	3.0	2.3	1.4
Windspeed(mph)[2]	9.6	10.0	11.5	11.8	10.2	9.5	8.4	8.0	8.5	9.0	9.8	9.7
Snowfall (in)[2]	5.8	4.4	3.8	0.8	0.1	0.0	0.0	0.0	0.0	0.2	1.0	5.0
Sunshine (%)[2]	56%	55%	57%	58%	61%	65%	71%	70%	66%	65%	54%	52%

Source: [1]*Climatography of the United States No. 81 (30 years of data from 1971-2000)*
[2]*www.city-data.com analysis of weather station data.*

AREA TRANSPORTATION MODES

Airports are a significant part of the national transportation infrastructure. Other modes of transportation can work in synergy with airports to promote access and economic development. They can also compete with airports for users. The following discussion presents information related to the various transportation modes available in the area of the airport.

Highways

The airport is within close proximity to the surface transportation system. Interstate 70 is two miles to the south. The Oakland Expressway borders on the eastern edge of the airport and it connects I-70 with U.S. Highway 24 one mile north of the airport. Both U.S. 24 and Interstate 70 provide east-west mobility. Interstate 470 is the southern loop highway around Topeka and its eastern terminus is at the intersection with Interstate 70 and the Oakland Expressway. Interstate 335, known as the Kansas Turnpike, provides southerly access from Topeka to south of Wichita, where it becomes Interstate 35 and continues south to Dallas and terminates at Laredo, Texas.

Rail

Topeka is served by AmTrak, the national passenger rail service. The station is located at 500 SE Holliday Place in Topeka, approximately three miles from the airport. The *Southwest Chief* makes a daily stop in Topeka.

Topeka also provides freight rail services. The Union Pacific and Burlington Northern-Santa Fe (BNSF) lines converge in downtown Topeka. The Union Pacific lines extend to the east and on the north bank of the Kansas River. The BNSF extend south of the airport and traverse on the south bank of the Kansas River to the east. Both lines extend to the west coast.

Public Transit System

The Topeka Metropolitan Transit Authority provides public transit services in Topeka (bus service). Oakland Route #1 extends from the downtown bus station, east to Strait Avenue and makes a stop at the intersection with Sardou Avenue at the entrance to the airport, before continuing west on Sardou and serving north Topeka. The bus stops at the airport entrance every hour beginning at 6:29 am with the last stop at 5:29 pm.

Long distance bus service is provided by Greyhound. There is a terminal station at 600 Southeast Quincy Street in downtown Topeka. There are several taxi cab and limousine service companies available in Topeka as well.

AREA LAND USE

Land uses in the vicinity of the airport can have an impact on airport operations and growth potential. The following section identifies baseline information relating to both existing and future land uses in the vicinity of Philip Billard Municipal Airport. By understanding the land use issues surrounding the airport, more appropriate recommendations can be made for the future of the airport.

Exhibit 1B presents the current land use in the vicinity of the airport. To the west is significant residential development. To the south is some residential development, primarily adjacent to NE Seward Road and industrial land uses. To the east are primarily industrial/commercial land uses. There are some residential houses interspersed within the industrial areas. To the north and east are primarily agricultural land uses. The Kansas River meanders to the north and east of the airport creating a natural barrier.

In 2012, the Metropolitan Topeka Planning Organization adopted the Long Range Transportation Plan. As shown on **Exhibit 1C**, the plan includes both current and future land use plans. The future land use plan categorized land uses surrounding the airport. Land to the west is primarily residential, to the south and east is primarily industrial. The land surrounding the Kansas River to the north and east is planned to remain open space. The airport is planned to remain a quazi-governmental land use as it continues to operate as an airport.

HEIGHT AND HAZARD ZONING

The City of Topeka and Shawnee County have provided height and hazard zoning for the protection of Philip Billard Municipal Airport. Topeka Municipal Code, Chapter 18.205, *Forbes Field and Philip Billard Airports Hazard Zoning,* codifies these regulations. The code establishes various zones as defined by the instrument capability of each runway. The zones established are the approach zones (visual, nonprecision, and precision), transition zones, horizontal zones, and conical zones, as applicable to each runway as defined in Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*.

According to the code, the height limitations require that no structure or tree shall be erected, altered, allowed to grow, or be maintained in any zone to a height in excess of the height limit established for each zone. **Exhibit 1D** presents the various zones as associated with Philip Billard Municipal Airport. The following is a description of each zone:

Runway 13 Precision Instrument Approach Zone: The inner edge of the precision instrument runway approach zone coincides with the width of the primary surface and is 1,000 feet wide. The approach zone expands outward uniformly to a width of 16,000 feet at a horizontal distance of 50,000 feet from the primary surface, its centerline being the continuation of the centerline of the runway.

This approach zone slopes upward 50 feet horizontally for each foot vertically (50:1) beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 10,000 feet along the extended runway centerline; then slopes upward 40 feet horizontally for each foot vertically (40:1) to an additional horizontal distance of 40,000 feet along the extended runway centerline.

Runway 31 Nonprecision Instrument Approach Zone: The inner edge of this approach zone coincides with the width of the primary surface and is 1,000 feet wide. The approach zone expands outward uniformly to a width of 4,000 feet at a horizontal distance of 10,000 feet from the primary surface, its centerline being the continuation of the centerline of the runway.

This approach zone slopes upward 34 feet horizontally for each foot vertically (34:1) beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 10,000 feet along the extended runway centerline.

Runways 18, 36, 4, 22 Nonprecision Instrument Approach Zone: The inner edge of this approach zone coincides with the width of the primary surface and is 500 feet wide. The approach zone expands outward uniformly to a width of 3,500 feet at a horizontal distance of 10,000 feet from the primary surface, its centerline being the continuation of the centerline of the runway.

This approach zone slopes upward 34 feet horizontally for each foot vertically (34:1) beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 10,000 feet along the extended runway centerline.

Transitional Zones: Transitional zones are established as the area beneath the transitional surfaces. These surfaces extend outward and upward at a 90-degree angle to the runway centerline and the runway centerline extended at a slope of seven feet horizontally for each foot vertically from the sides of the primary and approach surfaces to where they intersect with the horizontal and conical surfaces. Transitional zones for those portions of the precision approach zones which project through and beyond the limits of the conical surface extend a distance of 5,000 feet measured horizontally from the edge of the approach and at 90-degree angles to the extended runway centerline.

PHILIP BILLARD MUNICIPAL AIRPORT

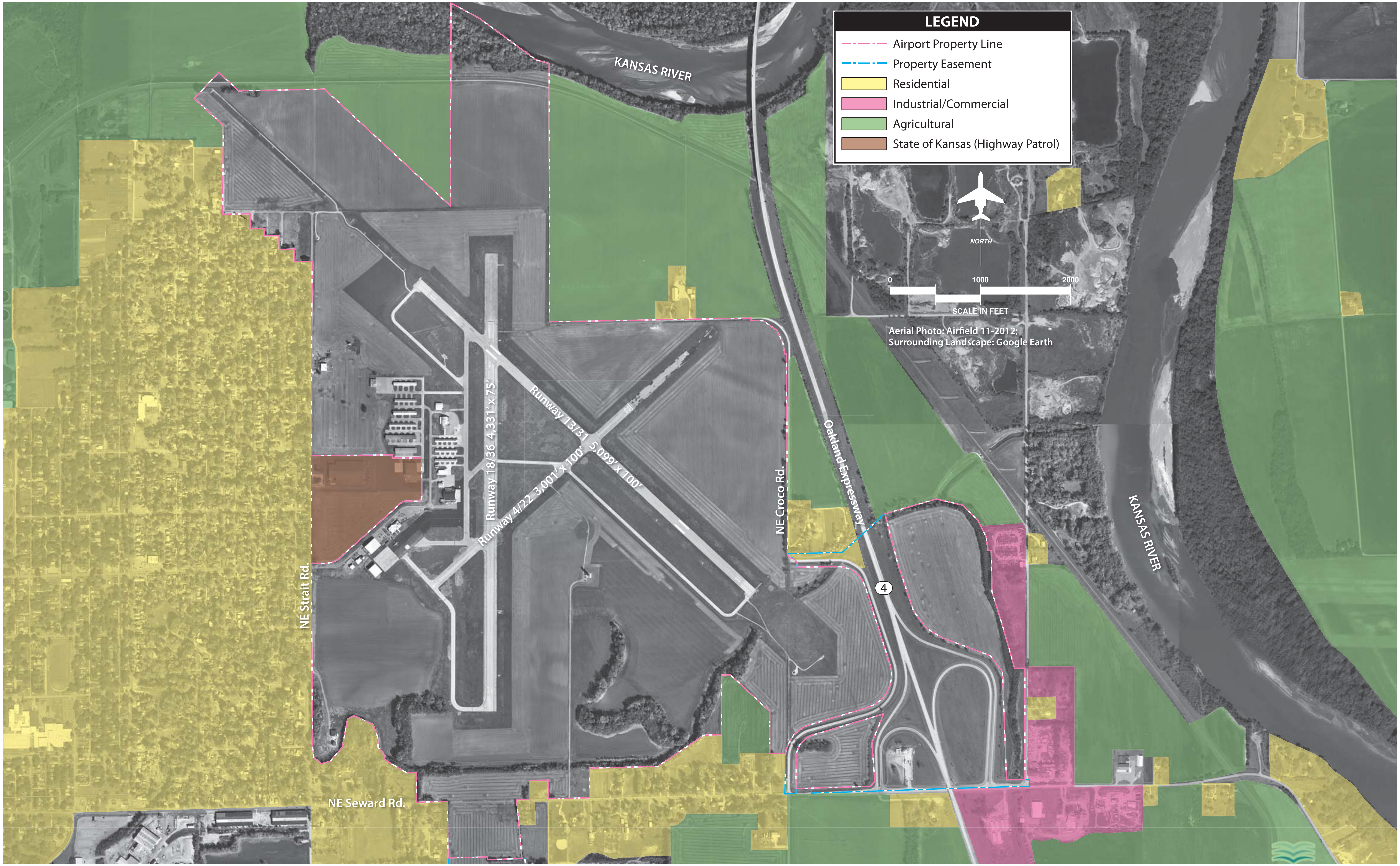


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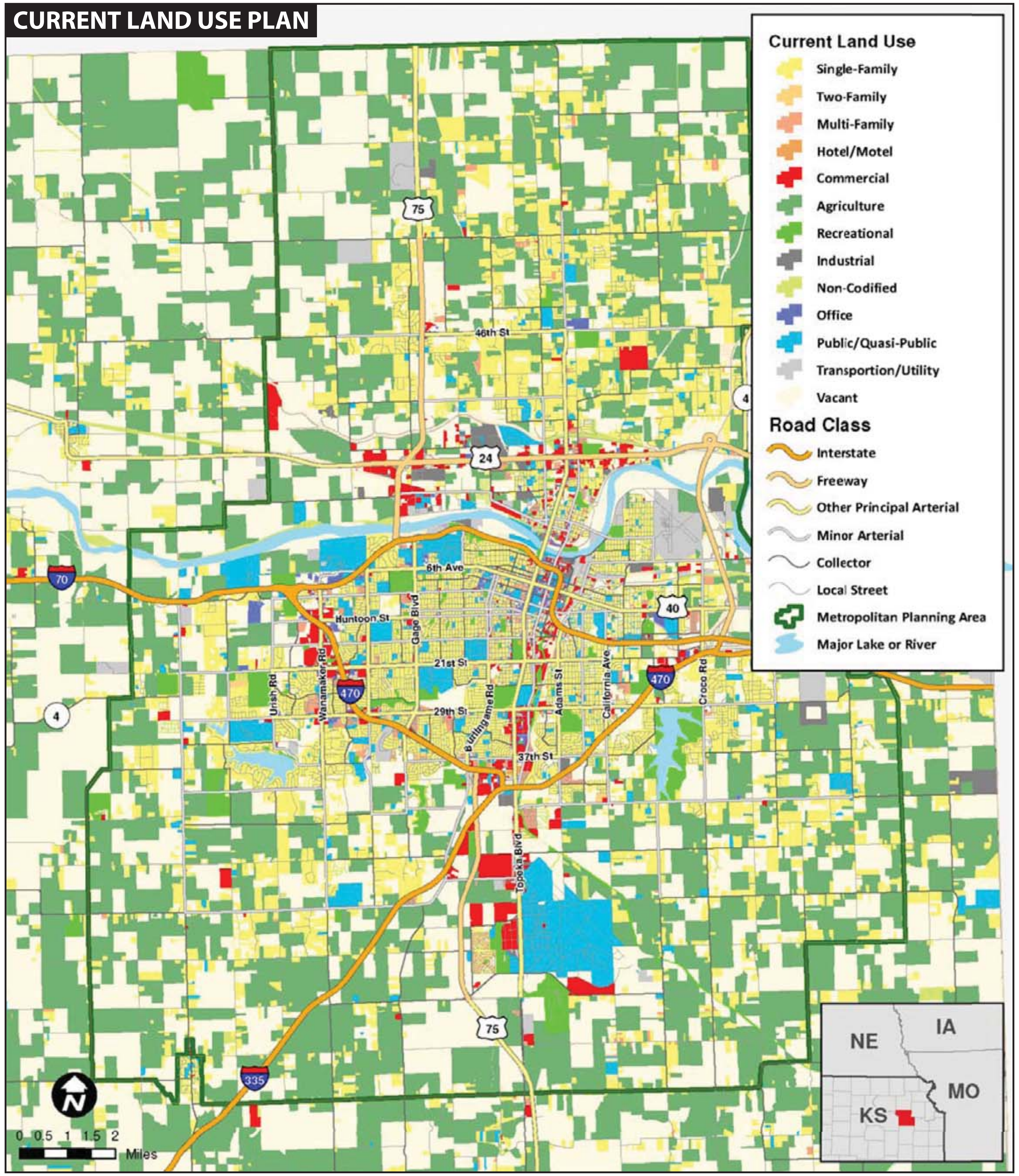
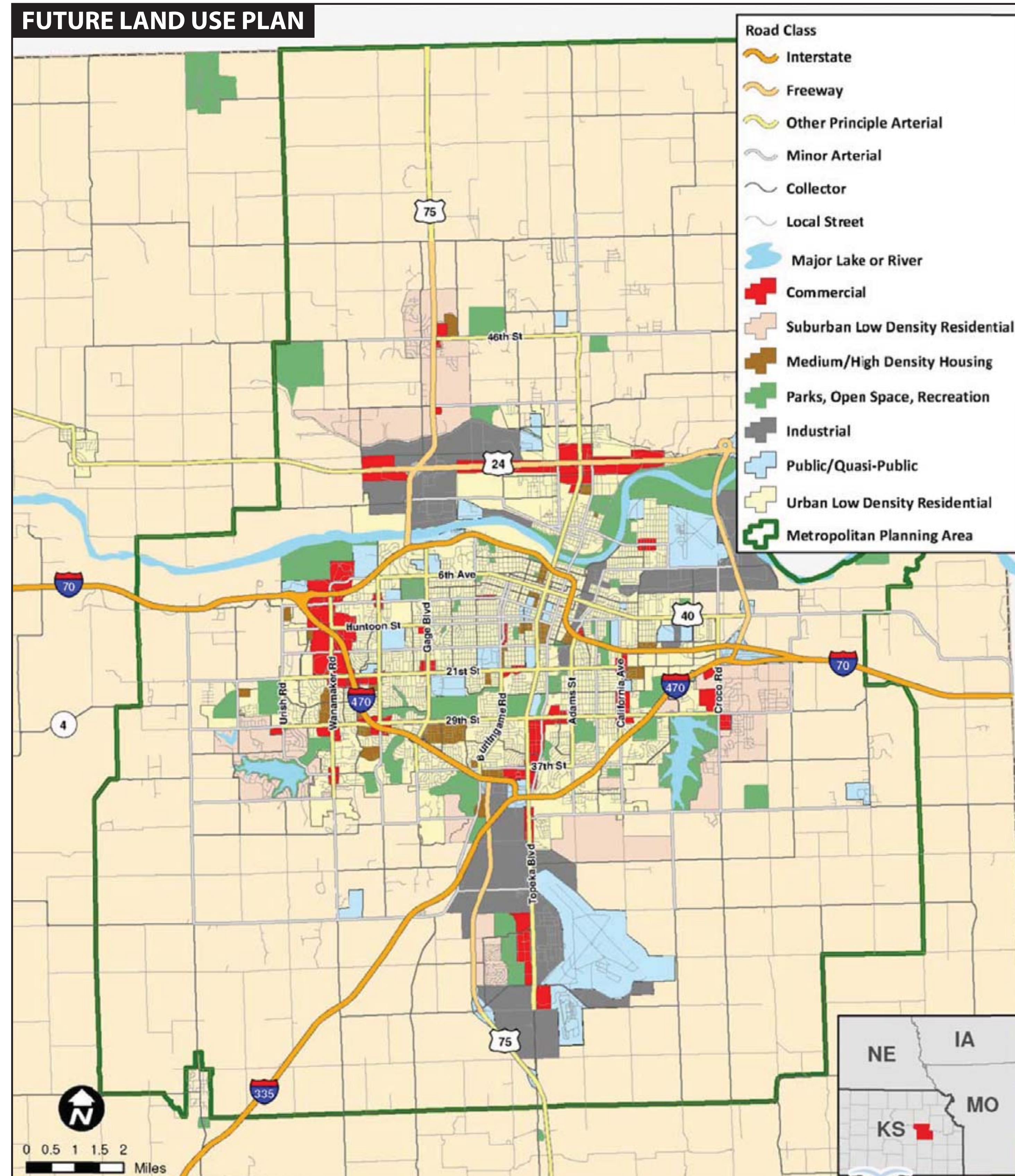
Exhibit 1B
EXISTING LAND USE

CURRENT LAND USE PLAN



FUTURE LAND USE PLAN



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Source: 2040 Metropolitan Topeka Long Range Transportation Plan

Exhibit 1C
CURRENT AND FUTURE LAND USE PLANS

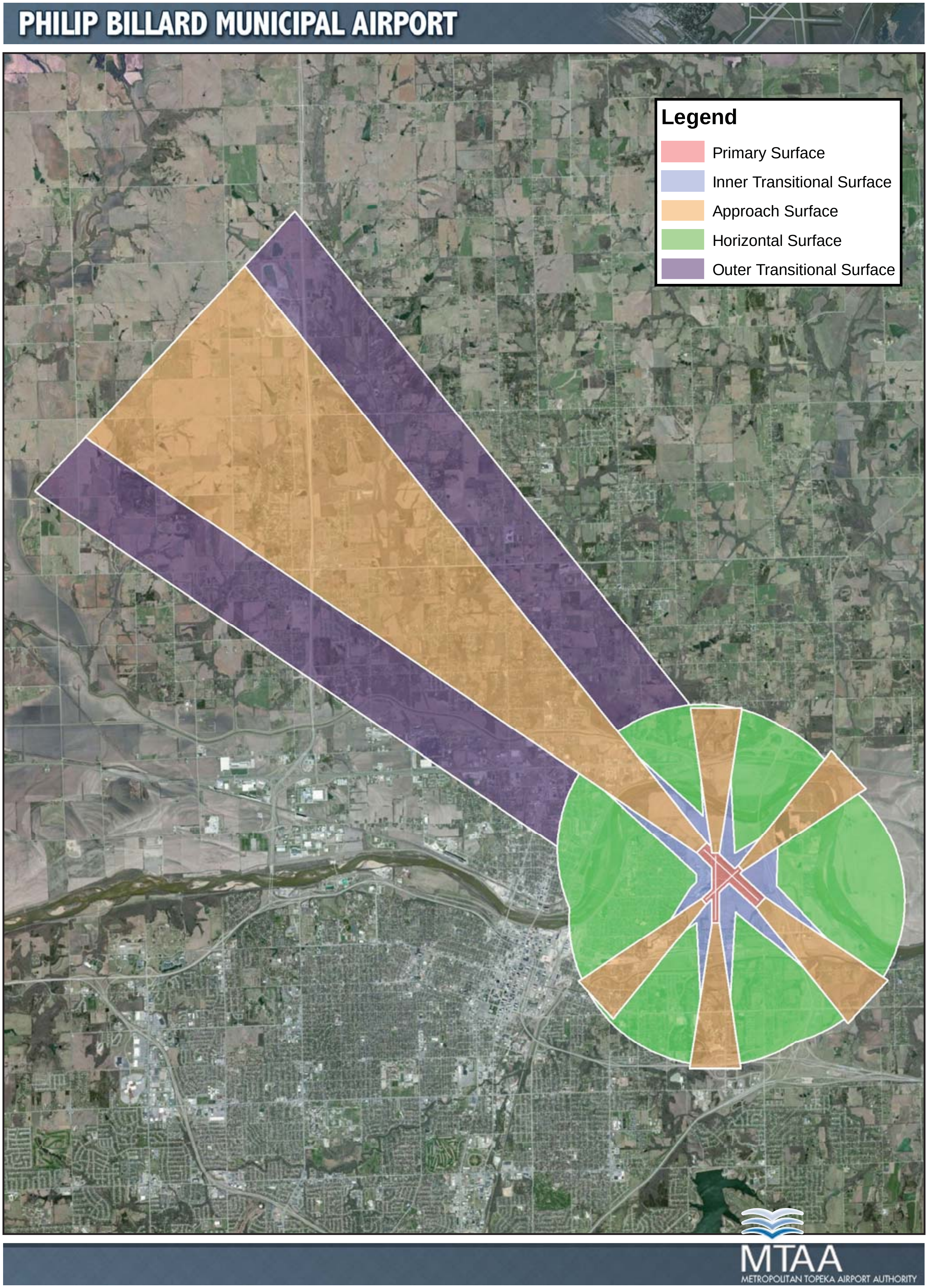


Exhibit 1D
HEIGHT AND HAZARD ZONES

Horizontal Zone: The horizontal zone is established by swinging arcs of specified radii from the center of each end of the primary surface to each runway. The radius of each arc is 5,000 feet for all runways designated as utility or visual and 10,000 feet for all other runways. The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be the highest determined for either end of the runway. When a 5,000-foot arc is encompassed by tangents connecting two adjacent 10,000-foot areas, the 5,000-foot arc shall be disregarded on the construction of the perimeter of the horizontal surface, and connecting the adjacent arcs by drawing lines tangent to those arcs. The horizontal zone does not include the approach and transitional zones.

Conical Zone: The conical zone is established as the area that commences at the periphery of the horizontal zone and extends outward there from a horizontal distance of 4,000 feet. The conical zone does not include the precision instrument approach zones and the transitional zones.

The height and hazard zoning surrounding Philip Billard Municipal Airport provides for protection of the airport against obstructions that could be a hazard to air navigation. The zoning regulation is structured to be adaptable so that if any of the instrument approaches were to change at the airport, the restrictions would still apply. These regulations should be maintained through the existence of the airport.

AIRPORT SYSTEM PLANNING ROLE

Airport planning exists on many levels: national, state, and local. Each level has a different emphasis and purpose. On the national level, the Philip Billard Municipal Airport is included in the *National Plan of Integrated Airport Systems* (NPIAS) and in the *General Aviation Airports: A National Asset*, an FAA report published in 2012. On the state level, the airport is included in the *Kansas Airport System Plan* (2009) (OAP 2007). The local planning document is the Airport Master Plan and associated ALP, which were last updated in 2002.

FEDERAL AIRPORT PLANNING

On the national level, the Philip Billard Municipal Airport is included in the NPIAS as a general aviation facility. This federal plan identifies 3,332 existing airports which are considered significant to the national air transportation system. The NPIAS is published and used by the FAA in administering the Airport Improvement Program (AIP), which is the source of federal funds for airport improvement projects across the country. The AIP program is funded exclusively by user fees and user taxes, such as those on fuel and airline tickets. The 2013-2017 NPIAS estimates that $42.5 billion worth of needed airport improvements are eligible for AIP funding across the country over the next five years. An airport must be included in the NPIAS to be eligible for federal funding assistance through the AIP.

The NPIAS supports the FAA's strategic goals for safety, system efficiency, and environmental compatibility by identifying specific airport improvements. The current issue of the NPIAS identifies approximately $1.3 million in development needs over the next five years for Philip Billard Municipal Airport. This figure is not a guarantee of federal funding; instead, this figure represents development needs as presented to the FAA by the airport administration in the annual airport capital improvement program.

Airports that apply for and accept AIP grants must adhere to various grant assurances. These assurances include maintaining the airport facility safely and efficiently in accordance with specific conditions. The duration of the assurances depends on the type of airport, the useful life of the facility being developed, and other factors. Typically, the useful life for an airport development project is a minimum of 20 years. Thus, when an airport accepts AIP grants, they are obligated to maintain that facility in accordance with FAA standards for at least that long.

Of the $42.5 billion in airport development needs nationally, approximately 30 percent is designated for 2,831 general aviation airports (includes reliever airports). Philip Billard Municipal Airport is designated as a general aviation airport.

In 2012, the FAA published a document titled *General Aviation Airports: A National Asset*. The purpose of the report is to further classify general aviation airports into four categories: national, regional, local, and basic airports. Of the 2,952 general aviation airports included in the study, 497 were not specifically classified due to types of activity and characteristics that did not provide for clear classification within one of the four groups. **Exhibit 1E** summarizes the composition of the National Airspace System as well as the general aviation classifications and functions.

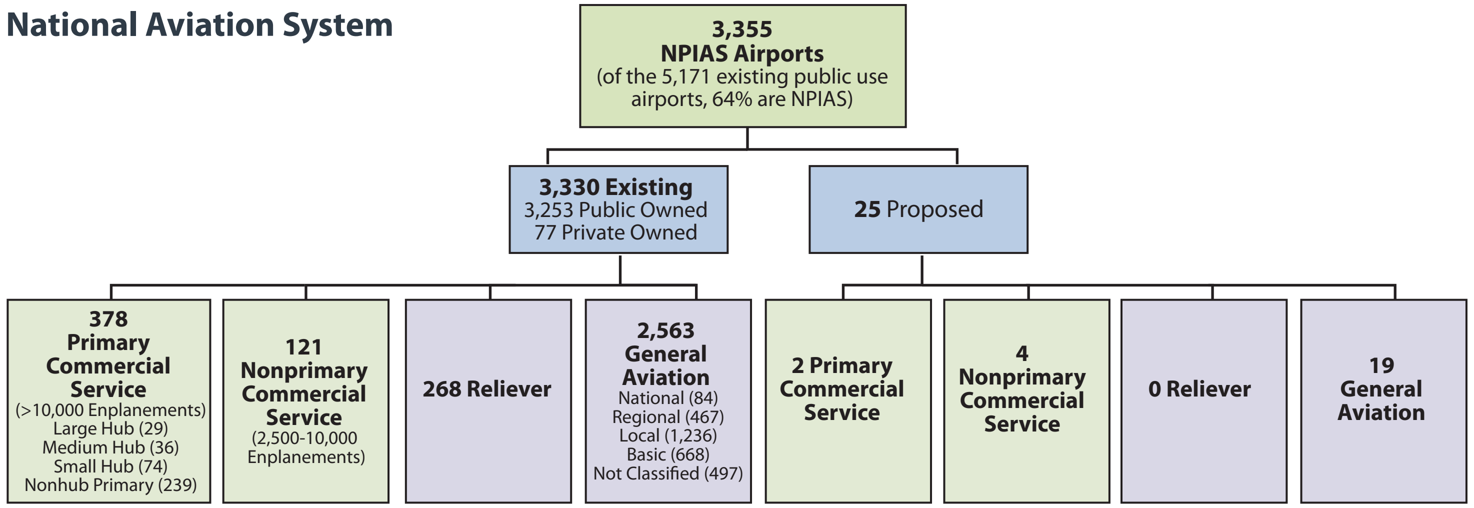
With this report, which has been integrated into the NPIAS, the FAA is recognizing the important contribution that general aviation airports provide to the national aviation system and economy. General aviation contributed $38.8 billion in economic output in 2009. When factoring in manufacturing and visitor expenditures, general aviation accounted for an economic contribution of $76.5 billion.

The new categories for general aviation airports are intended to help guide policymakers when making decisions regarding airports. The FAA recognized that categorizing all general aviation airports the same did not properly identify the important role of each airport within a community and the benefits of a large and diverse aviation system.

Philip Billard Municipal Airport is categorized as one of the 1,236 "local" general aviation facilities. "Local" general aviation airports support at least 10 annual instrument operations and have 15 or more based aircraft. The FAA describes "local" general aviation airports as the "backbone" of the general aviation system. These airports are typically located near larger population centers. "Local" airports account for 42 percent of the general aviation airports that are eligible for federal funding. They also account for 38 percent of the total flying at the studied general aviation airports and 17 percent of flying with flight plans. Most of the activity is by piston-powered aircraft in support of business and personal needs. These airports typically accommodate flight training, emergency services, and some charter operations. The flying tends to be within the state or immediate region.

PHILIP BILLARD MUNICIPAL AIRPORT

National Aviation System

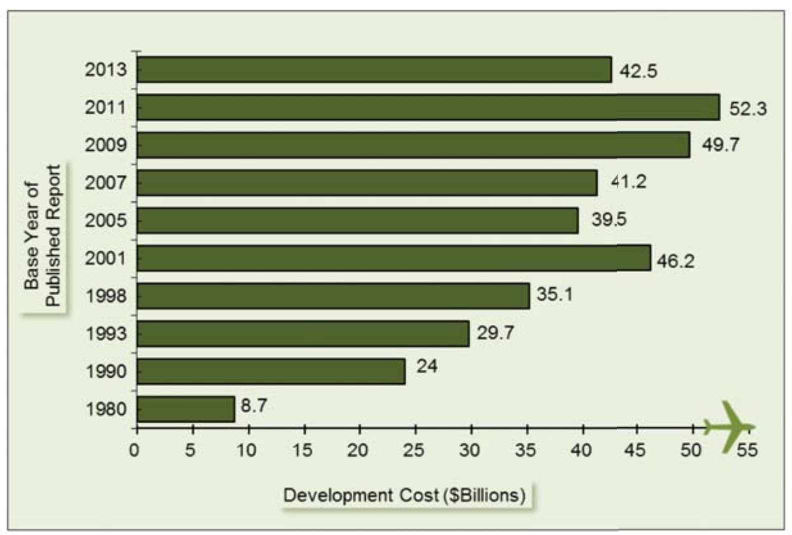


There are more than 19,800 aviation facilities in the United States. 5,171 of those are public use facilities. The National Plan of Integrated Airport Systems (NPIAS) includes 3,355 public use landing facilities, of which 3,330 are existing and 25 are proposed.

General Aviation Airports

GROUP (number of airports)	DESCRIPTION	FUNCTIONS (varies among individual airports)
National (84)	**Serves national – global markets** Very high levels of activity with many jets and multiengine propeller aircraft Averaging about 200 total based aircraft, including 30 jets	Emergency Preparedness and Response
Regional (467)	**Serves regional – national markets** High levels of activity with some jets and multiengine propeller aircraft Averaging about 90 total based aircraft, including 3 jets	Critical Community Access
Local (1,236)	**Serves local – regional markets** Moderate levels of activity with some multiengine propeller aircraft Averaging about 33 based propeller-driven aircraft and no jets	Other Aviation Specific Functions; Commercial, Industrial, and Economic Activities
Basic (668)	**Often serving critical aeronautical functions within local and regional markets** Moderate – low levels of activity Averaging about 10 propeller-driven aircraft and no jets	Destination and Special Functions

The FAA has further categorized general aviation airports to help guide policy makers when making decisions regarding airport development.

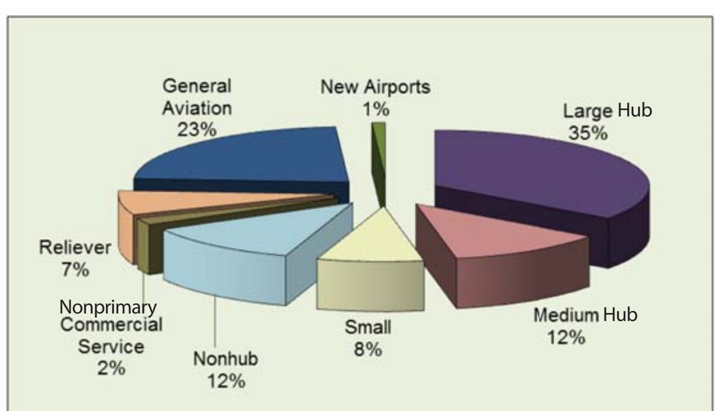


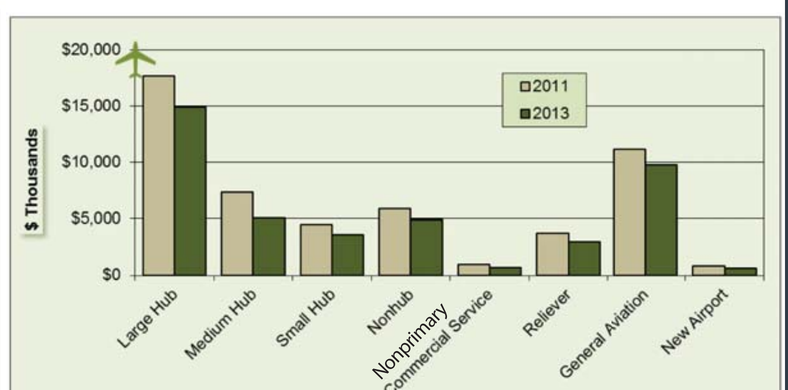
The FAA estimates that over the next five years, (2013-2017), there will be $42.5 billion of airport infrastructure projects eligible for Airport Improvement Program (AIP) funding.

Emergency Preparedness and Response	▪ Aeromedical Flights ▪ Law Enforcement/National Security/Border Security ▪ Emergency Response ▪ Aerial Fire Fighting Support ▪ Emergency Diversionary Airport ▪ Disaster Relief and Search and Rescue ▪ Critical Federal Functions
Critical Community Access	▪ Remote Population/Island Access ▪ Air Taxi/Charter Services ▪ Essential Scheduled Air Service Cargo
Other Aviation Specific Functions	▪ Self-Piloted Business Flights ▪ Corporate ▪ Flight Instruction ▪ Personal Flying ▪ Charter Passenger Services ▪ Aircraft/Avionics Manufacturing/Maintenance ▪ Aircraft Storage ▪ Aerospace Engineering/Research

Commercial, Industrial, and Economic Activities	▪ Agricultural Support ▪ Aerial Surveying and Observation ▪ Low-Orbit Space Launch and Landing ▪ Oil and Mineral Exploration/Survey ▪ Utility/Pipeline Control and Inspection ▪ Business Executive Flight Service ▪ Manufacturing and Distribution ▪ Express Delivery Service ▪ Air Cargo
Destination and Special Events	▪ Tourism and Access to Special Events ▪ Intermodal Connections (rail/ship) ▪ Special Aeronautical (skydiving/airshows)

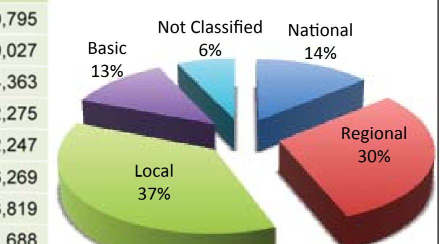
General aviation airports provide important services for both local communities and the national aviation system.





The 449 commercial service (primary and nonprimary) airports account for 69% of the total development in the NPIAS. The 2,563 general aviation and 268 reliever airports account for 30% of development.

Category	National	Regional	Local	Basic	Not Classified	TOTAL
Safety	$75,705,614	$86,710,307	$70,021,759	$16,866,556	$7,026,559	$256,330,795
Security	$30,588,072	$70,028,017	$116,979,036	$54,635,381	$42,428,521	$314,659,027
Reconstruction	$566,808,683	$1,151,264,524	$1,408,160,656	$505,127,646	$225,522,854	$3,856,884,363
Standards	$824,339,636	$2,215,374,810	$2,967,664,186	$1,013,246,603	$533,257,040	$7,553,882,275
Environmental	$15,797,438	$9,895,920	$25,330,900	$13,827,647	$4,270,342	$69,122,247
Noise	$59,033,952	$12,492,106	$4,410,211	$0	$0	$75,936,269
Capacity	$167,431,296	$218,153,518	$168,522,546	$56,143,576	$32,282,883	$642,533,819
Terminal	$48,187,551	$61,979,002	$70,218,522	$21,798,925	$9,867,688	$212,051,688
Access	$47,984,641	$109,815,827	$104,412,928	$42,708,943	$13,451,896	$318,374,235
Other	$7,571,000	$27,813,731	$49,226,059	$26,995,300	$15,686,691	$127,292,781
Total	$1,843,447,883	$3,963,527,762	$4,984,946,803	$1,751,350,577	$883,794,474	$13,427,067,499



Airports in the general aviation categories account for $13.4 billion of the $42.5 billion in identified development need over the next five years.

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Source: National Plan of Integrated Airport Systems 2013-2017

Source: General Aviation Airports: A National Asset (May 2012)

Exhibit 1E
NATIONAL AVIATION SYSTEM
COMPOSITION AND DEVELOPMENT NEEDS

STATE AIRPORT PLANNING

The primary planning document for the State of Kansas is the *Kansas Airport System Plan* (2009 KASP). The plan provides the Kansas Department of Transportation's (KDOT) – Aviation Division staff with a tool to assess the needs of the state's airports; help justify funding for airport improvements; and provides information to airport sponsors and others concerning the value, use, and needs of the state's public use airports.

The 2009 KASP identified five roles for Kansas airports which are defined as follows:

Commercial Service Airports: These airports accommodate scheduled major/national or regional/commuter commercial air service.

Regional Airports: Airports that accommodate regional economic activities, connect the state and national economies, and serve all types of general aviation aircraft.

Business Airports: Airports that accommodate local business activities and general aviation users.

Community Airports: These airports serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying.

Basic Airports: Airports that serve a limited role in the local economy, primarily serving recreational and personal flying.

Philip Billard Municipal Airport is classified as a Regional Airport in the 2009 KASP. The minimum facility and service requirements are listed in **Table 1C.** The airport layout and available services meet the minimum recommendations in the 2009 KASP for all criteria except for a full parallel taxiway. However, the current taxiway layout does provide ready access to both ends of the primary runway.

LOCAL AIRPORT PLANNING

The Airport Master Plan is the primary local planning document. The Master Plan is intended to provide a 20-year vision for airport development based on aviation demand forecasts. The most recent airport planning document is the 2002 *Airport Master Plan Update*. Over time, the forecast element of an airport master plan typically becomes less reliable due to changes in aviation activity and/or the economy. As a result, the FAA recommends that general aviation airports update their master plans every seven to ten years, or as necessary to address any significant changes. Therefore, this is an appropriate time to update the airport master plan and revisit the development assumptions from the previous planning study.

TABLE 1C **Minimum Facility and Service Criteria** **KASP Regional Airports**	
Airport Criteria	**Minimum Objective**
Runway Length	5,000 feet
Runway Width	100 feet
Taxiway	Full Parallel
Surface	Paved/All Weather Surface
Pavement Condition Index (PCI)	70 or Greater
Approach Capability	Near Precision
Visual Aids	Rotating Beacon, Lighted Wind Sock, REILS, VASI/PAPI
Lighting	MIRL/MITL
Approach Lighting System	ALS desired
Weather	AWOS, ASOS, ATCT
Planning documents	Security Plan, Snow Removal Plan
Services	Limited Service FBO, Restrooms, Links to Ground Transportation, AvGas and Jet A Fuel
Facilities	Terminal Building, Pilots' Lounge, Hangars for 100% of based aircraft, Apron 100' x 100', Auto Parking

REIL: Runway End Identification Lights
VASI: Visual Approach Slope Indicator
PAPI: Precision Approach Path Indicator
AWOS: Automated Weather Observation System
ASOS: Automated Surface Observation System
ATCT: Airport Traffic Control Tower
FBO: Fixed Base Operator

Source: Kansas Airport System Plan (2009 KASP)

ECONOMIC IMPACT

In August 2010, the Kansas Department of Transportation – Division of Aviation published the commissioned report, *Kansas Aviation Economic Impact Study*. The report identifies 140 public use airports in the state, of which eight provide commercial service and the remaining 132 are general aviation airports. In 2009, the base year for the study, the system of 140 airports supported approximately 47,651 jobs, generated $2.3 billion in annual payroll, and produced $10.4 billion in annual economic activity.

Philip Billard Municipal Airport is included in the study. It is estimated that the airport accounts for 199 jobs, $6.8 million in payroll, and $14.3 million in total economic output. **Table 1D** presents detailed information related to the economic impacts of Philip Billard Municipal Airport.

TABLE 1D Economic Impact Estimates Philip Billard Municipal Airport		
Estimate of Annual Expenditures by General Aviation (GA) Visitors		
Estimated GA Visitors	Avg. Visitor Spending per Trip	Annual GA Visitor Expenditures
16,081	$85	$1,366,800
Estimate of On-Airport Employment		
First-Round Employment	Second Round Employment	Total On-Airport Employment
83	80	163
Estimate of Visitor Related Employment		
First-Round Employment	Second Round Employment	Total On-Airport Employment
27	9	36
Estimate of On-Airport Payroll		
First-Round Payroll	Second Round Payroll	Total On-Airport Payroll
$3,474,800	$2,462,500	$5,937,300
Estimate of GA Visitor-Related Payroll		
First-Round Payroll	Second Round Payroll	Total On-Airport Payroll
$552,100	$311,300	$863,400
Estimate of On-Airport Output		
First-Round Output	Second Round Output	Total On-Airport Output
$7,425,900	$4,609,200	$12,035,100
Estimate of GA Visitor-Related Output		
First-Round Output	Second Round Output	Total On-Airport Output
$1,366,800	$856,400	$2,223,200
Estimate of Total Economic Impact		
Total Employment	Total Payroll	Total Output
199	$6,800,700	$14,258,300
Source: Kansas Aviation Economic Impact Study 2010, prepared by Wilbur Smith Associates		

The *Kansas Aviation Economic Impact Study* also characterizes many of the qualitative benefits provided by Philip Billard Municipal Airport. The study identifies 22 potential benefit categories, of which nine (9) occur at the airport. The categories include personal flying, military training, agricultural spraying, corporate/business activity, aerial advertising, aerial surveying, flight training, police/law enforcement, various community events, and youth outreach.

Foreign Trade Zone

Shawnee County, along with Douglas, Miami, Johnson, Wyandotte, and Leavenworth counties comprise the Alternative Site Framework (ASF) for the Greater Kansas City Foreign Trade Zone (FTZ). Businesses that locate in any of these counties are eligible to apply to the County for the benefits that the FTZ offers.

The FTZ is designated to promote international trade and offer companies and importers a way to gain a financial edge in the global marketplace. The benefits of operating a business in an FTZ are primarily the reduction or elimination of duties or excise taxes on goods imported into the U.S. At a minimum, a U.S. importer could store a shipment in the FTZ and gradually import only what is needed, and thereby improve the company's cash flow by spreading the import duty over a longer period of time.

AIRPORT PROPERTY

Philip Billard Municipal Airport encompasses approximately 866.7 acres. In addition, the airport owns avigation easements encompassing 109 acres. The easements include 24.2 acres over the Kansas Highway Patrol, 12.5 acres on the extended Runway 36 centerline, and 72.3 acres at the interchange at Oakland Expressway and Seward Road.

AIRSIDE FACILITIES

Airport facilities can be functionally classified into two broad categories: airside and landside. The airside category includes those facilities which are needed for the safe and efficient movement of aircraft, such as runways, taxiways, lighting, and navigational aids. The landside category includes facilities necessary to provide a safe transition from surface-to-air transportation, including aprons, hangars, terminal buildings, and various other support facilities.

Existing airside facilities are identified on **Exhibit 1F**. **Table 1E** summarizes airside facility data for Philip Billard Municipal Airport.

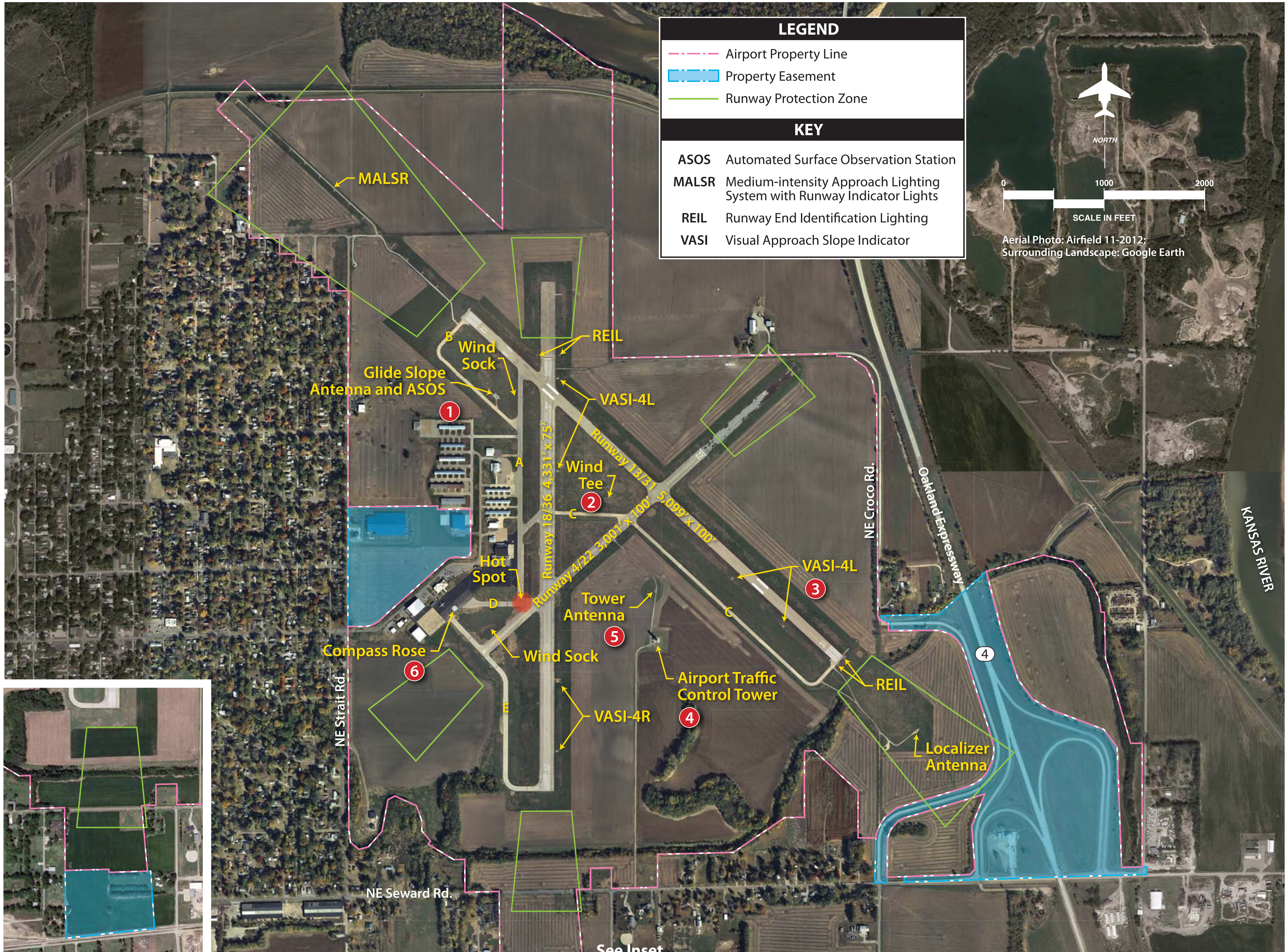
RUNWAYS

Philip Billard Municipal Airport is served by a three-runway system. The primary runway, Runway 13-31, is 5,099 feet long and 100 feet wide. The Runway 13 end has an elevation of 879.7 feet MSL, and the Runway 31 end is at 875.5 feet MSL. The runway has a longitudinal gradient of 0.1 percent. It is estimated that this runway accommodates approximately 25 percent of annual aircraft operations.

Runway 13-31 is strength-rated at 50,000 pounds for aircraft with single wheel landing gear struts (S), 72,000 pounds for dual wheel struts (D), and 110,000 pounds for dual tandem wheel struts (DT). The strength rating refers to the weight of aircraft with certain landing gear configurations. Runways can support operations by heavier aircraft; however, frequent operations by heavier aircraft can shorten the useful life of the pavement.

Runway 18-36 serves as the primary crosswind runway and is 4,331 feet long and 75 feet wide. This runway is strength-rated at 60,000 pounds (S), 80,000 pounds (D), and 96,000 pounds (DT). The Runway 18 end has an elevation of 879.8 feet MSL, and the Runway 36 end is 880.7 feet MSL. The runway has a longitudinal gradient of 0.1 percent. It is estimated that this runway accommodates 70 percent of annual aircraft operations.

PHILIP BILLARD MUNICIPAL AIRPORT



1 Glideslope Antenna and ASOS

2 Wind Tee

3 VASI

4 Airport Traffic Control Tower

5 Tower Antenna

6 Compass Rose

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Exhibit 1F
AIRSIDE FACILITIES

TABLE 1E Airside Facility Data Philip Billard Municipal Airport			
Field Elevation: 881.3 MSL	**RUNWAY 13-31**	**RUNWAY 18-36**	**RUNWAY 4-22**
Runway Length	5,099'	4,331'	3,001'
Runway Width	100'	75'	100'
Runway True Bearing	134.33°/314.34°	181.67°/1.67°	49.12°/229.13°
Runway Magnetic Heading	129°/309°	177°/357°	44°/224°
Runway Surface Material (Condition)	Asphalt (Good)	Asphalt (Good)	Asphalt (Poor)
Runway Markings (Condition)	Precision (Good)	Nonprecision (Good)	Basic (Poor)
Runway Lighting	High Intensity (HIRL)	Medium Intensity (MIRL)	Medium Intensity (MIRL)
Runway Load Bearing Strength (pounds)	50,000S/ 72,000D/ 110,000DT	60,000S/ 80,000D/ 96,000DT	29,000S
Taxiway Lighting	Medium Intensity (MITL)		
Taxiway, Taxi-lanes & Apron Lightning	Various Centerline Marking, Tie-Down Area Marking, Reflectors		
Traffic Pattern	Standard Left Hand Traffic Pattern		
Visual Approach Aids	VASI-4L (31) REIL (31) MALSR (13)	VASI-4L (18) VASI-4R (36) REIL (18)	None
Instrument Approach Aids	ILS (13) RNAV - GPS LOC BC (31)	RNAV - GPS	RNAV - GPS (4) VOR (22)
Weather and Navigational Aids	Automated Surface Observing System (ASOS) Lighted Wind Cone Wind Tee Indicator Airport Beacon Limited Aviation Weather Reporting Station (LAWRS) Airport Traffic Control Tower (ATCT)		

GPS - Global Positioning System
VOR - Very High Frequency Omni-directional Range
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
REIL - Runway End Identifier Lights
S/D/DT - Single Wheel Landing Strut/ Dual Wheel Landing Strut/Dual-Tandem Wheel Landing Strut

Source: Airport/Facility Directory - North Central U.S. (November 15, 2012); Airport records.

Runway 4-22 is the secondary crosswind runway and measures 3,001 feet in length and 100 feet in width. The runway is strength-rated at 29,000 pounds (S). The Runway 4 end has an elevation of 878 feet MSL and the Runway 22 end has an elevation of 879.2 feet MSL for a runway gradient of less than 0.1 percent. Runway 4-22 is estimated to accommodate five percent of annual operations.

PAVEMENT CONDITION

The condition of various airfield elements including pavements and markings is rated as Good, Fair, or Poor. A rating of Good indicates that the element is currently stable and regular maintenance can preserve the surface. No immediate attention is required. A rating of Fair indicates that the element may be in need of some immediate preservation action to maintain the element. A rating of Poor is an indication that the element is in need of replacement or reconstruction in the near term.

Runways 13-31 and 18-36 are in Good condition. Runway 4-22 is in Poor condition and may require some short term preservation action if it is to remain a viable runway.

Preservation of pavement is required by the FAA through Grant Assurance No. 11, which states that any airport requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program. Airport staff performs regular visual inspections of the airfield pavement surfaces.

A common method for obtaining more detailed pavement condition analysis is to have a qualified engineer develop a Pavement Condition Index (PCI) report for the airport. Utilizing a software program and by conducting various pavement condition tests, the current and future condition of various pavement sections can be rated. The PCI ratings index ranges from 0 to 100, providing an indication of the overall condition of that section of pavement. Typically when the PCI falls below 65 for runways, 60 for taxiways, and 50 for aprons, the pavement is considered to need critical preservation action. The report also provides a 10-year useful life analysis of each pavement section. There is not a recent PCI report for Philip Billard Municipal Airport.

TAXIWAYS

Taxiway A extends from the intersection with Runway 13 to its intersection with Taxiway D. This taxiway serves as a partial parallel taxiway to Runway 18-36 and provides primary access to the terminal area. Taxiway A is 50 feet wide and 270 feet from Runway 18-36, centerline to centerline.

Taxiway B is the threshold taxiway leading to Runway 13. It is 35 feet wide and intersects with Taxiway A. A portion of Taxiway B is parallel to Runway 13-31 and is separated from the runway by 500 feet.

Taxiway C has three distinct components. The first extends from Taxiway A at an angle to Runway 18-36. This portion of Taxiway C is 50 feet wide. Taxiway C then continues from Runway 18-36 to intersect with Runway 4-22 at an angle. This portion of the taxiway is 35 feet wide. Taxiway C then continues southeast to the Runway 31 threshold. This portion of the taxiway is 35 feet wide and parallel to Runway 13-31 at a separation distance of 400 feet.

Taxiway D extends from the main terminal apron to the east where it intersects with Taxiway A before extending to an angled intersection with Runway 4-22. The taxiway is 50 feet wide. The intersection of Taxiways D, A, and Runway 4-22 is identified by the FAA as a Hot Spot on the airfield. Hot Spots are locations where the physical geometry of the runway/taxiway system can be confusing to pilots and potentially lead to inadvertent runway incursions.

Taxiway E extends from the main terminal apron to the Runway 4 threshold. It continues to the Runway 36 threshold.

The taxiway is 50 feet wide and that portion that is parallel to Runway 18-36 is 400 feet from the runway centerline.

Hot Spot

The FAA identifies areas on the airfield that can be potentially confusing to pilots. These Hot Spots are published by the FAA on the airport diagram. There is one Hot Spot identified at Philip Billard Municipal Airport which is at the intersection of Taxiway A, Taxiway D, and Runway 4-22.

PAVEMENT MARKINGS

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. Runway 13 has precision markings that include runway edge marking, threshold bar, threshold markings, runway designation, fixed distance marks, centerline, touchdown zone markings, and aiming point. Runway 31 has the same precision markings as Runway 13, except there are no fixed distance marks. Runway 18-36 has non-precision markings which include runway edge marking, threshold bar, threshold markings, runway designation, and centerline markings. Runway 4-22 provides basic markings which include the threshold bar, runway designations, and runway centerline markings. The markings for Runway 13-31 and 18-36 are in "Good" condition, while the markings for Runway 4-22 are in "Poor" condition.

The taxiways have centerline markings. The terminal apron has centerline marking as well as aircraft tie-down markings. These markings are in "Good" condition.

AIRFIELD LIGHTING

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows:

Identification Lighting: The location of the airport at night is universally identified by a beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The beacon at Philip Billard Municipal Airport is on the top of a 50-foot tall steel pole located on the western edge of the main aircraft tie-down apron. The pole is hinged, allowing quick access to the beacon when repairs or replacement is necessary.

Runway and Taxiway Lighting: Runway lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runway and aircraft parking areas.

Runway 13-31 is equipped with high intensity runway lighting (HIRL) and both crosswind runways are equipped with medium intensity runway lighting (MIRL). These are lights set atop poles that are approximately one foot above the ground. The light poles are frangible, meaning if they are struck by an object, such as an aircraft wheel, they can easily break away, thus limiting the potential damage to an aircraft. The edge lights are white in color and the threshold lights are green on the approach side and red on the departure side. None of the runways have caution zone lighting, which are yellow runway edge lights positioned in the last two thousand feet of some jet-capable runways.

All taxiways are equipped with medium intensity taxiway lighting (MITL). The taxilanes leading to hangar areas have blue edge reflectors rather than edge lights.

Visual Approach Lighting: Common visual approach aids include visual approach slope indicator (VASI) lights and precision approach path indicator (PAPI) lights. VASI are a staggered set of light boxes located to the side of the runway, and PAPIs are a set of non-staggered light boxes located to the side of the runway approximately 1,000 feet from the runway threshold. When interpreted by pilots, both VASIs and PAPIs give them an indication of being above, below, or on the correct descent path to the runway. Two-box systems are common for runways serving small aircraft. Runways utilized by faster turboprop and jet aircraft are typically equipped with four-box systems. The standard is for VASIs and PAPIs to be set to the left side of the runway.

Runway 31 provides a four-light VASI system set to the left side of the runway. Runway 18 has a VASI system set to the left side of the runway. Runway 36 has a VASI system set to the right side of the runway.

Approach Lighting Systems: The approach to Runway 13 is equipped with a medium intensity approach lighting system with runway alignment indicator lights (MALSR). These lights extend approximately 2,400 feet from the Runway 13 threshold. This light system provides pilots with rapid identification of the extended runway centerline and a visual lighted grid to align their aircraft for landing. The MALSR is owned and maintained by the FAA.

Runway End Identification Lighting: REILs provide a visual identification of the runway end for landing aircraft. The system consists of two flashing light assemblies located approximately 40 feet to either side of the runway landing threshold. These flashing lights can be seen day or night for a distance of up to 20 miles depending on visibility conditions. Runway ends serving jet aircraft but without an approach lighting system should be outfitted with REILs. Runways 18 and 31 are equipped with REILs which are owned and maintained by the FAA.

Airfield Signs: Airfield signs provide information to pilots regarding current location on the airfield as well as what they are approaching (runway or taxiway). The airport has lighted signage identifying runways and taxiways. These signs were installed in 2010 with a grant from KDOT.

Distance-To-Go Signs: Runway 13-31 is equipped with lighted distance-to-go signs on the east side of the runway. These signs alert pilots to how much runway length is remaining in increments of 1,000 feet.

Pilot-Controlled Lighting: The airfield lights are turned off at nighttime. Pilots can utilize the pilot-controlled lighting system (PCL) to activate certain airfield lights from their aircraft through a series of clicks of their radio transmitter utilizing the CTAF frequency (118.7 MHz). The edge lights for Runways 13-31 and 18-36, as well as the MALSR, VASIs and REILs can be turned on with the system. Typically, the airfield lights will remain on for approximately 15 minutes.

The VASIs, REILS, and MALSR are all owned and maintained by the FAA Facilities & Equipment Division.

WEATHER AND COMMUNICATION AIDS

Philip Billard Municipal Airport has a lighted windsock in the terminal area bounded by Taxiways D and E and Runway 4. The windsock provides information to pilots regarding wind conditions, including direction and speed. There is an additional unlit supplemental windsock located to the west of the Runway 18 threshold near the intersections of Taxiways A and B. There are two windsocks on top of the Kansas Highway Patrol hangar.

A lighted wind tee, which provides wind direction information, is also located in the mid-field area between Runway 18-36 and Runway 13-31. The wind tee rotates depending on the direction of the wind, thereby providing pilots with a visual indication of the wind direction.

Philip Billard Municipal Airport is equipped with an Automated Surface Observing System (ASOS). The ASOS automatically records weather conditions such as wind speed, wind gust, wind direction, temperature, dew point, altimeter setting, visibility, fog/haze condition, precipitation, and cloud height. This information is then transmitted at regular intervals (usually every hour). Aircraft in the vicinity can receive this information if they have their radio tuned to the correct frequency (121.275 MHz). In addition, pilots and individuals can call a published telephone number (1-785-234-1591) and receive the information via an automated voice recording.

Philip Billard Municipal Airport also utilizes the common traffic advisory frequency (CTAF). This radio frequency (118.7 MHz) is used by pilots in the vicinity of the airport to communicate with each other about approaches or departures from the airport. The UNICOM (Universal Communication) frequency (122.95 MHz) can also be utilized to contact the airport FBO.

The airport traffic control tower (ATCT) can be contacted on frequencies (118.7 MHz) and (247.8 MHz) from 7:00 am to 7:00 pm while the tower is open. ATCT ground control and clearance delivery is available on frequency 121.9 MHz. The tower personnel are certified weather observers which makes the airport a Limited Aviation Weather Reporting Station (LAWRS).

Approach and Departure Control services are available from the Kansas City Air Route Traffic Control Center (ARTCC) via frequency 123.8 MHz.

NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying in the vicinity of Philip Billard Municipal Airport include a very high frequency omni-directional range (VOR) facility, a non-directional beacon, and the global positioning system (GPS).

The very high omni-directional range (VOR), in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The TOPEKA VORTAC is located 5.3 nautical miles to the northeast and is on frequency 117.80 MHz.

The BILOY non-directional beacon (NDB) is located approximately 4.3 nautical miles to the northwest of the airport. The FAA has been decommissioning NDBs in recent years as GPS and other technology have advanced.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from a VOR in that pilots are not required to navigate using a specific ground-based facility. GPS uses satellites placed in orbit around the earth that transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS, pilots can navigate directly to any airport in the country and are not required to navigate using a ground-based navigational facility.

The airport has navigational equipment on the airfield which can aid pilots desiring to land at the airport. Runway 13 has an Instrument Landing System (ILS) that consists of a localizer and a glideslope antenna used in conjunction with the MALSR. The localizer antenna, which provides lateral guidance, is located approximately 1,000 feet south of the Runway 31 threshold. The glideslope antenna, which provides horizontal guidance, is located approximately 800 feet from the Runway 31 threshold and 400 feet to the right of centerline.

AREA AIRSPACE

The *Federal Aviation Administration* (FAA) *Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe environment for civil, commercial, and military aviation. The NAS is defined as the common network of U.S. airspace, including air navigational facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. System components shared jointly with the military are also included as part of this system.

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the NAS. The U.S. airspace structure provides for categories of airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G as described below. **Exhibit 1G** generally illustrates each airspace type in three-dimensional form.

- Class A airspace is controlled airspace and includes all airspace from 18,000 feet MSL to Flight Level 600 (approximately 60,000 feet MSL).

- Class B airspace is controlled airspace surrounding high-activity

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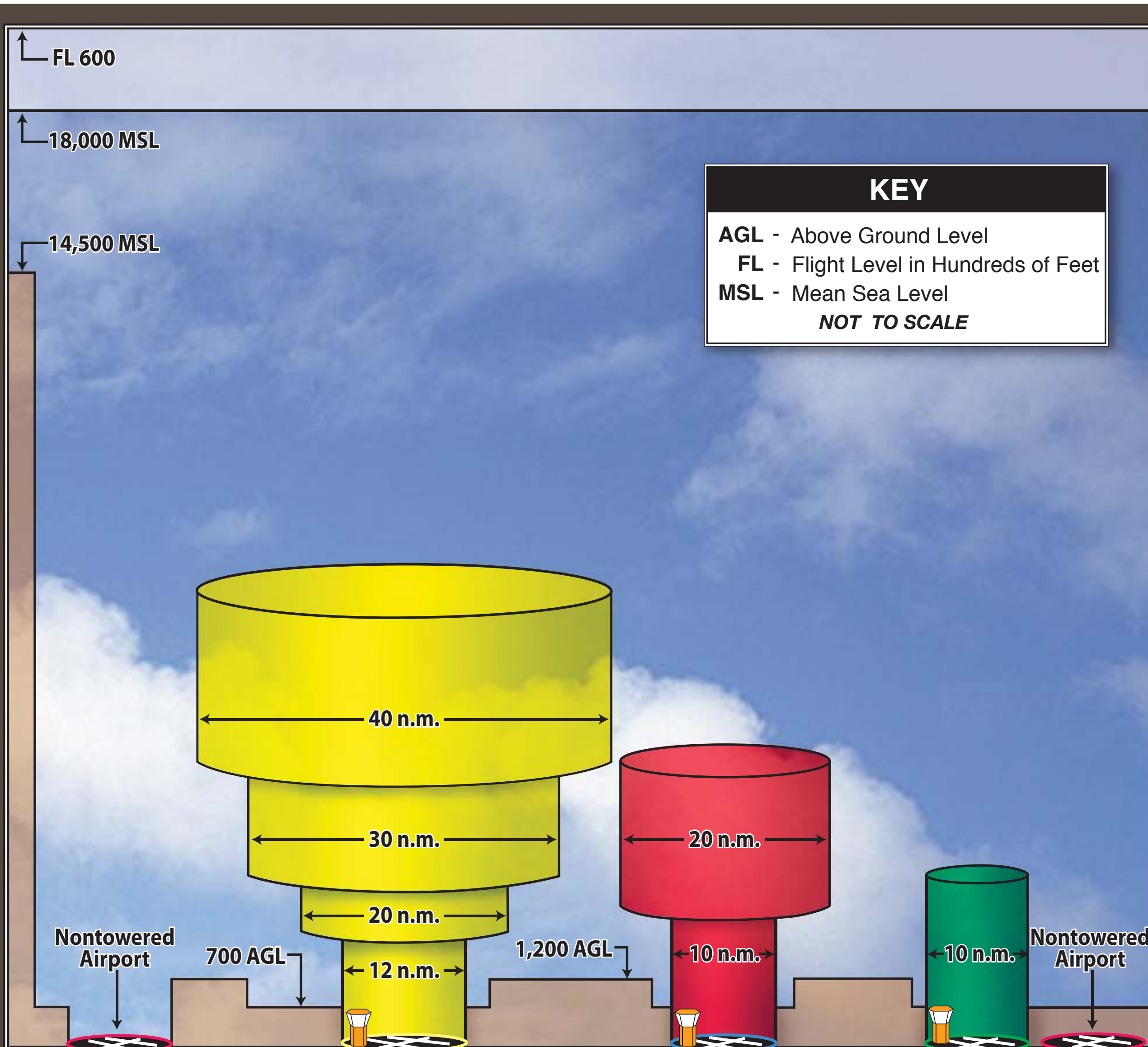

CLASSIFICATION	DEFINITION
CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600.
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.

Source: "Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

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Exhibit 1G
AIRSPACE CLASSIFICATION

commercial service airports (i.e., Kansas City International Airport).

- Class C airspace is controlled airspace surrounding lower-activity commercial service (i.e., Wichita Mid-Continent Airport) and some military airports.

- Class D airspace is controlled airspace surrounding low-activity commercial service and general aviation airports with an ATCT, such as Philip Billard Municipal Airport.

All aircraft operating within Classes A, B, C, and D airspace must be in constant contact with the air traffic control facility responsible for that particular airspace sector.

- Class E airspace is controlled airspace surrounding an airport that encompasses all instrument approach procedures and low-altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with air traffic control when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio contact with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Class G airspace is uncontrolled airspace that does not require communication with an air traffic control facility.

Airspace within the vicinity of Philip Billard Municipal Airport is depicted on **Exhibit 1H**. The airport operates in Class D airspace when the ATCT is open. The Class D airspace extends upward from the surface to and including 3,400 feet MSL within a four-mile radius of the airport, excluding that airspace within the Topeka Regional Airport Class D airspace. The airport operates in Class E airspace that extends from 700 feet to 18,000 feet MSL when the tower is closed. Below 700 feet, the airport is in uncontrolled Class G airspace. There is a portion of Class E airspace that extends to the southeast that is Class E airspace from the surface to 18,000 feet MSL.

Victor Airways

Victor Airways are designated navigational routes extending between VOR facilities. Victor Airways are identified on sectional charges with a "V" followed by a number. Victor Airways have a floor of 1,200 feet AGL and extend upward to an altitude of 18,000 feet MSL and are eight nautical miles wide. There are numerous Victor Airways in the vicinity due to the location of the TOPEKA VORTAC. The Victor Airways in the region include V-71, V-77, V-4, V502, V10-12, V77-280, V508, and V-307.

Military Training Routes

A Military Training Route or MTR is a specified training route for military pilot proficiency. Military aircraft can operate on the MTR at speeds in excess of 350 knots and at an elevation of up to 10,000 feet MSL. Military training routes are designated on sectional charts with "IR" or "VR" followed by a number. Military training routes in the region include IR504 and VR512, which are both approximately 30 miles to the west.

Military Operations Areas (MOAs)

A Military Operations Area (MOA) is airspace designated for military training use. This is not restricted airspace as civil pilots can use the airspace. However, they should be on alert for the possibility of military traffic. A pilot may need to be aware that military aircraft can be found in high concentrations, conducting aerobatic maneuvers, and possibly operating at high speeds at lower elevations. The activity status of an MOA is advertised by a *Notice to Airmen* (NOTAM) and noted on Sectional Charts. There are several MOAs associated with Fort Riley located approximately 60 miles to the west.

Mode C

Large commercial service airports typically have a surrounding Mode C ring. Aircraft operating within the Mode C ring are required to have an operable radio transponder. The Mode C ring surrounding Kansas City International Airport is 15 miles to the east of Philip Billard Municipal Airport.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures are a series of predetermined maneuvers established by the FAA using electronic navigational aids to assist pilots in locating and landing at an airport during low visibility and low cloud ceiling conditions. The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level that a cloud layer (defined in feet above the ground) can be situated for a pilot to complete the approach. If the observed visibility or cloud ceiling is below the minimums prescribed for the approach, the pilot cannot complete the instrument approach. The available instrument approaches for Philip Billard Municipal Airport are summarized on **Exhibit 1J**.

The ILS to Runway 13 provides Category I (CAT I) approach minimums with 200-foot cloud ceiling heights and ½-mile visibility minimums. These are typically the lowest minimums available to a general aviation airport. When utilizing just the localizer antenna, the minimum cloud ceiling is 519 feet and the visibility minimum remains at ½-mile for approach category A and B aircraft. For aircraft in approach category C, the visibility minimum increases to 1½-miles. Pilots can also utilize the ILS to locate the airport and then circle to the most appropriate runway depending on local wind conditions. This circling ILS approach has higher minimums.

Runway 13 has GPS approaches including an LPV (localizer performance with vertical guidance) approach. LPV instrument approaches are the most advanced GPS-type approaches in that they provide both horizontal and vertical positioning information. The LPV approach to Runway 13 provides for CAT-I minimums. Stand-alone CAT I LPV approaches (an LPV approach without the presence of an existing ILS) is a goal for the FAA.

There are GPS instrument approaches to all runway ends, however, the minimums will vary depending on the runway. Pilots can also utilize the TOPEKA VOR facility for approaches to Runway 22.

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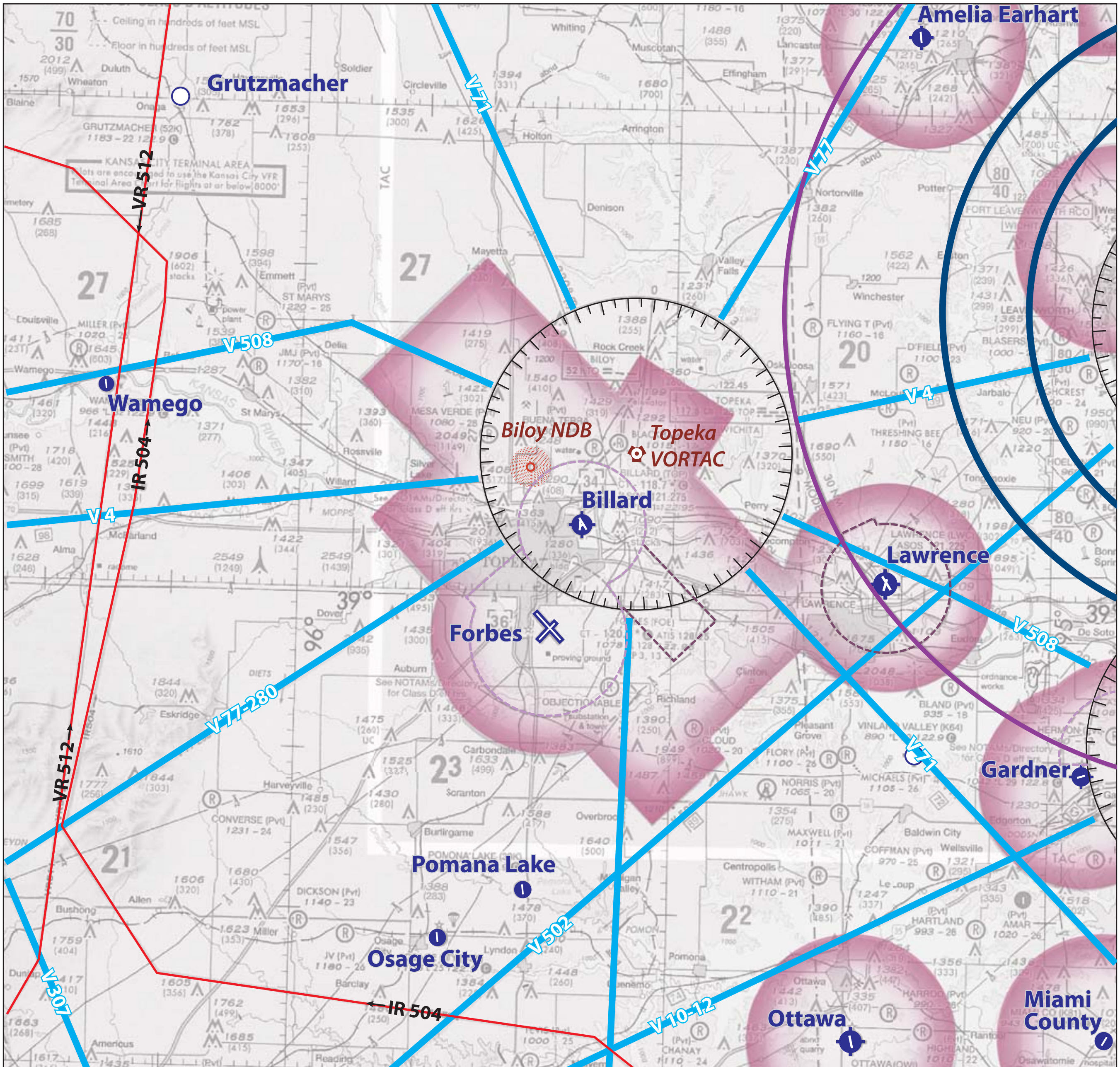

LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- Non-Directional Radiobeacon (NDB)
- Compass Rose
- Military Training Routes
- Victor Airways
- Class B Airspace
- Class D Airspace
- Class C Airspace
- Class E (sfc) Airspace
- Class E Airspace with floor 700' above surface

Source:
Kansas City North Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, May 2012

NORTH

NOT TO SCALE

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Note: Not to be used for navigation

Exhibit 1H
AIRSPACE MAP

PHILIP BILLARD MUNICIPAL AIRPORT

	WEATHER MINIMUMS BY AIRCRAFT TYPE		
	Category A	Category B	Category C
ILS Or LOC Rwy 13			
ILS Straight-In 13	200'/½-mile		
LOC Straight-In 13	519'/½-mile		519'/1-mile
Circling	519'/1-mile		579'/1½-mile
RNAV (GPS) Rwy 13			
LPV DA	200'/½-mile		
LNAV/VNAV DA	250'/½-mile		
LNAV MDA	400'/½-mile		400'/⅝-mile
Circling	459'/1-mile	479'/1-mile	579'/1½-mile
RNAV (GPS) Rwy 31			
LP MDA	445'/1-mile		445'/1⅜-mile
LNAV MDA	465'/1-mile		465'/1⅜-mile
Circling	459'/1-mile	479'/1-mile	579'/1½-mile
RNAV (GPS) Rwy 18			
LNAV MDA	440'/1-mile		440'/1¼-mile
Circling	459'/1-mile	479'/1-mile	579'/1½-mile
RNAV (GPS) Rwy 36			
LNAV MDA	520'/1-mile		520'/1½-mile
Circling	519'/1-mile		579'/1½-mile
LOC BC Rwy 31			
Straight-In 31	521'/1-mile		579'/1½-mile
Circling	519'/1-mile	539'/1-mile	579'/1½-mile
RNAV (GPS) Rwy 4			
LNAV MDA	701'/1-mile		701'/2-mile
Circling	699'/1-mile		699'/2-mile
RNAV (GPS) Rwy 22			
LNAV MDA	421'/1-mile		421'/1¼-mile
Circling	459'/1-mile	479'/1-mile	579'/1½-mile
VOR Rwy 22			
Straight-In 22	441'/1-mile		441'/1¼-mile
Circling	459'/1-mile	479'/1-mile	579'/1½-mile

Aircraft Categories are based on 1.3 times the stall speed in landing configuration as follows:

Category A: 0-90 knots (e.g., Cessna 172)
Category B: 91-120 knots (e.g., Beechcraft KingAir)
Category C: 121-140 knots (e.g., Canadair Challenger)
Category D: 141-166 knots (e.g., Gulfstream IV)

Abbreviations:

ILS - Instrument Landing System
LPV - Localizer Performance with Vertical Guidance
LP - Lateral Performance
GPS - Global Positioning System
LNAV/RNAV/VNAV - A technical variant of GPS
VOR - Very High Frequency Omnidirectional Radio Range
Note: (xxx/ x-mile) = Visibility/Cloud ceiling height

Source: U.S. Terminal Procedures,North Central Region (December 13, 2012)

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Exhibit 1J
INSTRUMENT APPROACH PROCEDURES

OBSTRUCTIONS AND LOCAL CONDITIONS

Various pilot information services identify potential obstructions in the vicinity of the airport of which pilots should be aware. On the approach to Runway 31, there are 41-foot tall trees, 1,482 feet from the runway end, and 651 feet right of centerline. Pilots should use a minimum slope of 31:1 to clear the trees. On the Runway 31 end, there are trees measuring 31 feet tall, 286 feet from the runway, and 306 feet right of centerline. A 2:1 slope is recommended to clear these trees.

On Runway 18, there are 78-foot tall trees located 2,895 feet from the runway end. A 34:1 slope is recommended to clear the trees. On the Runway 36 end, there are 71-foot tall trees located 1,094 feet from the runway and 465 feet to the left of centerline. A 12:1 slope is suggested to clear these trees.

On the Runway 4 end, there are 93-foot tall trees approximately 2,748 feet from the runway and 72 feet left of centerline. A 27:1 slope is recommended. On the Runway 22 end, there are 37-foot tall trees, 1,211 feet from the runway, and 347 feet right of centerline. A 27:1 slope is recommended to clear these trees.

There are large and small migratory birds on and in the vicinity of the airport. Pilots should use caution. The airport experiences periodic activity from ultralight flyers. These aircraft are smaller and slower than typical aircraft so pilots should be aware of their possible presence. In addition, various wild animals have been known to traverse the airport and runways including coyotes and deer.

RUNWAY USE AND TRAFFIC PATTERNS

The elevation at Philip Billard Municipal Airport is 881 feet MSL. All runways have a standard left-hand traffic pattern. Runway use is dictated by prevailing wind conditions. Ideally, it is desirable for aircraft to land directly into the wind. The prevailing wind during the summer months is from the south to the north, and in the winter it is from the north to the south.

Runway 13-31 is estimated to accommodate 25 percent of the annual operations. Runway 18-36 experiences approximately 70 percent of the operations. Runway 18 is the preferred calm wind runway. It is estimated that Runway 4-22 experiences approximately five percent of annual operations. **Table 1F** presents the estimated runway usage percentages at the airport.

TABLE 1F
Estimated Runway Usage
Philip Billard Municipal Airport

Runway	All Operations	Air Taxi/ Corporate Operations	Military Operations	Night Operations	Large Aircraft
Runway 13-31	25%	60%	45%	45%	70%
Runway 18-36	70%	40%	45%	45%	30%
Runway 4-22	5%	0%	10%	10%	0%

Source: ATCT interviews conducted 10.2012.

LANDSIDE FACILITIES

Landside elements are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the FBO(s), aircraft storage hangars, aircraft maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking, roadway access, and aircraft rescue and firefighting. Landside facilities are identified on **Exhibit 1K**.

AIRPORT BUSINESSES

Philip Billard Municipal Airport supports both aviation and non-aviation-related businesses. Aviation-related businesses include a fixed base operator (FBO), several aircraft maintenance businesses, a restaurant, and the Kansas Highway Patrol. The following describes the aviation-related businesses:

Hetrick Aviation: Aircraft maintenance
Kansas Air Center: Airport fixed base operator
Billard Café: Airport restaurant
Teamsters Local Union #696: Meeting facility for local union
New Jetz, LLC: Corporate Tenant
R&B Aircraft: Aircraft maintenance
Kansas Highway Patrol: Aircraft/helicopter hangar
Air Explorers Post 8: Volunteer organization promoting aviation to youth
Capitol Helicopter: Helicopter operator
Meier Farm: Agricultural land lease
Riverside Farms: Agricultural land lease
National Weather Service: On-airport weather radar facility

AIRCRAFT HANGAR FACILITIES

It is important to identify the types, sizes, and availability of hangar space at the airport in order to ultimately determine the long term need for additional facilities. Hangars can be categorized as T-hangars, box hangars, or conventional hangars. T-hangar units are intended for storage of a single small aircraft. They are "T" shaped, thus their name, and are typically nested together to maximize space and to lower the cost of construction.

Box hangars can be rectangular or square and typically provide between 2,500 and 6,000 square feet of storage space. These hangars are often stand-alone structures, but they can be connected as well. Box hangars provide greater flexibility than T-hangars because they do not have interior support structures that limit aircraft positioning. Box hangars are typically equipped with utilities such as electricity, water, and possibly sewer service.

Conventional hangars are large, clear-span hangars that typically house airport businesses or serve bulk aircraft storage needs. Operators of larger corporate aircraft may utilize these hangars as well.

All the hangars on airport property are owned by the MTAA. The MTAA manages leasing of the box and conventional hangars. They outsource T-hangar leasing to the airport FBO, Kansas Air Center. Kansas Air Center maintains a wait list of approximately five aircraft owners who wait, on average, six months for a space to become available. All T-hangars are currently full. The Kansas High Patrol owns a conventional hangar with airfield access that is outside airport property. This is typically referenced as a through-the-fence operation.

Exhibit 1L presents a summary of the buildings and hangars at Philip Billard Municipal Airport. There are nine T-hangar structures providing a total of 76 individual aircraft positions. There are four box hangar structures providing approximately eight aircraft positions.

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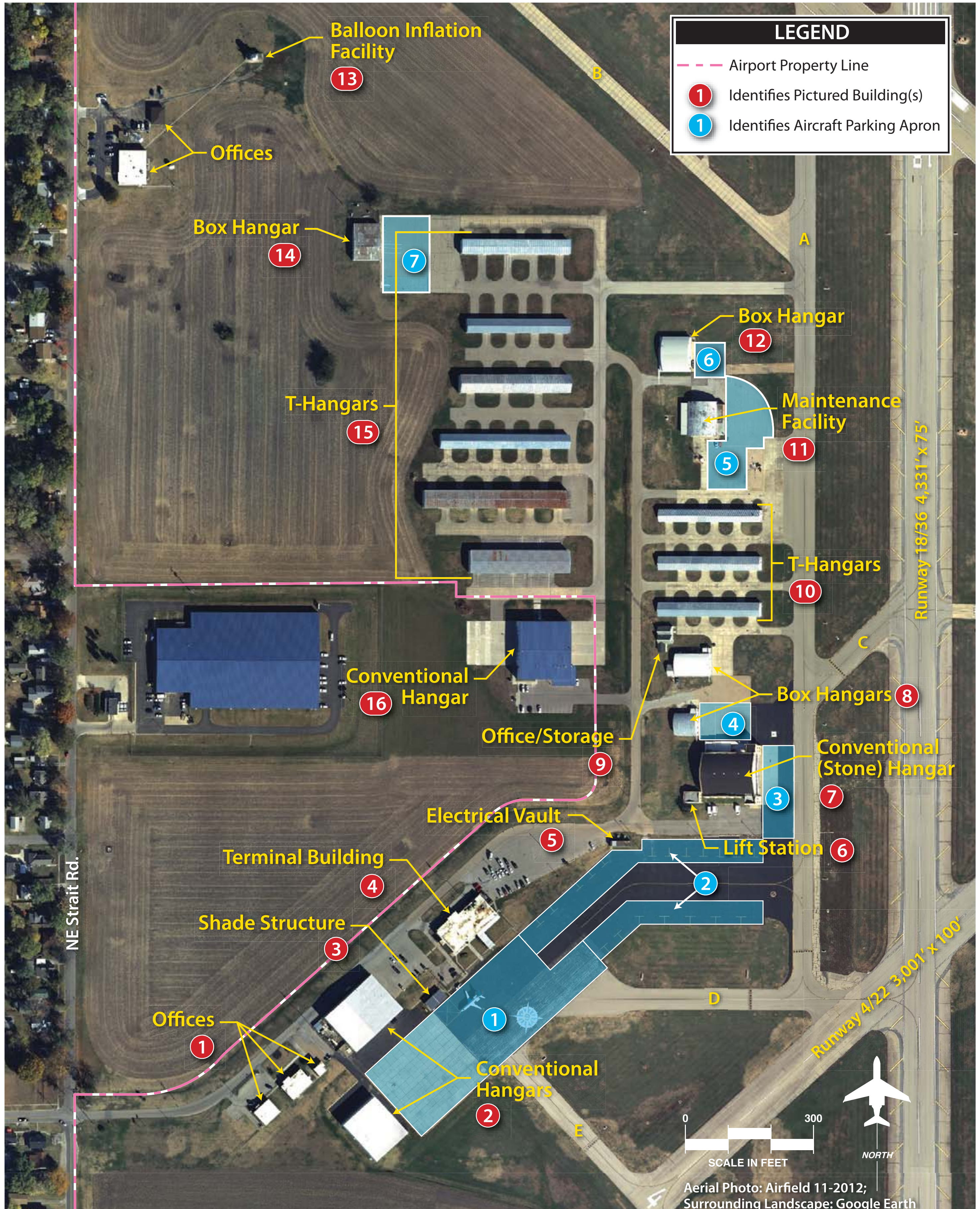

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Exhibit 1K
LANDSIDE FACILITIES

PHILIP BILLARD MUNICIPAL AIRPORT

Map ID	Building Type	Use/Occupant	Estimate of Total Aircraft Positions	Maintenance Office Space (s.f.)	Aircraft Storage Space (s.f.)
1	Office	Teamsters	NA	2,100	NA
2	Office	Teamsters	NA	2,600	NA
3	Office	Teamsters	NA	440	NA
4	Conventional Hangar	Individual Lease	5	6,000	5,500
5	Conventional Hangar	Individual Lease	6	1,000	15,500
6	Shade Structure	FBO-Fuel Truck Storage	NA	1,250	NA
7	Terminal Building	FBO/Restaurant	NA	9,500	NA
8	Electrical Vault	MTAA	NA	500	NA
9	Lift Station	City of Topeka	NA	900	NA
10	Conventional (Stone) Hangar	Individual Lease	5	2,400	12,000
11	Box Hangar	Individual Lease	2	200	2,500
12	Box Hangar	Individual Lease	2	250	4,000
13	Office/Storage	MTAA	NA	1,600	1,300
14	T-Hangar	Individual Lease	8	NA	8,400
15	T-Hangar	Individual Lease	8	NA	8,400
16	T-Hangar	Individual Lease	8	NA	8,400
17	Maintenance Facility	MTAA	NA	7,850	NA
18	BoxHangar	Individual Lease	2	1,200	4,000
19	T-Hangar	Individual Lease	8	NA	8,750
20	T-Hangar	Individual Lease	8	NA	8,400
21	T-Hangar	Individual Lease	6	NA	10,400
22	T-Hangar	Individual Lease	10	NA	10,500
23	T-Hangar	Individual Lease	10	NA	13,600
24	T-Hangar	Individual Lease	10	NA	12,650
25	Box Hangar	Individual Lease	2	100	5,000
26	Office	National Weather Service	NA	NA	NA
27	Office	National Weather Service	NA	NA	NA
28	Balloon Inflation Facility	National Weather Service	NA	NA	NA
Through-the-fence Aviation Facilities					
29	Conventional Hangar	Kansas Highway Patrol	4	3,600	10,800
TOTALS			**107**	**41,490**	**148,800**
AVIATION BUILDING SPACE BY TYPE					
TOTAL T-HANGAR			**76**	**NA**	**89,500**
TOTAL BOX HANGAR			**8**	**9,600**	**15,500**
TOTAL CONVENTIONAL HANGAR			**20**	**13,000**	**43,800**

Source: Airport Records/Interviews

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

There are four conventional hangars providing approximately 20 aircraft positions. This includes the Kansas Highway Patrol hangar. The aircraft storage capacity of box and conventional hangars can vary on the use of the hangar. For example, a conventional hangar may have a capacity to house several aircraft; however, the hangar may be primarily utilized as a maintenance facility, thus reducing the storage capacity.

The box hangars and conventional hangars will typically have dedicated office space located within or attached to the hangar. As mentioned, these hangars may also support non-storage activities such as regular maintenance or office space. An estimate of the area used for these purposes has been provided in the table as well. In addition, based on demand, hangar occupants may be able to adjust how many aircraft can be stored at any given time; thus, the estimates of aircraft positions and area dedicated for non-storage activities is flexible. Nonetheless, it is estimated that there are approximately 89,500 square feet of T-hangar storage space, 15,500 square feet of box hangar storage space, and 43,800 square feet of conventional hangar storage space.

AIRCRAFT PARKING APRON

There are seven identified aircraft aprons on the airport. The first is the main terminal area apron which encompasses approximately 12,000 square yards of pavement. This apron is located immediately in front (airside) of the terminal building and serves several primary functions. It is the primary transient apron and has 11 small aircraft positions marked. It also extends to the south to serve the needs of the conventional hangars.

The next apron is the local aircraft tie-down location which is between the terminal building and the stone hangar. This apron encompasses approximately 6,100 square yards, and there are 17 aircraft tie-down positions marked. A taxilane bisects this apron and leads from the airfield to the terminal apron.

The remaining aircraft aprons are associated with individual hangars. An apron encompassing approximately 2,000 square yards fronts the stone hangar. The apron immediately north of the stone hangar is approximately 900 square yards. In the north terminal area, the apron adjacent to the fuel farm encompasses 3,000 square yards. The apron serving the hangar housing the Explorers Post #8 is approximately 600 square yards. The last apron serving the box hangar at the northwest corner of the terminal area is approximately 2,000 square yards.

AUTOMOBILE PARKING AND HANGAR VEHICLE ACCESS

Vehicle parking and road access to hangars are an important consideration in airport planning. It is desirable to segregate vehicle access and aircraft movement areas to the greatest extent possible. Most of the box and conventional hangars have dedicated vehicle parking adjacent to the hangar. The hangars at the north end of the terminal area do not have dedicated vehicle parking lots; therefore, vehicles must cross or utilize apron area to park. As is common for general aviation airports, there are no dedicated vehicle parking lots for those accessing T-hangars. Aircraft owners accessing a T-hangar unit will typically park their vehicle in the hangar when utilizing their aircraft.

Those accessing hangars in the north terminal area will traverse active taxilanes. Drivers of these vehicles should be vigilant to avoid interactions with aircraft. As new hangars are considered, dedicated vehicle parking lots should also be considered in order to limit the need to utilize active aircraft movement areas.

EMERGENCY RESPONSE

As a general aviation facility that is not certified for scheduled commercial service (CFR Part 139), the airport is not required to have on-airport firefighting capability. Topeka Fire Department, Station No. 6 is the closest to the airport. It is located at 1419 NE Seward, approximately 1.7 drive miles to the west of the airport. Station No. 7 is located north of the Kansas River at 934 NE Quincy St. This fire station is approximately 2.1 drive miles west of the airport.

AIRPORT MAINTENANCE

The airport utilizes the brick, barrel roofed hangar at the north end of the terminal area as a maintenance facility. The low threshold of the hangar door makes utilization of this structure for aircraft storage difficult. The airport stores a new snow plow and truck, a snow blower, and a smaller snow plow with spreader here. Field maintenance equipment, such as a John Deer tractor with gang mowers and a batwing mower, are also stored here. Various trimming equipment is stored here as well.

UTILITIES

The airport is supplied with the full range of utilities. Potable Water, Wastewater and Storm Water utilities are all provided by the City of Topeka and are available at the airport. Kansas Gas Service provides a gas line to the airport and Westar Energy provides electricity. Gas and electricity are set up in a campus style where utilities flow to a single meter and then MTAA manages individual invoices to leased property.

FUEL FACILITIES

The airport maintains an underground fuel farm on the apron in the north terminal area. There are two tanks: a 9,000 gallon tank for AvGas and an 8,000 gallon tank for Jet A. The airport FBO maintains four fuel delivery trucks. Two of the trucks are for AvGas and have capacities of 2,200 gallons and 750 gallons. Two of the trucks are for Jet A fuel and have capacities of 3,000 gallons and 2,200 gallons.

FENCING

Perimeter fencing provides an important security function and a wildlife prevention function. For general aviation airports, full perimeter fencing is not required; however, it is common for airports located in more urban areas. Philip Billard Municipal Airport has natural barriers with the Kansas River levee and the Oakland Expressway.

At Philip Billard Municipal Airport, there is three-foot high chain link fencing in the terminal area. The Kansas Highway Patrol has six-foot high chain link around their facility. Other areas of the airport have intermittent fencing with three-string barbed wire.

ADDITIONAL AIRPORT DOCUMENTATION

It is recommended that general aviation airports with significant activity maintain various procedural documents which provide guidance for airport management and tenants on airport issues. Typically, this includes a Minimum Standards document that is meant to encourage and ensure the provision of adequate services and facilities, economic health, and orderly development of aviation and related aeronautical activities at the airport. A Rules and Regulations document outlines the airport rules for administration and tenants. Philip Billard Municipal Airport has a rules and regulations document but does not have a minimum standards document.

HISTORICAL AIRPORT ACTIVITY

At general aviation airports, the number of based aircraft and the total annual operations (takeoffs and landings) are the primary indicators of aeronautical activity. These indicators will be used in subsequent analyses in this master plan to project future aeronautical activity and determine future facility needs. **Exhibit 1M** presents historical operations and based aircraft for the airport.

ANNUAL OPERATIONS

Aircraft operations are classified as local or itinerant. Local operations consist mostly of aircraft training operations conducted within the airport traffic pattern and touch-and-go and stop-and-go operations. Itinerant operations are arriving or departing aircraft which have an origin or destination away from the airport. One operation is counted when an aircraft arrives and one operation is counted when an aircraft departs.

Aircraft operations are further classified in three general categories: air taxi, general aviation, and military. Air taxi operations normally consist of the use of general aviation type aircraft for the "on-demand" commercial transport of persons and property in accordance with 14 CFR Part 135 and Subchapter K of 14 CFR Part 91. Generally, fractional aircraft operations and air ambulance operations will fall in the air taxi category. General aviation operations include a wide range of aircraft use ranging from personal to business and corporate uses.

Philip Billard Municipal Airport has an airport traffic control tower (ATCT) and daily operations are reported to the FAA. The airport was generally experiencing between 60,000 and 70,000 annual operations from 1995 through 2008. After 2008, a time frame coinciding with a national economic recession, operations dropped below 50,000 annually. In 2012, total operations showed a year-over-year increase for the first time since 2006 with 51,615 operations.

BASED AIRCRAFT

Identifying the current number of based aircraft is important to master plan analysis, yet it can be challenging because of the transient nature of aircraft storage. The MTAA manages and leases all box and conventional hangars. The MTAA contracts with the airport FBO, Kansas Air Center, to manage and lease T-hangar space. There are 76 T-hangar positions, all of which were full at the end of 2012. MTAA identified an additional 12 aircraft that are based in box and conventional hangars. Therefore, there are currently

88 aircraft based at Philip Billard Municipal Airport.

Through interviews with airport tenants and the airport administration, the type of based aircraft can also be estimated. There are 74 single engine piston powered aircraft, six multi-engine piston powered aircraft, one turboprop (King Air 350 – Kansas Highway Patrol), two business jets (Lear 45 - Newcomer Funeral Homes; Cessna Citation Bravo 550 – New Jetz, LLC), two helicopters (Bell 407s – Kansas Highway Patrol), and three that are classified as experimental/other.

AIRPORT SERVICE AREA

The service area is loosely defined as a baseline geographical area from which future aviation demand (particularly based aircraft) is most likely to originate. The service area should relate to existing geographical areas, such as a county or city boundary, in order to facilitate correlation with known socioeconomic data. With this relationship, forecasts of aviation demand can be made.

Many factors can contribute to the definition of an airport's service area. A primary factor is the proximity, capability, and level of services offered by other area airports. Another factor is the actual location where based aircraft owners live or work in proximity to the airport.

REGIONAL AIRPORTS

The proximity of other airports has an impact on the growth potential of the airport. A review of the public use airport facilities within 30 nautical miles of Phillip Billard Municipal Airport was conducted to identify and distinguish the types of air service available in the region. Information pertaining to each airport was obtained from FAA Form 5010, Airport Master Record, and from current airport master plans. The location of these and other airports in the region are shown on the area airspace exhibit shown later in this chapter. The following is a brief description of those public use airports in the region.

Topeka Regional Airport (FOE) (Formerly Forbes Field Airport) is located approximately seven nautical miles to the south of Phillip Billard Municipal Airport. Topeka Regional Airport is a former military airfield that is currently home to the 190th Air Refueling Wing of the Kansas Air National Guard. The airport is operated as a joint-use facility with the Kansas Air National Guard owning their portion of the airport. There are approximately 12 KC-135 Stratotanker aircraft based at the airport. The airport is listed in the *National Plan of Integrated Airport Systems* (NPIAS) as a non-hub primary commercial service airport. While there is not currently scheduled commercial passenger service, the airport did account for approximately 15,000 passenger enplanements in 2011.

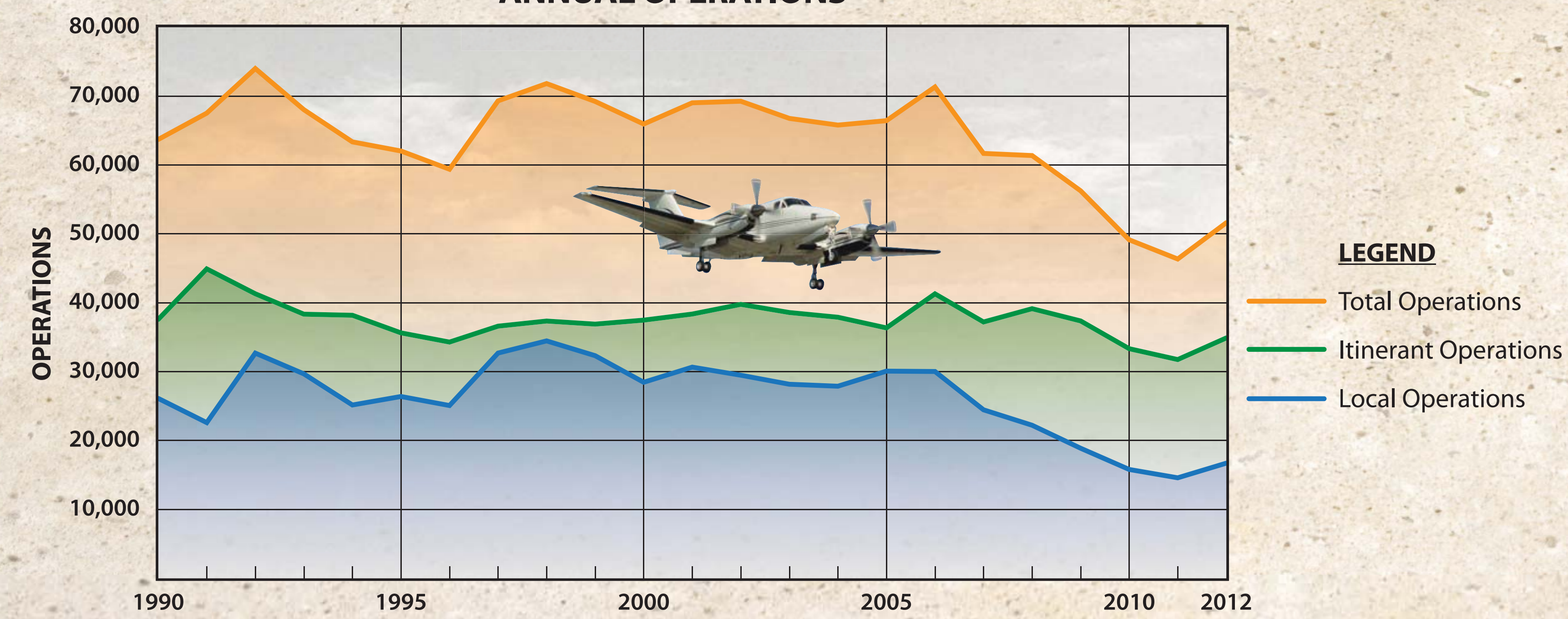
The airport has a two-runway system with primary Runway 13-31 measuring 12,803 feet long and 200 feet wide. Crosswind Runway 3-21 is 7,001 feet long and 150 feet wide. It is estimated that the airport has 58 based aircraft, of which 15 are single engine piston, six are multi-engine piston, six are jets, 13 are helicopters, and 18 are KC-135 military tankers. The airport has an air traffic control tower (ATCT) and experiences approximately 36,000 annual operations. The full gamut of instrument approaches is available to all runway ends including a precision CAT-I ILS instrument approach to Runway 31.

PHILIP BILLARD MUNICIPAL AIRPORT

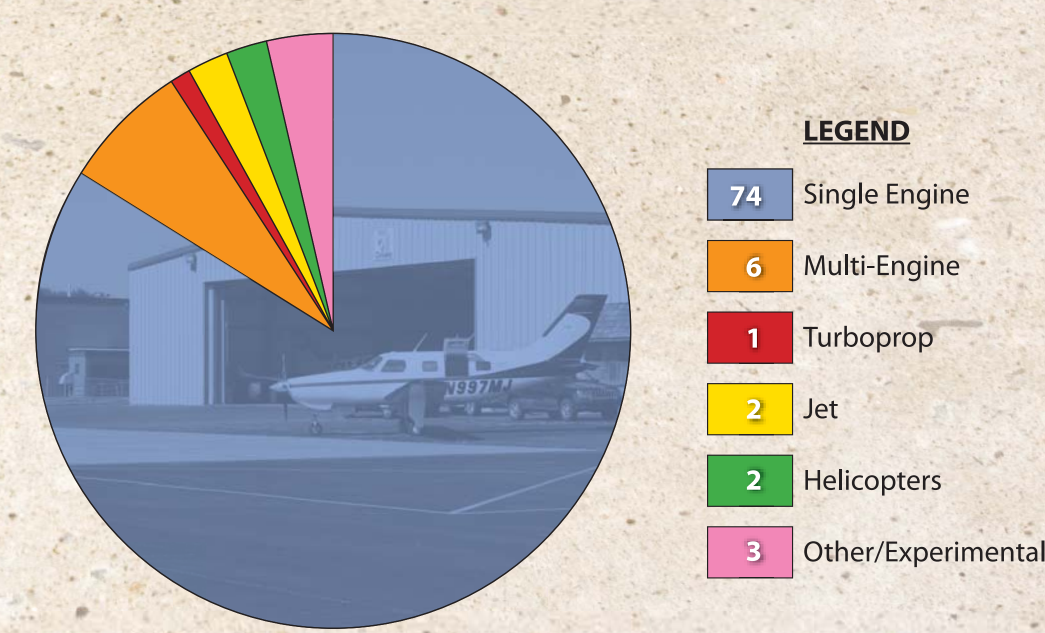
YEAR	IFR ITINERANT OPERATIONS					VFR ITINERANT OPERATIONS					TOTAL ITINERANT OPERATIONS					LOCAL OPERATIONS			TOTAL OPERATIONS
	AC	AT	GA	MIL	SUB	AC	AT	GA	MIL	SUB	AC	AT	GA	MIL	SUB	CIVIL	MIL	SUB	
1990	0	241	4,866	35	5,142	74	550	31,170	662	32,456	74	791	36,036	697	37,598	25,603	510	26,113	63,711
1991	0	476	4,381	95	4,952	344	721	37,655	1,246	39,966	344	1,197	42,036	1,341	44,918	22,161	446	22,607	67,525
1992	0	270	4,503	144	4,917	52	283	35,043	1,010	36,388	52	553	39,546	1,154	41,305	32,259	436	32,695	74,000
1993	0	133	3,692	104	3,929	0	134	33,066	1,215	34,415	0	267	36,758	1,319	38,344	29,066	616	29,682	68,026
1994	0	5	2,925	59	2,989	0	59	34,229	910	35,198	0	64	37,154	969	38,187	24,744	420	25,164	63,351
1995	0	160	3,156	109	3,425	0	175	31,121	910	32,206	0	335	34,277	1,019	35,631	25,957	440	26,397	62,028
1996	0	164	3,114	85	3,363	0	178	29,996	758	30,932	0	342	33,110	843	34,295	24,551	535	25,086	59,381
1997	0	264	2,757	56	3,077	0	372	32,292	864	33,528	0	636	35,049	920	36,605	32,251	450	32,701	69,306
1998	0	297	3,655	25	3,977	0	170	32,687	514	33,371	0	467	36,342	539	37,348	34,162	306	34,468	71,816
1999	0	235	3,961	13	4,209	0	148	32,124	420	32,692	0	383	36,085	433	36,901	32,160	160	32,320	69,221
2000	0	0	3,948	6	3,954	0	13	32,944	569	33,526	0	13	36,892	575	37,480	28,289	173	28,462	65,942
2001	0	181	3,337	32	3,550	0	982	33,109	722	34,813	0	1,163	36,446	754	38,363	30,211	448	30,659	69,022
2002	0	241	3,164	110	3,515	0	2,275	33,050	928	36,253	0	2,516	36,214	1,038	39,768	28,762	724	29,486	69,254
2003	0	185	3,148	36	3,369	0	1,029	33,373	814	35,216	0	1,214	36,521	850	38,585	27,251	924	28,175	66,760
2004	0	256	3,443	64	3,763	0	1,038	31,851	1,248	34,137	0	1,294	35,294	1,312	37,900	26,772	1,118	27,890	65,790
2005	0	120	3,223	63	3,406	0	1,209	30,243	1,494	32,946	0	1,329	33,466	1,557	36,352	28,829	1,250	30,079	66,431
2006	0	187	3,879	38	4,104	0	1,257	34,422	1,512	37,191	0	1,444	38,301	1,550	41,295	28,373	1,654	30,027	71,322
2007	0	226	3,437	95	3,758	0	1,726	30,618	1,110	33,454	0	1,952	34,055	1,205	37,212	23,012	1,452	24,464	61,676
2008	0	217	7,472	110	7,799	0	1,293	29,428	621	31,342	0	1,510	36,900	731	39,141	21,357	869	22,226	61,367
2009	0	535	9,906	186	10,627	0	1,087	25,255	394	26,736	0	1,622	35,161	580	37,363	18,538	349	18,887	56,250
2010	0	414	9,787	97	10,298	0	557	22,360	121	23,038	0	971	32,147	218	33,336	15,429	378	15,807	49,143
2011	0	399	7,415	93	7,907	0	529	23,276	45	23,850	0	928	30,691	138	31,757	14,452	142	14,594	46,351
2012	0	585	8,137	238	8,960	0	1,107	24,451	376	25,934	0	1,692	32,588	614	34,894	16,331	390	16,721	51,615

KEY
- **GA** General Aviation
- **MIL** Military
- **SUB** Subtotals
- **AC** Air Carrier (commercially operated aircraft having seating capacity more than 60 seats or a maximum payload capacity of 18,000 pounds)
- **AT** Air Taxi (commercially operated aircraft having 60 or fewer passenger seats or less than 18,000 pounds maximum payload capacity)

ANNUAL OPERATIONS



BASED AIRCRAFT FLEET MIX



Lawrence Municipal Airport (LWC) is located 19 nautical miles to the east of Philip Billard Municipal Airport. LWC is a general aviation facility providing a two-runway system. Primary Runway 15-33 is 5,700 feet long and 100 feet wide. Crosswind Runway 1-19 is 3,901 feet long and 75 feet wide. As of 2010, there were 60 based aircraft, of which 52 were single engine piston and five were multi-engine. There were also a based turboprop, jet, and helicopter. Annual operations are estimated at 32,700. The airport has a precision CAT-I ILS instrument approach to Runway 33 and a non-precision approach to Runway 15. The airport has a full service fixed-base operator providing fuel and aircraft service.

Other public use airports in the region include Gardner Municipal Airport (K34) located 35 nm to the southeast, Ottawa Municipal Airport (OWI) located 26 nm to the southeast, and Amelia Earhart Airport (K59) located 36 nm to the northeast. Each of these airports is a smaller general aviation facility supporting primarily single engine piston aircraft.

SERVICE AREA SUMMARY

Philip Billard Municipal Airport and Topeka Regional Airport share a primary service area that extends approximately 20 miles from Topeka. The service area likely extends slightly more to the west as the next closest capable airport is in Manhattan, Kansas. **Exhibit 1N** presents the primary airport service area.

Each point on the exhibit represents the zip code of a registered aircraft in the region. As can be seen, the location of registered aircraft tends to congregate around urban areas or areas with an airport.

HISTORIC SOCIOECONOMIC DATA

Socioeconomic information related to the approximate airport service area is an important consideration in the master planning process. The historic trend in elements such as population, employment, and income provides insight into the long term socioeconomic condition of the region. **Table 1G** presents the historic population data from the U.S. Census Bureau for both Shawnee County and the City of Topeka.

TABLE 1G
Historic Population Estimates

	1950	1960	1970	1980	1990	2000	2010
Shawnee County	105,418	141,286	155,322	154,916	160,976	169,871	177,934
AACGR	NA	2.97%	0.95%	-0.03%	0.38%	0.54%	0.46%
City of Topeka	78,791	119,484	125,011	115,266	119,883	122,377	127,473
AACGR	NA	4.25%	0.45%	-0.81%	0.39%	0.21%	0.41%
Kansas	1,905,299	2,178,611	2,246,578	2,363,679	2,477,574	2,688,418	2,853,118
AACGR	NA	1.35%	0.31%	0.51%	0.47%	0.82%	0.60%

AACGR: Average Annual Compound Growth Rate
Source: U.S. Census Bureau

The population of the City of Topeka in 2000 was 122,377 and in 2010, the population was 127,473, for an average annual compound growth rate (AACGR) of 0.41 percent. The population of Shawnee County in 2000 was 169,871 and in 2010, it was 177,934, for an AACGR of 0.46 percent. The State of Kansas grew at a slightly higher rate over the same 10-year period with an AACGR of 0.60 percent.

Several sources were examined for employment and income data in the region. Demographic data available from Woods & Poole Economics, an independent firm specializing in long term demographic projections for U.S. states, counties, and statistical areas, provides comprehensive historical and forecast data. They publish data annually and update the previous several years as necessary. Use of Woods & Poole data for airport planning is specifically approved by the FAA. **Table 1H** presents the historical demographic data for Shawnee County, the State of Kansas, and the Topeka Metropolitan Statistical Area (MSA) which includes Shawnee, Jackson, Jefferson, Osage, and Wood Counties.

TABLE 1H
Historic Demographic Data

Year	Shawnee County	AAGR	Topeka MSA	AAGR	Kansas	AAGR
Population						
1990	161,304	NA	210,598	NA	2,481,349	NA
1995	167,734	0.78%	220,036	0.88%	2,601,007	0.95%
2000*	169,871	0.25%	224,859	0.43%	2,693,681	0.70%
2005	171,893	0.24%	228,208	0.30%	2,745,299	0.38%
2010*	177,934	0.69%	234,259	0.52%	2,859,169	0.82%
Employment						
1990	109,184	NA	128,043	NA	1,473,899	NA
1995	117,023	1.40%	137,633	1.45%	1,600,099	1.66%
2000	121,964	0.83%	145,189	1.07%	1,757,893	1.90%
2005	115,744	-1.04%	139,082	-0.86%	1,760,764	0.03%
2010	116,640	0.15%	140,510	0.20%	1,813,307	0.59%
Income (PCPI-Per Capita Personal Income in $2005)						
1990	$26,013	NA	$24,840	NA	$24,997	NA
1995	$27,327	0.99%	$26,240	1.10%	$26,657	1.29%
2000	$31,857	3.12%	$30,442	3.02%	$31,710	3.53%
2005	$32,082	0.14%	$30,756	0.21%	$33,103	0.86%
2010	$35,399	1.99%	$33,831	1.92%	$35,809	1.58%

MSA: Metropolitan Statistical Area includes Shawnee, Jackson, Jefferson, Osage, and Wood Counties
AAGR: Average Annual Growth Rate
Source: Woods & Poole Economics - Complete Economic Demographic Data Source (CEDDS-2012);
**U.S. Census Bureau for Shawnee County and Kansas*

While population growth has remained relatively steady in each of the defined areas, employment and income have seen fluctuations. From 2000 to 2005, both employment and income measurements noticeably decreased. From 2005 to 2010, employment appears to have stabilized, returning to positive growth measures. Income saw a significant increase from 2005 to 2010.

PHILIP BILLARD MUNICIPAL AIRPORT

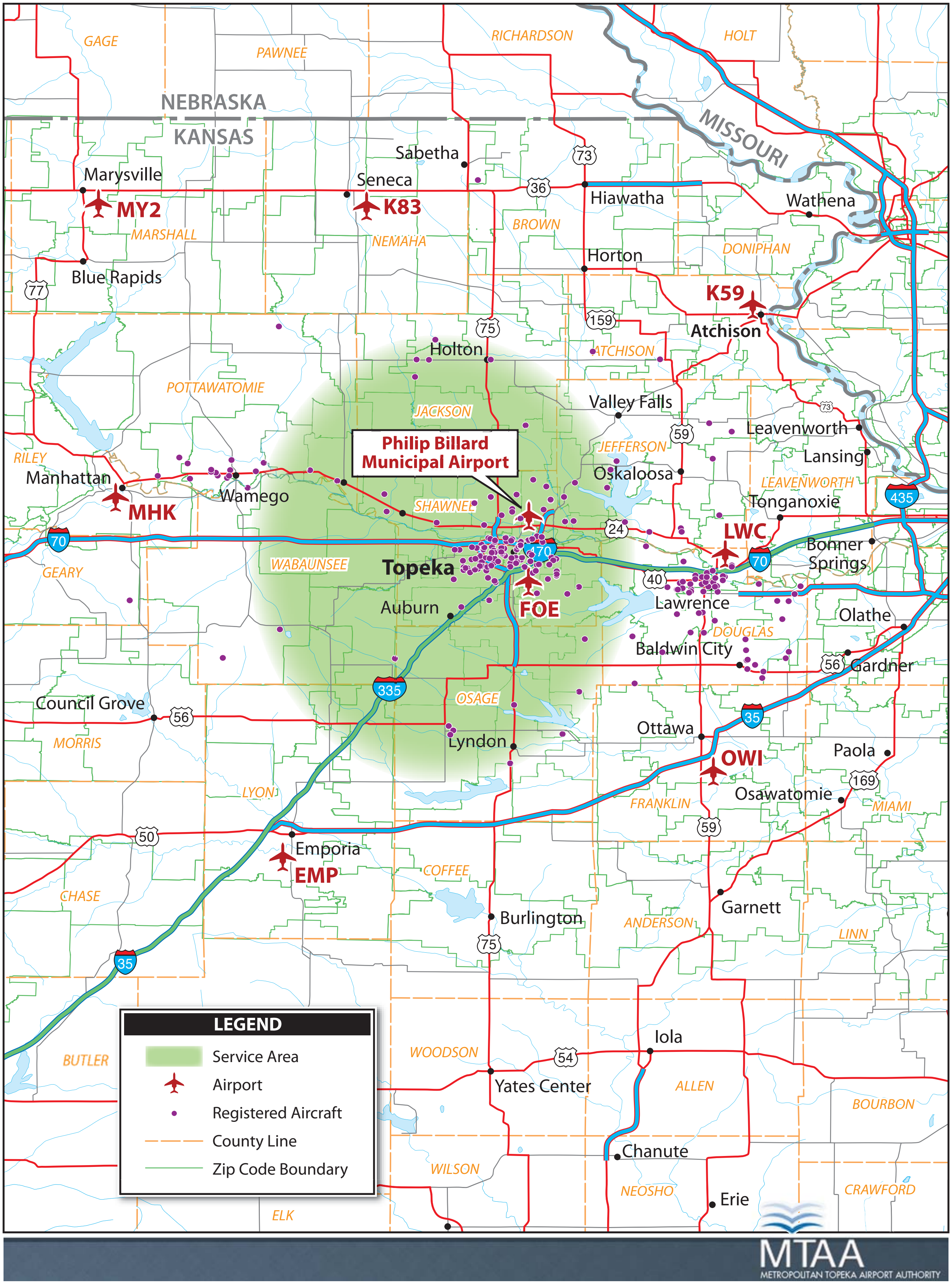


Exhibit 1N
AIRPORT SERVICE AREA

ENVIRONMENTAL INVENTORY

A review of the potential environmental impacts associated with proposed airport projects is an essential consideration in the airport master plan process. The intent of this inventory is to identify potential environmental sensitivities or resources that might affect future improvements at the airport. The information contained in this section was obtained from official internet resources, agency maps, and existing literature.

Research was done for each of the 23 environmental impact categories described within the FAA's *Environmental Desk Reference for Airport Actions*. It was determined that the following resources are not present within the airport environs or cannot be inventoried:

- Resources Not Present
  - Coastal Resources (Coastal Barriers and Coastal Zones) – the airport is inland and not subject to any coastal restrictions.
  - Wild and Scenic Rivers – no wild and scenic rivers are located within the State of Kansas.
- Resources that were not inventoried but will be addressed once a 20-year development program is established at the end of this master plan.
  - Construction Impacts
  - Energy Supply and Natural Resources
  - Noise
  - Social Impacts

The following sections provide a discussion of the remaining resource categories.

AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short term and long term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: Ozone (O_3), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrogen Oxide (NO), Particulate matter (PM_{10} and $PM_{2.5}$), and Lead (Pb). Various levels of review apply within both the *National Environmental Policy Act* (NEPA) and various permitting requirements. Potentially significant air quality impacts, associated with an FAA project or action, would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed.

According to the EPA's Greenbook, Shawnee County, Kansas is an attainment area for all criteria pollutants as of December 14, 2012.

COMPATIBLE LAND USE

The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport's noise impacts. Noise exposure contours will be prepared for Philip Billard Municipal Airport based on the aviation forecasts outlined in Chapter Two.

Land immediately surrounding the airport is a mix of residential, industrial, and agricultural. To the west is a residential neighborhood. To the south is a mix of homes and industrial businesses. To the east and north are agricultural lands and the Kansas River.

Compatible land use also addresses nearby features that could pose a threat to safe aircraft operations by attracting wildlife (e.g., landfills and ponds). The Rolling Meadow Recycling & Disposal Facility is located approximately nine miles northwest of the airport. In addition to the previously discussed Kansas River, there are also several manmade fishery ponds immediately east of the airport. As of this writing, the ponds were dry and the fishery was not operating commercially.

DEPARTMENT OF TRANSPORTATION ACT: SECTION 4(f)

Section 4(f) of the DOT Act, which was recodified and renumbered as Section 303(c) of 49 USC, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a historic site, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance unless there is no feasible and/or prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.

Much of the property surrounding the Kansas River, to the north and east of the airport, is potential Section 4(f) property.

FARMLAND

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and take into account the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines developed by the U.S. Department of Agriculture (USDA) apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

Information obtained from the Natural Resource Conservation Service's (NRCS) Web Soil Survey indicates that nearly all airport property is classified as prime farmland. Areas to the north, nearest the Kansas River, and areas east of the Oakland Expressway are not prime farmland.

FISH, WILDLIFE, AND PLANTS

A number of regulations have been established to ensure that projects do not negatively impact protected plants and animals or their designated habitat. Section 7 of the *Endangered Species Act* (ESA), as amended, applies to federal agency actions and sets forth requirements for consultation to determine if the proposed action may affect a federally endangered or threatened species.

According to the U.S. Fish and Wildlife Service (USFWS) and the Kansas Department of Wildlife and Parks, there are a number of federal and state species that have potential habitat in Shawnee County. These species are listed in **Table 1J**.

It is unknown whether or not any of these species are present within the airport environs. However, several of these species, including the chestnut lamprey, flat floater mussel, hornyhead chub, silver chub, silverband shiner, sturgeon chub, Topeka shiner, and western silvery minnow are marine species whose habitat is not present at the airport. Additional field investigations would be required to determine the presence of the remaining species at the airport.

TABLE 1J Threatened or Endangered Species - Shawnee County, Kansas			
Common Name	**Species**	**State Status**	**Federal Status**
American Burying Beetle	*Nicrophorus americanus*	Endangered	Endangered
American Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Threatened
Chestnut Lamprey	*Ichthyomyzon castaneus*	Threatened	-
Flat Floater Mussel	*Anodonta suborbiculata*	Endangered	-
Hornyhead Chub	*Nocomis biguttatus*	Threatened	-
Least Tern	*Sterna antillarum*	Endangered	Endangered
Peregrine Falcon	*Falco peregrinus*	Endangered	-
Piping Plover	*Charadrius melodus*	Threatened	Threatened
Silver Chub	*Macrhybopsis storeriana*	Threatened	-
Silverband Shiner	*Notropis shumardi*	Threatened	-
Smooth Earth Snake	*Virginia valeriae*	Threatened	-
Snowy Plover	*Charadrius alexandrinus*	Threatened	-
Sturgeon Chub	*Macrhybopsis gelida*	Threatened	Candidate
Topeka Shiner	*Notropis topeka*	Threatened	Endangered
Western Silvery Minnow	*Hybognathus argyritis*	Threatened	-
Whooping Crane	*Grus americana*	Endangered	Endangered

Source: USFWS, http://www.fws.gov/mountain-prairie/endspp/CountyLists/Kansas.pdf accessed December 2012.

Kansas Department of Wildlife and Parks, County Lists, Threatened and Endangered Species, http://www.kdwp.state.ks.us/, accessed December 2012.

FLOODPLAINS

Executive Order 11988 directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains.

There is a levee system on the south side of the Kansas River that encompasses the airport; therefore, the airport is protected from significant flooding. Along the south end of the airport, the Old Channel drainage channel traverses airport property. This drainage channel empties into Shunganunga Creek, approximately one-half mile to the southeast of the airport. The Shawnee County, Kansas Flood Zone Map, from the Federal Emergency Management Agency (FEMA) indicates that existing airport facilities would not be impacted by a 100-year flooding event.

HAZARDOUS MATERIALS, POLLUTION, AND SOLID WASTE

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

The EPA's *Enviromapper for Envirofacts* was consulted regarding the presence of impaired waters or regulated hazardous sites. According to the EPA *Enviromapper*, there are no active SUPERFUND sites in Shawnee County. With regard to *Clean Water Act* Section 303(d) impaired waters, there are two within the vicinity of the airport: the Kansas River, located to the north and east of the airport, and Shunganunga Creek located one-half mile south of the airport.

HISTORICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act* (NHPA) *of 1966*, as amended, the *Archaeological and Historic Preservation Act* (AHPA) *of 1974*, the *Archaeological Resources Protection Act* (ARPA), and the *Native American Graves Protection and Repatriation Act* (NAGPRA) *of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources. Impacts may occur when the proposed project causes an adverse effect on a property which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance. In Kansas, the State Historic Preservation Officer has oversight on Kansas laws and regulations regarding historical, architectural, archeological, and cultural resource laws and regulations.

A review of the National Register of Historic Places indicates that no registered sites are located in close proximity to the airport.

LIGHT EMISSIONS AND VISUAL IMPACTS

Airport lighting is characterized as either airfield lighting (i.e., runway, taxiway, approach and landing lights) or landside lighting (i.e., security lights, building interior lighting, parking lights, and signage). Generally, airport lighting does not result in significant impacts unless a high intensity strobe light, such as a Runway End Identifier Lighting (REIL), would produce glare on any adjoining site, particularly residential uses.

The existing light features of the airport are described in detail previously in this chapter.

ENVIRONMENTAL JUSTICE

Environmental justice can be defined as insuring that an action does not unfairly impact a minority race or families living under the poverty level. The EPA's *EJView* was consulted regarding the presence of environmental justice areas within the airport environs. According to the census data resources in the tool, the census blockgroup that contains the airport has a 25 percent minority population. Approximately 33 percent of the people living within the block group containing the airport have annual incomes below the poverty level.

WATER QUALITY

The *Clean Water Act* provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, and regulate other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc.

The Kansas River is located to the immediate north and east of the airport, and Shunganunga Creek is located less than a mile south of the airport. The Old Channel drainage ravine is located on the south portion of airport property and feeds into Shunganunga Creek. As previously discussed, the Kansas River and Shunganunga Creek are listed as Section 303(d) impaired waters as they violate established water quality standards.

Congress has mandated (under the *Clean Water Act*) the National Pollutant Discharge Elimination System (NPDES). This program addresses non-agricultural storm water discharges. Through the use of NPDES permits, certain procedures are required to prevent contamination of water bodies from storm water runoff. The EPA can delegate this permit authority to individual states. The Kansas Department of Health and Environment administers the NPDES permit program for the State of Kansas. Philip Billard Municipal Airport is eligible for coverage under the industrial activity general permit (S-ISWA-0507-1) issued September 1, 2006.

WETLANDS

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act*. Wetlands are defined in Executive Order 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonably saturated soil conditions for growth and reproduction." Wetlands can include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: the soil is inundated or saturated to the surface at some time during the growing season (hydrology), has a population of plants able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and soils that are saturated enough to develop anaerobic conditions during the growing season (hydric).

A review of the National Wetland Inventory maps indicates the presence of potential wetlands on airport property. The potential wetland is located to the immediate east of the south end of Taxiway E. The wetland type is Freshwater Forested/Shrub and is described as forested swamp or wetland shrub bog or wetland. Essentially, this is a short ravine that feeds into the Old Channel drainage channel. Further analysis would be needed to determine if the wetlands would be considered jurisdictional by the U.S. Army Corps of Engineers.

SUMMARY

The information discussed in this inventory chapter provides a foundation upon which the remaining elements of the planning process will be constructed. Information on current airport facilities and utilization will serve as a basis, with additional analysis and data collection, for the development of forecasts of aviation activity and facility requirement determinations. **Exhibit 1P** presents a map of various environmental elements in relation to the airport.

DOCUMENT SOURCES

A variety of different sources were utilized in the inventory process. The following listing reflects a partial compilation of these sources. This does not include data provided by airport management as part of their records, nor does it include airport drawings and photographs which were referenced for information. On-site inventory and interviews with staff and tenants contributed to the inventory effort.

Airport/Facility Directory, North Central U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, November 15, 2012.

Kansas City Sectional Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, November 15, 2012.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2013-2017.

General Aviation Airports: A National Asset, U.S. Department of Transportation, Federal Aviation Administration, May 2012.

U.S. Terminal Procedures, North Central Region, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, December 13, 2012.

Complete Economic and Demographic Data Source (CEDDS), Woods & Poole Economics, 2012. Washington, D.C.

Philip Billard Municipal Airport Master Plan Update. Metropolitan Topeka Airport Authority, 2002. Prepared by Bucher, Willis & Ratliff.

2040 Long Range Transportation Plan. Metropolitan Topeka Planning Organization. Adopted April 23, 2012.

Topeka Land Use and Growth Management Plan 2025. Prepared by the Topeka Planning Department. Approved by Topeka City Council on January 24, 2004.

2012 Complete Economic and Demographic Data Source (CEDDS). Woods & Poole Economics, Washington, D.C.

Kansas Airport System Plan – 2009. Prepared by Wilbur Smith Associates. Available at: http://www.ksdot.org/divaviation/default.asp

Kansas Aviation Economic Impact Study – 2010. Prepared by Wilbur Smith Associates. Available at: http://www.ksdot.org/divaviation/default.asp

A number of websites were also used to collect information for the inventory chapter. These include the following:

The City of Topeka:
http://www.topeka.org

Metropolitan Topeka Airport Authority
http://www.mtaa-topeka.org/

Greater Topeka Chamber of Commerce:
http://www.topekachamber.corg

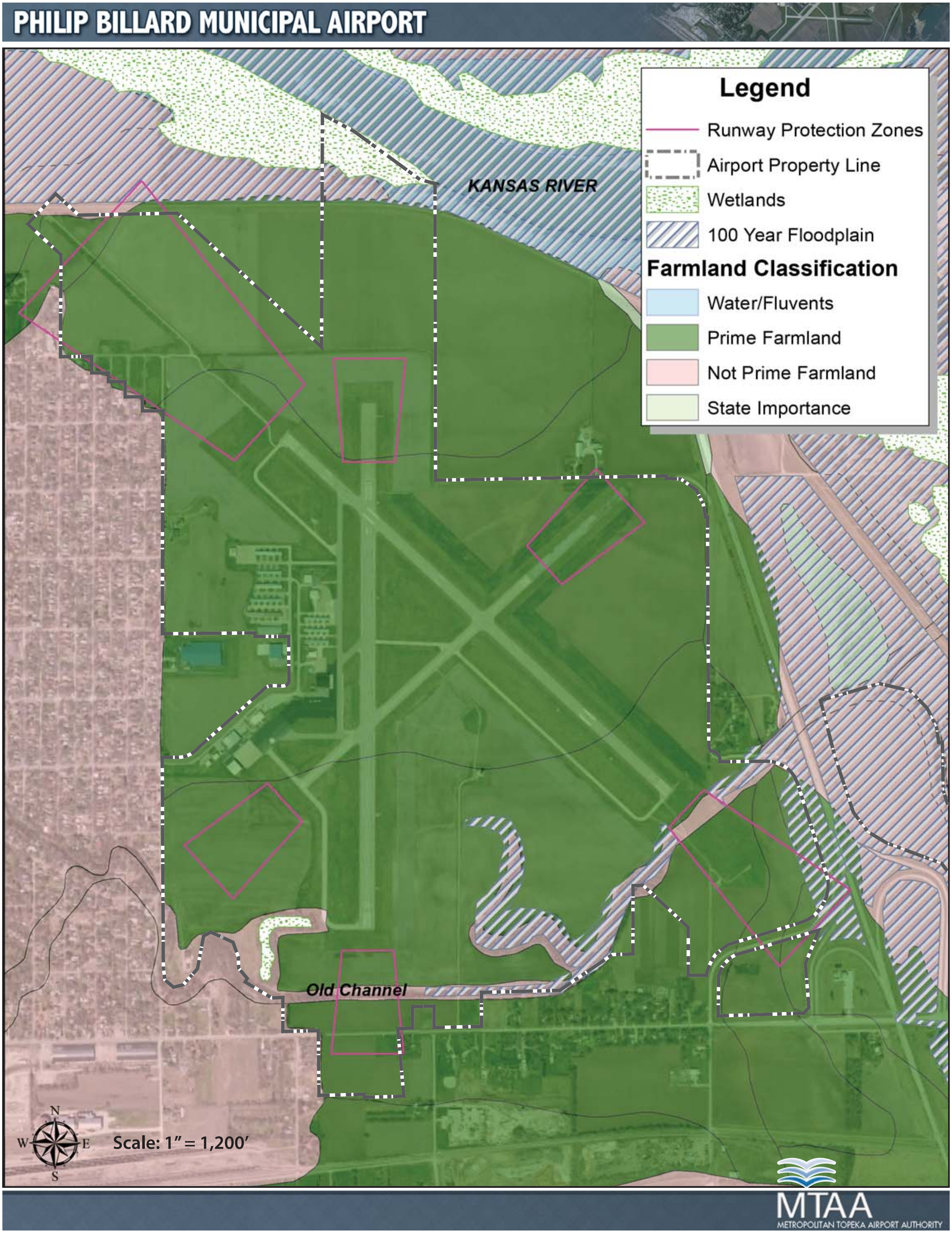


Exhibit 1P
ENVIRONMENTAL INVENTORY

FAA 5010 Airport Master Record Data:
www.airnav.com

U.S. Census Bureau:
www.census.gov

GCR and Associates.
http://www.airportiq.com/default.htm

Federal Aviation Administration
http://www.faa.gov

METROPOLITAN TOPEKA AIRPORT AUTHORITY
TOPEKA REGIONAL AIRPORT & BUSINESS CENTER | BILLARD AIRPORT

Chapter Two

AVIATION DEMAND FORECASTS

Chapter Two

AVIATION DEMAND FORECASTS

An important factor when planning the future needs of an airport involves a definition of aviation demand that may reasonably be expected to occur in both the near term (five years) and long term (20 years). For a general aviation airport such as Philip Billard Municipal Airport (TOP), forecasts of based aircraft and operations (takeoffs and landings) serve as the basis for facility planning.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. The FAA reviews such forecasts with the objective of comparing them to the *FAA Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). In addition, aviation activity forecasts are an important input to the benefit-cost analyses associated with some airport development projects

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*, dated December 4, 2004, states that forecasts should be:

- Realistic
- Based on the latest available data
- Reflective of current conditions at the airport
- Supported by information in the study
- Able to provide adequate justification for airport planning and development

The forecast process for an airport master plan consists of a series of basic steps that vary in complexity depending upon the issues to be addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and evaluation and documentation of the results. FAA Advisory Circular (AC)

150/5070-6B, *Airport Master Plans*, outlines seven standard steps involved in the forecast process, including:

1) **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.

2) **Review Previous Airport Forecasts**: May include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.

3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.

4) **Select Forecast Methods**: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.

5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.

6) **Summarize and Document Results**: Provide supporting text and tables as necessary.

7) **Compare Forecast Results with FAA's TAF**: Follow guidance in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*. In part, the Order indicates that forecasts should not vary significantly (more than 10 percent) from the TAF. When there is a greater than 10 percent variance, supporting documentation should be supplied to the FAA.

The aviation demand forecasts are then submitted to the FAA for their approval. Master plan forecasts for operations and based aircraft for general aviation airports are considered to be consistent with the TAF if they meet the following criteria:

Where the 5- or 10-year forecasts exceed 100,000 total annual operations or 100 based aircraft:

a) Forecasts differ by less than 10 percent in the 5-year forecast and 15 percent in the 10-year period, or
b) Forecasts do not affect the timing or scale of an airport project, or
c) Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3C.

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for Philip Billard Municipal Airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation-demand projections for Philip Billard Municipal Airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast.

Beyond five years, the predictive reliability of the forecasts can diminish. Therefore, it is prudent for the airport to update the forecasts, reassess the assumptions originally made, and revise the forecasts based on the current airport and industry conditions. Facility and financial planning usually require at least a 10-year preview, since it often takes several years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors are known to influence the aviation industry and can have significant impacts on the extent and nature of activity occurring in both the local and national markets. Technological advances in aviation have historically altered and will continue to change the growth rates in aviation demand over time. A recent example is the substantial growth in the production and delivery of business jet aircraft, which resulted in a growth rate that far exceeded expectations. Such changes are difficult to predict, but over time, reasonable growth trends can be identified. Using a broad spectrum of demographic, economic, and industry data, forecasts for Philip Billard Municipal Airport have been developed.

For each aviation demand indicator, such as based aircraft and operations, several forecasts are developed. These several forecasts are presented to define a reasonable planning envelope. The selected forecast for a particular demand indicator may be one of the forecasts or it may be an average of all of the forecasts. Several standard statistical methods have been employed to generate various projections of aviation demand.

Trend series projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical demand data and then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of a direct relationship between two separate sets of historic data. Should there be a reasonable correlation between the data, further evaluation using regression analysis may be employed.

Regression analysis measures the statistical relationship between dependent and independent variables, yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures the association between changes in a dependent variable and independent variable(s). If the r-squared (r^2) value (coefficient determination) is greater than 0.90, it indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower.

Historical growth analysis is a simple forecasting method in which the historical average annual growth rate is identified, and then extended out to forecast years. This analysis method assumes factors that impacted growth in the past will continue into the future.

Market share analysis involves a historical review of airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections, but can provide a useful check on the validity of other forecasting techniques.

Utilizing these statistical methods, available existing forecasts, and analyst expertise, forecasts of aviation demand for Philip Billard Municipal Airport have been developed. The remainder of this chapter presents the aviation demand forecasts and includes activity in two broad categories: based aircraft and annual operations.

NATIONAL AVIATION TRENDS AND FORECASTS

The forecasts developed for the airport must consider national, regional, and local aviation trends. The following section describes recent trends in aviation. This information is utilized both in statistical analysis and to aid the forecast preparer in making any manual adjustments to the forecasts as necessary. The national aviation forecast information is primarily sourced from the *FAA Aerospace Forecast: Fiscal Years 2012-2032*.

NATIONAL TRENDS

The aviation industry in the United States has experienced an event-filled decade. Since the turn of the century, the industry has faced impacts of the events of September 11, 2001, scares from pandemics such as SARS, the bankruptcy of five network air carriers, all-time high fuel prices, and a serious economic downturn with global ramifications. The Bureau of Economic Research has determined that the worst economic recession in the post-World War II era began in December 2007 and lasted until mid-2009. Eight of the world's top 10 economies were in recession by January 2009.

As the recession began, unemployment in the United States was at 5.0 percent. While it grew through 2008, unemployment intensified in 2009 until peaking at 10.1 percent in October, although the recession officially ended in June of that year. As of the end of 2011, unemployment stood at 8.6 percent and by the end of 2012, the unemployment rate was still high at 7.7 percent.

This recession did not face the high inflationary environment of the recession in the early 1980s or the high-energy costs of the mid-1970s recession. While recessions during the post-war era have averaged 10 months in duration, this one lasted 19 months. Continued levels of high debt, a weak housing market, and tight credit, are expected to keep the recovery modest by most standards. The resolution of those factors will determine the future path of the recovery.

The nation's gross domestic product (GDP) is the primary measure of overall economic growth. The FAA forecasts were based upon a 2.6 percent annual average growth in GDP for federal fiscal year 2012 through 2032. The GDP growth rate in fiscal year 2011 was 2.1 percent with signs at the end of the year showing pent-up demand coming back with growth in consumer spending, a turn-around in the housing market, and traction in the labor market.

Economic growth on the global scale is expected to be higher with emerging markets in Asia/Pacific and Latin America leading the way. The global GDP was projected to grow at an average of 3.3 percent over the 20-year forecast period.

GENERAL AVIATION TRENDS

Following more than a decade of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994, which limits the liability on general aviation aircraft to 18 years from the date of manufacture. This legislation sparked an interest to renew the manufacture of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance had been a major factor in the decision by many American aircraft manufacturers to slow or discontinue the production of general aviation aircraft.

General aviation activity trends tend to closely match national economic trends. From 2008 through 2012, total operations by general aviation aircraft have declined annually. The FAA forecasts a return to growth in 2013 with an average annual growth rate of 0.3 percent through 2032.

The FAA forecasts the fleet and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. **Exhibit 2A** presents the historical and forecast U.S. active general aviation aircraft.

After growing rapidly for most of the decade, the demand for business jet aircraft has slowed over the past few years as the industry has been hard hit by the economic recession. Nonetheless, the FAA forecast calls for robust growth in the long-term, driven by higher corporate profits and continued concerns about safety, security, and flight delays. Overall, business aviation is projected to outpace personal/recreational use.

The active general aviation fleet is projected to increase at an average annual rate of 0.6 percent through 2032, growing from a 2011 estimate of 222,520 to 253,205 in 2032. The turbine fleet, including helicopters, is forecast to grow annually at 2.9 percent, with the jet portion increasing at 4.0 percent annually.

Piston-powered aircraft are projected to decrease from the 2011 total of 158,055 through 2024, with declines in both single and multi-engine fixed wing aircraft but growth in piston helicopters. Starting in 2025, active piston-powered aircraft are forecast to increase to 155,395 in 2032, still below the current number in the fleet. Fixed-wing single and multi-engine piston aircraft are forecast to decline annually at 0.1 percent and 0.5 percent, respectively.

The FAA began tracking the light sport aircraft segment of the general aviation fleet in 2005. At the end of 2011, a total of 6,645 aircraft were estimated in this category. By 2032, a total of 10,195 light sport aircraft are forecast to be in the fleet.

GENERAL AVIATION AIRCRAFT SHIPMENTS AND REVENUE

The economic recession beginning in late 2007 has had a negative impact on general aviation aircraft production and the industry has been slow to recover. Aircraft manufacturing declined for four straight years from 2008 through 2011. Since 2008, manufacturing is down more than 61 percent. According to the General Aviation Manufacturers Association (GAMA), while manufacturing was down slightly in 2011, year-over-year, there is optimism that aircraft manufacturing will stabilize and return to growth in 2012 and beyond. **Table 2A** presents historical data related to general aviation aircraft shipments.

TABLE 2A
Annual General Aviation Airplane Shipments
Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
1994	1,132	544	77	233	278	3,749
1995	1,251	605	61	285	300	4,294
1996	1,437	731	70	320	316	4,936
1997	1,840	1043	80	279	438	7,170
1998	2,457	1508	98	336	515	8,604
1999	2,808	1689	112	340	667	11,560
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,963	1,999	52	321	591	11,918
2005	3,590	2,326	139	375	750	15,156
2006	4,053	2,513	242	412	886	18,815
2007	4,276	2,417	258	465	1,136	21,837
2008	3,970	1,943	176	538	1,313	24,772
2009	2,279	893	70	446	870	19,474
2010	2,020	781	108	368	763	19,715
2011	1,865	739	121	324	681	19,097

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet

Source: General Aviation Manufacturers Association 2011 Statbook

U.S. Active General Aviation Aircraft

	2012	2017	2022	2027	2032
FIXED WING					
Piston					
Single Engine	137,600	133,650	132,010	132,660	135,340
Multi-Engine	15,735	15,425	15,010	14,680	14,350
Turbine					
Turboprop	9,505	9,870	10,300	10,860	11,445
Turbojet	12,050	14,470	17,620	21,760	26,935
ROTORCRAFT					
Piston	3,780	4,250	4,680	5,180	5,705
Turbine	6,940	8,180	9,465	10,965	12,550
EXPERIMENTAL					
	24,480	26,165	27,825	29,480	31,140
SPORT AIRCRAFT					
	6,930	7,845	8,630	9,410	10,195
OTHER					
	5,670	5,635	5,605	5,575	5,545
TOTAL	**222,690**	**225,490**	**231,145**	**240,570**	**253,205**

Source: FAA Aerospace Forecasts, Fiscal Years 2012-2032.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

Exhibit 2A
U.S. ACTIVE GENERAL AVIATION AIRCRAFT FORECASTS

Worldwide shipments of general aviation airplanes fell for the fourth year in a row in 2011. A total of 1,885 units were delivered around the globe, as compared to 2,020 units in 2010. Worldwide general aviation billings were slightly lower than the previous year. Billings have remained fairly steady, around $19 billion, since experiencing a steep decline in 2009.

Business Jets: General aviation manufacturers delivered 681 business jets in 2011, as compared to 727 units in 2010, a 6.3 percent decline for equivalent reporting companies. Demand was much stronger in 2011 for large-cabin business jets, driven more heavily by emerging markets than it was for medium and light business jets. In addition, the relatively high number of airplanes on the used market over the past couple of years continued to have a dampening effect on business jet shipments this year.

Turboprops: In 2011, 324 turboprop airplanes were delivered to customers around the world, a decrease of 2.4 percent from the previous year's figure of 332 for equivalent reporting companies.

Pistons: The year started out in positive territory for piston-engine deliveries, but the segment ended down by 1.5 percent. Piston deliveries fell from 873 units shipped from equivalent reporting companies in 2010 to 860 during 2011. The piston segment fared best for unit deliveries among the three segments by which GAMA tracks the airplane manufacturing industry. This is due in part by deliveries to flight schools in emerging markets.

Most industry observers believe that the general aviation market, particularly the business aviation market, is in a position for sustained growth. Industry net orders are back to positive and most leading indicators continue to improve. According to *Bombardiers Market Forecast 2010-2011*, "All long-term market fundamentals remain positive: business jet utilization, backlogs, the pre-owned aircraft market, new aircraft programs, fractional and branded charter demand, business jet penetration in Growth Markets, and aircraft retirements." The business jet market should experience strong growth over the 2011-2030 time periods, with 24,000 total deliveries worth $648 billion in revenues. The worldwide business jet fleet is expected to grow from 14,700 in 2010 to 30,900 by 2030, net of retirements. The large jet category of the market is expected to expand faster than the other categories.

SOCIOECONOMIC PROJECTIONS

The socioeconomic conditions provide an important baseline for preparing aviation demand forecasts. Local socioeconomic variables such as population, employment, and income are indicators for understanding the dynamics of the community and can relate to local trends in aviation activity. Analysis of the demographics of the airport service area will give a more comprehensive understanding of the socioeconomic situations affecting the region which supports Philip Billard Municipal Airport. The following is a summary of the historical demographic trends presented in Chapter One as well as forecasts of those socioeconomic characteristics.

Table 2B summarizes historical and forecast population, employment, and income estimates for Shawnee County, the State of Kansas, and the Topeka Metropolitan Statistical Area (MSA), which includes Shawnee, Jefferson, Jackson, Osage, and

Wabaunsee Counties. Over the next 20 years, the population of Shawnee County is projected to add approximately 12,000 people. This equates to an average annual growth rate of 0.33 percent. Employment is projected to grow at 0.64 percent annually. Income for Shawnee County is projected to grow significantly at 1.44 percent annually. While income projects are similar to those for the state and the MSA, population growth in the county is projected to lag behind the state.

TABLE 2B
Demographic Trends and Forecast

	HISTORIC				FORECAST			
	2000	2010	2012	AAGR 2000-2012	2017	2022	2032	AAGR 2012-2032
Shawnee County								
Population	169,871	177,934	179,271	0.45%	182,155	185,296	191,540	0.33%
Employment	121,964	116,640	115,641	-0.44%	120,037	124,118	131,417	0.64%
Income (PCPI)	$31,857	$35,399	$36,345	1.10%	$38,346	$41,313	$48,412	1.44%
Topeka MSA								
Population	224,859	234,259	235,893	0.40%	240,584	245,619	255,671	0.40%
Employment	145,189	140,510	139,362	-0.34%	145,207	150,757	161,071	0.73%
Income (PCPI)	$30,442	$33,831	$34,522	1.05%	$36,508	$39,368	$46,190	1.47%
Kansas								
Population	2,688,418	2,853,118	2,902,120	0.64%	3,016,787	3,135,390	3,373,159	0.75%
Employment	1,757,893	1,813,307	1,836,237	0.36%	1,949,556	2,067,862	2,320,786	1.18%
Income (PCPI)	$31,710	$35,809	$36,978	1.29%	$39,083	$42,233	$50,060	1.53%

AAGR: Average annual growth rate
PCPI - Per Capita Personal Income ($2005)
Topeka MSA includes Shawnee, Jackson, Jefferson, Osage, and Wabaunsee counties

Source: Woods & Poole Economics - Complete Economic Demographic Data Source (CEDDS-2012); Historic population from U.S. Census Bureau

GENERAL AVIATION FORECASTS

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand include:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Peaking Period Operations

The remainder of this chapter will examine historical trends with regard to these areas of general aviation and project future demand for these segments of general aviation activity at the airport. These forecasts, once approved by the FAA, will become the basis for planning future facilities, both airside and landside, at the airport.

REGISTERED AIRCRAFT FORECAST

The number of based aircraft is the most basic indicator of general aviation demand at an airport. By first developing a forecast of based aircraft, other demand segments can be projected utilizing the forecast trend in based aircraft. One method of forecasting based aircraft is to first examine local aircraft ownership by reviewing aircraft registrations in the region. **Table 2C** presents historical data regarding aircraft registered in the five-county Topeka MSA. These counties approximate the service area for the airport.

TABLE 2C
Registered Aircraft by County in the Topeka MSA

Year	Shawnee	Jackson	Jefferson	Osage	Wabaunsee	Topeka MSA
1994	215	7	19	23	6	270
1995	201	7	21	26	7	262
1996	200	9	20	26	6	261
1997	204	11	18	27	5	265
1998	204	12	18	29	7	270
1999	201	9	18	29	5	262
2000	211	13	19	33	5	281
2001	211	12	22	32	4	281
2002	217	11	21	31	4	284
2003	212	9	23	38	4	286
2004	208	9	21	41	5	284
2005	214	11	19	37	5	286
2006	213	10	20	35	5	283
2007	223	9	25	34	5	296
2008	222	9	25	36	5	297
2009	220	10	25	26	7	288
2010	219	10	22	25	7	283
2011	214	10	23	26	8	281
2012	208	9	23	22	8	270
AAGR 1994-2012	**-0.18%**	**1.41%**	**1.07%**	**-0.25%**	**1.61%**	**0.00%**

Topeka MSA includes Shawnee, Jefferson, Jackson, Osage, and Wabaunsee counties
Source: FAA Aircraft Registry Database; FAA Census of U.S. Civil Aircraft

The trend in registered aircraft in the Topeka MSA counties since 1994 to a large degree reflects the fact that general aviation activity often trends with national economic trends. By the end of the 1990's, the number of registered aircraft in the region began to increase from a low of 261 in 1996 to a high of 297 in 2008. With the onset of the national recession, registered aircraft has declined to 270 in 2012. The current number of registered aircraft in the five-county region is the same as there were in 1994. Nonetheless, the historical trend shows that the number of registered aircraft has increased in the past and these increases have typically coincided with periods of sustained economic growth nationally.

Several forecasts of registered aircraft for the Topeka MSA have been developed and are presented on **Exhibit 2B**. Since the historical trend for registered aircraft has not shown any sustained growth, several market share forecasts of registered aircraft were developed. Forecasting methods, such as regression analysis and historical growth trend line analysis, would not return reliable statistical results and were, therefore, not considered further.

The first two forecasts consider the relationship between historical registered aircraft and the population. By maintaining the same ratio of aircraft per 1,000 people, a long term forecast emerges. Since 2012 was the lowest ratio of the last 12 years (1.1446 aircraft per 1,000 people), it is likely that this forecasts represents a low end forecast. The current ratio is likely the result of a slow economic recovery. The second forecast considers an increasing ratio of aircraft to the population. In this case, a rebound to the previous high ratio of 1.2868 aircraft per 1,000 people is considered in the next 10 years.

Two additional forecasts have been developed utilizing a market share ratio of the active U.S. general aviation fleet as forecast by the FAA. In 2012, the Topeka MSA registered aircraft represented 0.1212 percent of the total general aviation fleet of 222,690. This was the lowest ratio of the last 12 years and is likely influenced by the slow economic recovery. An increasing market share forecast was also considered in which the previous 10-year high ratio of 0.1364 percent was reclaimed within the next 10 years.

Since the precise nature of the future economy cannot be known, an average of the four market share forecasts has been chosen as the selected forecast of registered aircraft for the Topeka MSA. This results in registered aircraft increasing from 270 currently to 283 in the next five years, 298 in 10 years, and 328 in 20 years. These registered aircraft forecasts will be one element considered in the based aircraft forecasts to follow.

REGISTERED AIRCRAFT DISTRIBUTION

Table 2D presents the distribution of total registered by county. This forecast represents a constant market share distribution. This means, for example, that since in 2012, Shawnee County represented 77.04 percent of the Topeka MSA registered aircraft, this percentage has been carried forward to the forecast years of this master plan.

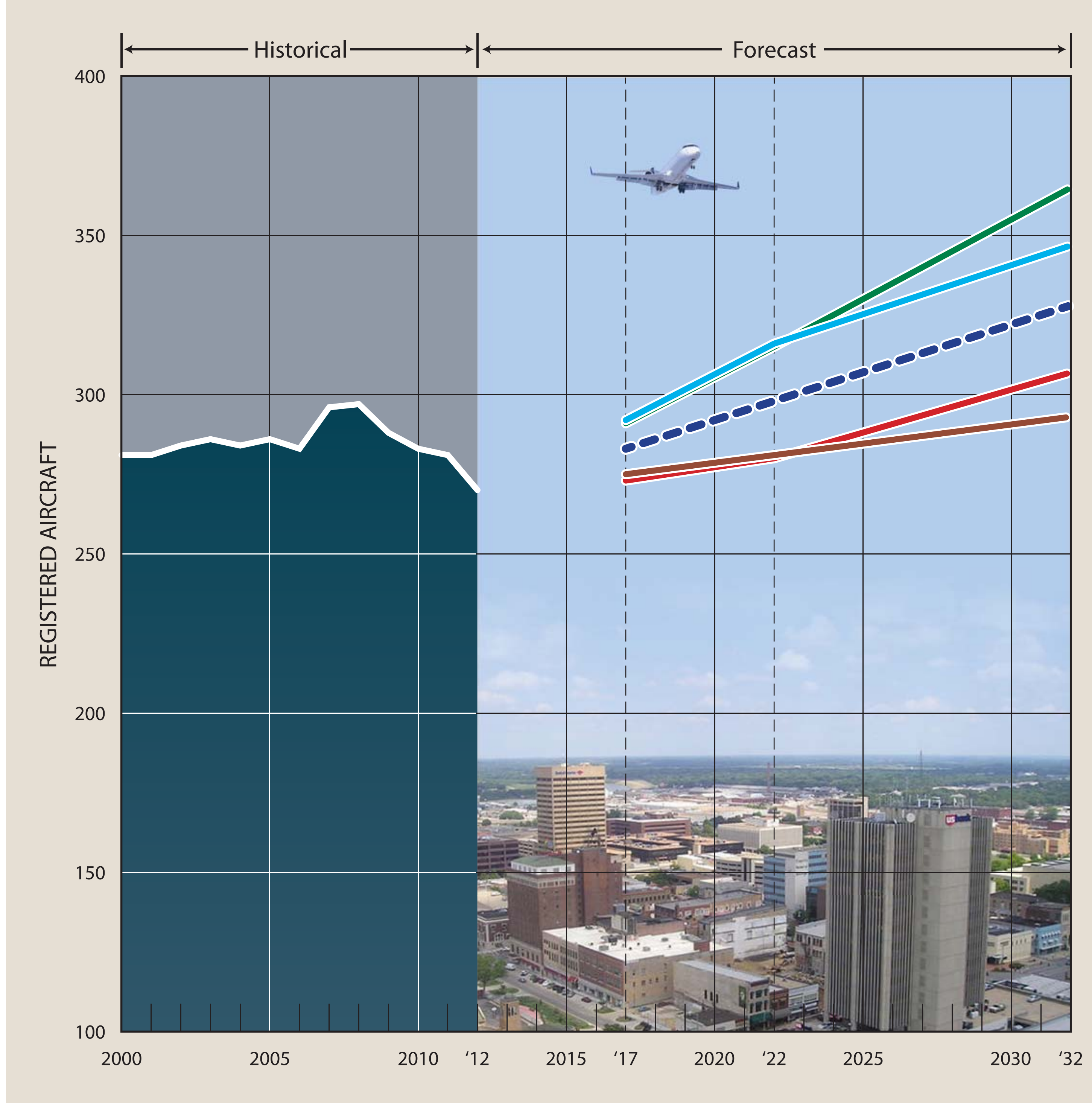
TABLE 2D
Constant Market Share Distribution of Topeka MSA Registered Aircraft

Year	Shawnee	Jackson	Jefferson	Osage	Wabaunsee	Total Topeka MSA Registered Aircraft
2012	208	9	23	22	8	270
Percent	77.04%	3.33%	8.52%	8.15%	2.96%	100.00%
Topeka MSA Forecast Distribution of Registered Aircraft By County (AAGR = 0.98%)						
2017	218	9	24	23	8	283
2022	230	10	25	24	9	298
2032	253	11	28	27	10	328

AAGR: Average annual growth rate
Source: Coffman Associates analysis

The forecast annual compound growth rate for each county is 0.98 percent. For Shawnee County, by 2017, 218 registered aircraft are forecast by the long term planning period. Shawnee County is forecast to have 253 registered aircraft. **Exhibit 2C** shows the forecast growth in registered aircraft for the Topeka MSA.

Year	Topeka MSA Registration[1]	U.S. Active Aircraft[2]	Percent of U.S. Active Aircraft	Topeka MSA Population[3]	Aircraft Per 1,000 Population
2000	281	217,533	0.1292%	224,859	1.2497
2001	281	211,446	0.1329%	225,090	1.2484
2002	284	211,244	0.1344%	225,355	1.2602
2003	286	209,606	0.1364%	226,153	1.2646
2004	284	219,319	0.1295%	227,155	1.2502
2005	286	224,257	0.1275%	228,208	1.2532
2006	283	221,942	0.1275%	228,825	1.2368
2007	296	231,606	0.1278%	230,025	1.2868
2008	297	228,664	0.1299%	231,272	1.2842
2009	288	223,876	0.1286%	232,548	1.2385
2010	283	223,370	0.1267%	234,259	1.2081
2011	281	222,520	0.1263%	235,031	1.1956
2012	270	222,690	0.1212%	235,893	1.1446
Constant Aircraft Per 1,000 Population (AAGR= 0.11%)					
2017	275	225,490	0.1221%	240,584	1.1446
2022	281	231,145	0.1216%	245,619	1.1446
2032	293	253,205	0.1156%	255,671	1.1446
Increasing Aircraft Per 1,000 Population (AAGR = 0.97%)					
2017	292	225,490	0.1297%	240,584	1.2157
2022	316	231,145	0.1367%	245,619	1.2868
2032	347	253,205	0.1371%	255,671	1.3579
Constant Share of U.S. Fleet (AAGR = 0.35%)					
2017	273	225,490	0.1212%	240,584	1.1364
2022	280	231,145	0.1212%	245,619	1.1410
2032	307	253,205	0.1212%	255,671	1.2008
Increasing Share of U.S. Fleet (AAGR = 1.22%)					
2017	291	225,490	0.1288%	240,584	1.2076
2022	315	231,145	0.1364%	245,619	1.2841
2032	365	253,205	0.1440%	255,671	1.4266
Selected Forecast - Average (AAGR = 0.69%)					
2017	283	225,490	0.1255%	240,584	1.1761
2022	298	231,145	0.1290%	245,619	1.2141
2032	328	253,205	0.1295%	255,671	1.2825



[1]FAA Aircraft Registration Database
[2]FAA Aerospace Forecasts Fiscal Years 2012-2032
[3]Woods & Poole Economics 2012
Topeka MSA includes Shawnee, Jefferson, Jackson, Osage, and Wabaunsee Counties
Source: *Coffman Associates analysis.*

LEGEND
- Constant Aircraft per 1,000 Population in Topeka
- Increasing Aircraft per 1,000 Population in Topeka
- Constant Share of U.S. Fleet
- Increasing Share of U.S. Fleet
- Selected Forecast

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Exhibit 2B
REGISTERED AIRCRAFT FORECASTS

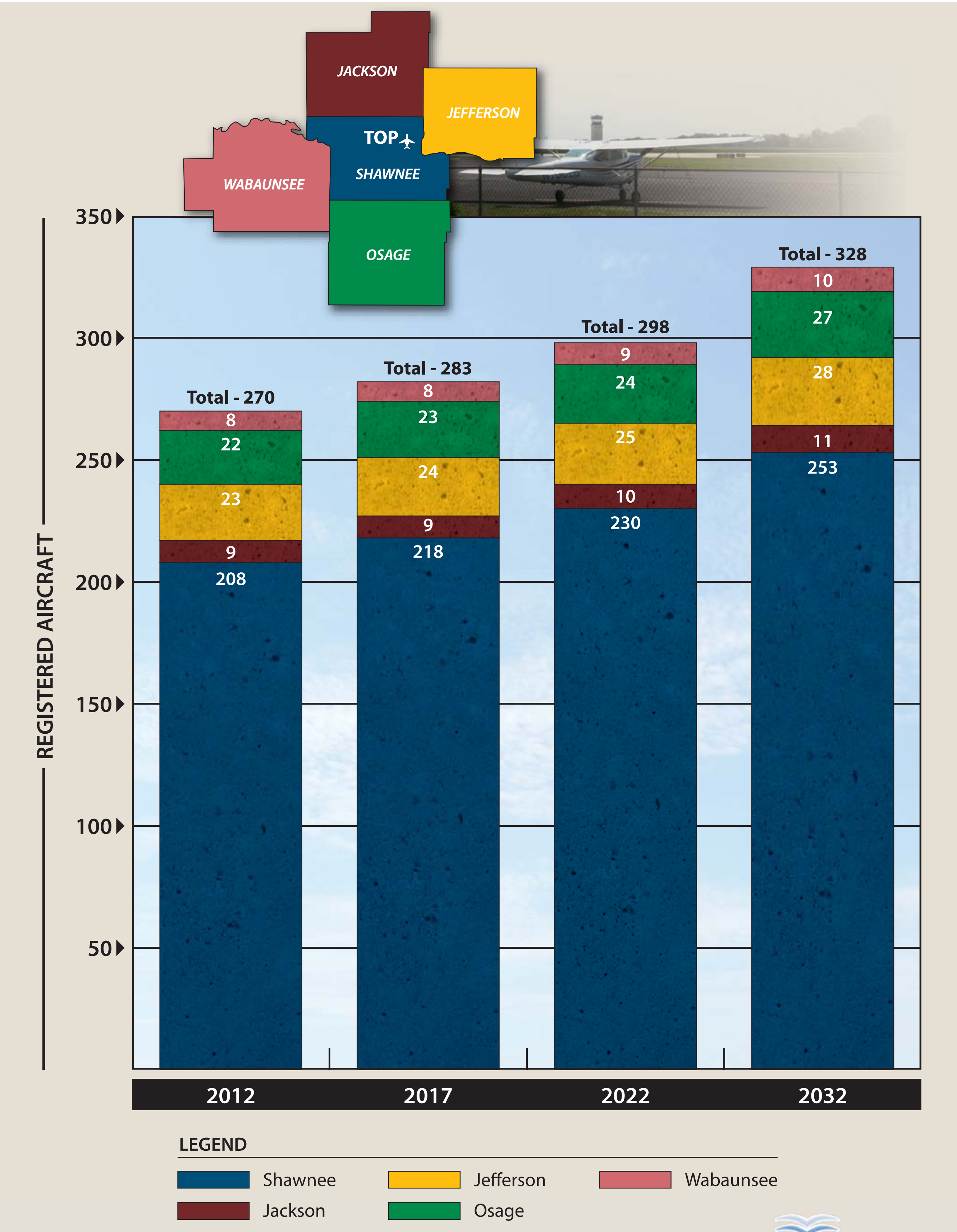


Exhibit 2C
REGISTERED AIRCRAFT
FORECAST DISTRIBUTION

BASED AIRCRAFT FORECASTS

Prior to generating statistical forecasts of based aircraft for the airport, it is important to establish the current number of based aircraft at the airport. Until recently, the FAA has not required airports to maintain annual based aircraft figures. For this master planning study, individual aircraft were physically counted to establish a baseline of based aircraft. Currently, there are a total of 88 aircraft based at the airport. **Table 2E** shows the type of based aircraft and where they are stored. This includes five aircraft which are stored in the Kansas Highway Patrol hangar.

TABLE 2E
2012 Based Aircraft Baseline
Philip Billard Municipal Airport

Hangar ID*	Hangar Description/Occupant	Aircraft
T-hangars	76 T-hangar units are full	68-SEP, 5-MEP, 3-Other
25	Doc Evans hangar	1-MEP (Cessna 414)
4	New Jetz, Inc. hangar	2-Jets (Lear 45, Cessna Bravo 550)
18	Explorer Post #8 hangar	2-SEP
11	Meissinger hangar	1-SEP
29	Kansas Highway Patrol hangar	2-H, 3-SEP, 1-TP (King Air 350)
	TOTAL	**88 Based Aircraft**

SEP-single engine piston; MEP-multi-engine piston; TP-turboprop; J-business jet, H-helicopter; O-Other

*Hangar ID shown on Exhibit 1L - Building Inventory

Source: MTAA

Based Aircraft Distribution Forecast

The first forecast generated for based aircraft utilizes the previously determined forecast of registered aircraft for the Topeka MSA. This is a distributive forecast that recognizes that there are two capable public use general aviation airports in Shawnee County. By taking the forecast number of registered aircraft and distributing a relative percent as based aircraft, a forecast emerges.

Philip Billard Municipal Airport accounted for 32.6 percent of the registered aircraft in the Topeka MSA and Topeka Regional Airport accounted for 13.7 percent. By maintaining these market shares of registered aircraft as a constant, a forecast of based aircraft is presented. For Philip Billard Municipal Airport, this forecast results in 92 based aircraft by 2017, 97 by 2022, and 107 based aircraft in the long term. **Table 2F** presents this analysis.

TABLE 2F Based Aircraft System Distribution in Shawnee County Philip Billard Municipal Airport						
Year	**Topeka MSA Registered Aircraft**	**Aircraft Based at TOP**	**Percent of MSA Aircraft Based at TOP**	**Aircraft Based at FOE**	**Percent of MSA Registered Aircraft Based at FOE**	**Percent of MSA Registered Aircraft Based at Both Airports**
2012	270	88	32.59%	37	13.70%	46.30%
Selected Forecast - Constant Market Share						
2017	283	92	32.59%	39	13.70%	46.30%
2022	298	97	32.59%	41	13.70%	46.30%
2032	328	107	32.59%	45	13.70%	46.30%
AAGR 2012-2032:		0.98%		0.98%		

TOP: Philip Billard Municipal Airport
FOE: Topeka Regional Airport
MSA: Metropolitan Statistical Area
Source: Coffman Associates Analysis

Existing Forecasts

There are several existing forecasts of based aircraft for Philip Billard Municipal Airport as shown in **Table 2G**. The FAA TAF is a generalized annual forecast of airport activity produced by the FAA. It can be used for long term planning when other statistical measures support its forecasts. The TAF estimates that in 2012 there were 69 based aircraft at the airport. It estimates an AAGR of 2.12 percent, which results in a long term forecast of 105 based aircraft. Since the TAF is 19 aircraft short of the actual number of based aircraft for 2012, the current TAF may be unreliable.

TABLE 2G Existing Based Aircraft Forecasts Philip Billard Municipal Airport		Projections Adjusted to Plan Years of this Master Plan				
	Base Year of Study	**2012**	**2017**	**2022**	**2032**	**AAGR 2012-2032**
Existing Projection Source						
2012 FAA *Terminal Area Forecast*	69 (2012)	69	77	86	105	2.12%
2002 Master Plan	98 (1999)	119	130	144	166	1.66%
2009 *Kansas Aviation System Plan*	88 (2007)	92	96	100	109	0.84%

AAGR: Average annual growth rate
Source: Coffman Associates analysis

A second existing forecast is from the previous master plan finalized in 2002. The base year for the previous master plan forecast was 1999, when a total of 98 based aircraft were identified. The 2002 master plan forecasts reflected an average annual growth rate of 1.66 percent.

A third existing forecast is from the 2009 *Kansas Aviation System Plan* (KASP). The KASP has a base year of 2007 and it identified 88 based aircraft at that time. The KASP reflected an annual growth rate of 0.83 percent.

These three existing forecasts have been interpolated and extrapolated to the plan years of this master plan as shown in the table. The previous forecasts can serve as a comparison to the selected based aircraft forecast to emerge from this master plan and they can also serve as the basis for several new forecasts.

New Based Aircraft Forecasts

Several new forecasts of based aircraft have been developed and are presented in **Table 2H**. The first three forecasts simply utilize the average annual growth rate from the three existing based aircraft forecasts and apply that to the actual current based aircraft figure of 88. This results in growth rates that are the same as the previous forecasts but the new based aircraft figures are relative to the plan years of this master plan.

TABLE 2H
Existing Based Aircraft Forecasts
Philip Billard Municipal Airport

	2012 (Base Year)	2017	2022	2032	AAGR 2012-2032
Comparison Projections					
2012 FAA *Terminal Area Forecast*	88	98	109	134	2.12%
2002 Master Plan	88	96	104	122	1.66%
2009 *Kansas Aviation System Plan*	88	92	96	104	0.84%
Additional Projections					
2012 FAA Active Aircraft Forecast Growth Rate	88	91	94	100	0.64%
Shawnee County Population Growth Rate	88	90	91	95	0.38%
Shawnee County Employment Growth Rate	88	91	94	100	0.64%
Shawnee County Income Growth Rate	88	94	101	117	1.43%

*Base year set to 2012 based aircraft figure.
AAGR: Average annual growth rate
Source: Coffman Associates analysis

The TAF annual growth rate of 2.12 percent, when applied to the current base year of 88 aircraft, results in a long term forecast of 134 based aircraft. This likely represents the high end of the planning envelope as this growth rate is not typical for Philip Billard Municipal Airport. The 2002 master plan also has a high growth rate of 1.66 percent, but this growth rate was developed in a different aviation environment, when growth was more substantial. The KASP forecast of 0.84 percent annual growth appears reasonable.

Several additional new forecasts have been developed that are based on applying the forecast growth rate of one variable to the current based aircraft figure. The first variable considered is the FAA forecast of an annual growth rate of 0.6

percent for active aircraft. When applying this growth rate to the current based aircraft figure of 88, we see a long term based aircraft figure of 100. Other forecasts have been similarly developed which consider the forecast growth rate for population, employment, and income in Shawnee County.

SELECTED BASED AIRCRAFT FORECAST

The first forecast presented which distributes the forecast of registered aircraft to the two airports in Shawnee County is the selected forecast. This forecast utilizes current FAA data of registered aircraft, applies statistical methods using variables known to influence aircraft ownership, and distributes those aircraft first to the counties in the Topeka MSA, then to the two airports in Shawnee County.

The following is the based aircraft forecast for Philip Billard Municipal Airport to be utilized for this airport master plan:

Short Term – 92
Intermediate Term – 97
Long Term - 107

The selected forecast falls within the planning envelope and is considered reasonable when compared to other existing forecasts. The average annual growth rate over the next 20 years is 0.98 percent. **Exhibit 2D** presents the based aircraft forecasts and the selected forecasts.

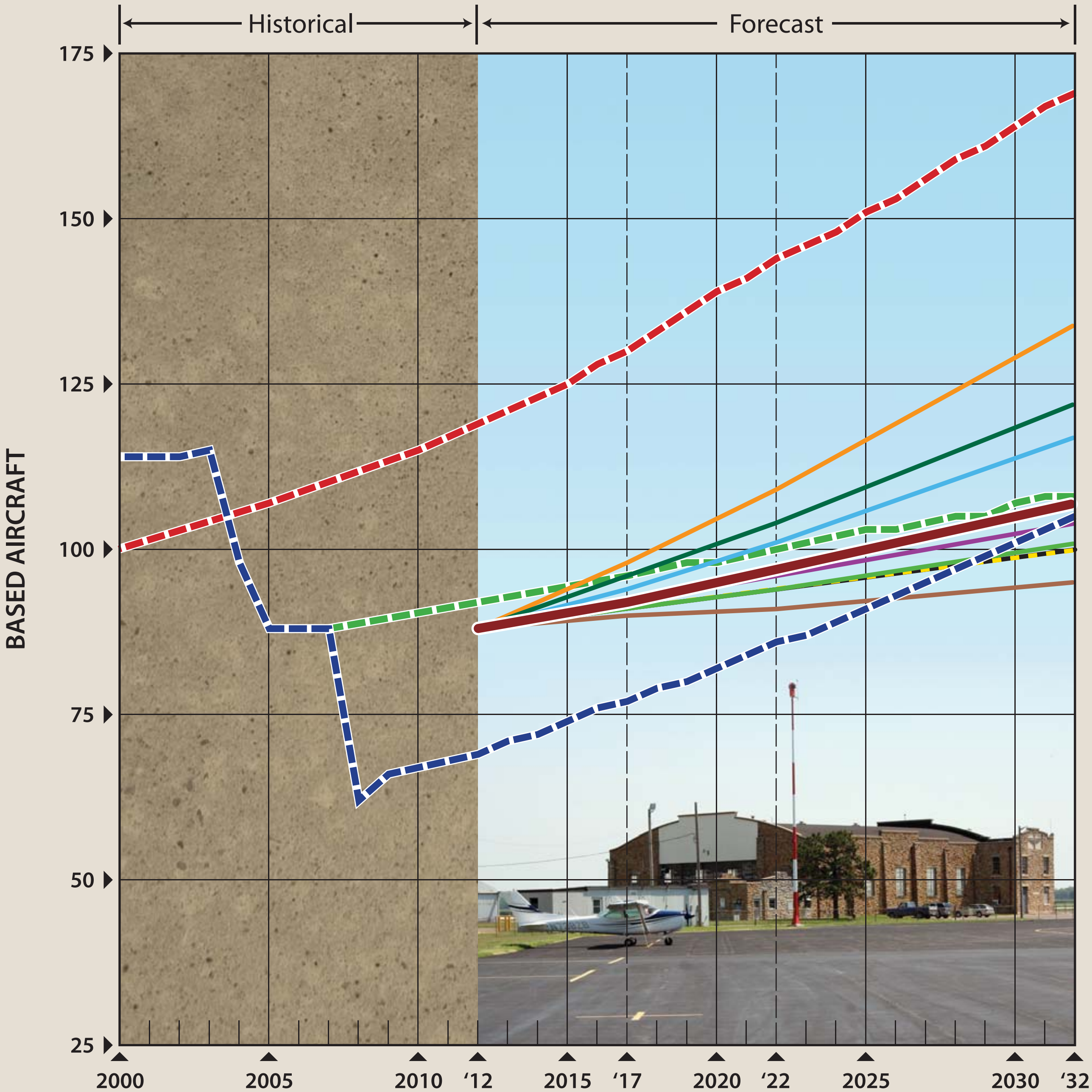
BASED AIRCRAFT FLEET MIX PROJECTION

Knowing the aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best serve the level of activity and the type of activities occurring at the airport. The existing based aircraft fleet mix is comprised of 74 single engine aircraft, 6 multi-engine piston-powered aircraft, two jet-powered aircraft, one turbo-prop, two helicopters, and three classified as other, which are typically small experimental aircraft.

Several factors must be considered when projecting a future fleet mix. As discussed previously, on the national level, the growth areas for the general aviation fleet are in turbine-powered aircraft (business jets and helicopters), while piston-powered aircraft are forecast to remain relatively flat.

On a more local level, the trends in registered aircraft in Shawnee County dating back to 1994 have been identified and are presented in **Table 2J**. As can be seen, the total number of registered aircraft has remained relatively steady with 215 in 1994 and 208 in 2012. There have been fluctuations with a high number of registered aircraft (223) reached in 2007, immediately prior to the national recession.

PHILIP BILLARD MUNICIPAL AIRPORT



LEGEND

- FAA APO Terminal Area Forecast
- 2002 Master Plan (1999 Base Year)
- 2009 Kansas Aviation System Plan (2007 Base Year)
- 2012 FAA Terminal Area Forecast
- 2002 Master Plan
- 2009 Kansas Aviation System Plan
- 2012 FAA Active Aircraft Forecast Growth Rate
- Shawnee County Population Growth Rate
- Shawnee County Employment Growth Rate
- Shawnee County Income Growth Rate
- Topeka MSA Registered Aircraft Growth Rate
- Constant Market Share of Topeka MSA Registered Aircraft - ***Selected Forecast***

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Exhibit 2D
BASED AIRCRAFT FORECASTS

TABLE 2J
Shawnee County Registered Aircraft Fleet Mix Projections

Year	SEP	%	MEP	%	TP	%	J	%	R	%	O	%	Total
1994	164	76.28%	20	9.30%	6	2.79%	3	1.40%	5	2.33%	17	7.91%	215
1995	148	73.63%	20	9.95%	6	2.99%	3	1.49%	6	2.99%	18	8.96%	201
1996	143	71.50%	19	9.50%	4	2.00%	10	5.00%	6	3.00%	18	9.00%	200
1997	145	71.08%	18	8.82%	3	1.47%	15	7.35%	5	2.45%	18	8.82%	204
1998	144	70.59%	20	9.80%	3	1.47%	13	6.37%	7	3.43%	17	8.33%	204
1999	134	66.67%	22	10.95%	4	1.99%	15	7.46%	7	3.48%	19	9.45%	201
2000	141	66.82%	25	11.85%	4	1.90%	16	7.58%	5	2.37%	20	9.48%	211
2001	141	66.82%	20	9.48%	11	5.21%	17	8.06%	4	1.90%	18	8.53%	211
2002	145	66.82%	20	9.22%	11	5.07%	18	8.29%	4	1.84%	19	8.76%	217
2003	135	63.68%	23	10.85%	15	7.08%	18	8.49%	3	1.42%	18	8.49%	212
2004	130	62.50%	23	11.06%	15	7.21%	18	8.65%	3	1.44%	19	9.13%	208
2005	127	59.35%	25	11.68%	18	8.41%	20	9.35%	3	1.40%	21	9.81%	214
2006	135	63.38%	28	13.15%	6	2.82%	13	6.10%	10	4.69%	21	9.86%	213
2007	134	60.09%	29	13.00%	7	3.14%	13	5.83%	11	4.93%	29	13.00%	223
2008	132	59.46%	27	12.16%	8	3.60%	25	11.26%	2	0.90%	28	12.61%	222
2009	129	58.64%	27	12.27%	7	3.18%	25	11.36%	3	1.36%	29	13.18%	220
2010	125	57.08%	28	12.79%	7	3.20%	10	4.57%	17	7.76%	32	14.61%	219
2011	124	57.94%	25	11.68%	8	3.74%	10	4.67%	16	7.48%	31	14.49%	214
2012	119	57.21%	21	10.10%	7	3.37%	11	5.29%	16	7.69%	34	16.35%	208
Avg.		64.71%		10.93%		3.72%		6.77%		3.31%		10.57%	
FLEET MIX PROJECTIONS													
2017	124	57.00%	23	10.50%	4	2.00%	13	6.00%	17	8.00%	36	16.50%	218
2022	128	55.75%	24	10.25%	5	2.00%	16	7.00%	20	8.50%	38	16.50%	230
2032	135	53.25%	25	9.75%	8	3.00%	21	8.50%	23	9.00%	42	16.50%	253

SEP-Single Engine Piston; MEP-Multi-Engine Piston; TP-Turboprop; J-Jet; R-Rotor (Helicopter); O-Other
Source: Coffman Associates analysis of FAA Aircraft Registry Database

A clear trend is that single engine piston-powered aircraft have declined as a percentage of the whole. In 1994, single engine piston aircraft represented more than 76 percent of the registered aircraft in Shawnee County. By 2012, single engine piston aircraft represented 57 percent. As with the national trend, Shawnee County has seen growth in turbine-powered aircraft, as a percentage of the whole. In the mid-2000s, turboprops and business jets were accounting for as much as 18 percent of the total registered aircraft. By 2012, primarily due to the recession, turboprops and business jets combined accounted for approximately nine percent of the local registered aircraft.

Table 2K presents the forecast fleet mix of based aircraft for Philip Billard Municipal Airport. The trend showed closely mirrors the pattern of local registered aircraft and the national trends of the past 18 years. Single engine piston aircraft are forecast to continue to account for the vast majority of based aircraft, while modestly decreasing as a percentage of the total based aircraft. Other categories of aircraft are forecast to grow modestly. Business jets are forecast to grow from two currently to five by 2032. Turboprops are forecast to grow from one currently to four in the long term.

TABLE 2K
Based Aircraft Fleet Mix
Philip Billard Municipal Airport

Aircraft Type	2012	Percent	2017	Percent	2022	Percent	2032	Percent
Single Engine Piston	74	84.09%	76	82.61%	79	81.44%	85	79.44%
Multi-Engine Piston	6	6.82%	6	6.52%	6	6.19%	6	5.61%
Turboprop	1	1.14%	2	2.17%	3	3.09%	4	3.74%
Jet	2	2.27%	3	3.26%	4	4.12%	5	4.67%
Helicopters	2	2.27%	2	2.17%	2	2.06%	3	2.80%
Other/Experimental	3	3.41%	3	3.26%	3	3.09%	4	3.74%
Total	**88**	**100.00%**	**92**	**100.00%**	**97**	**100.00%**	**107**	**100.00%**

Source: Coffman Associates analysis

ANNUAL OPERATIONS

The airport traffic control tower (ATCT) located on the airport collects information regarding aircraft operations (takeoffs and landings). Aircraft operations are reported in four general categories: air carrier, air taxi, general aviation, and military. Air carrier operations are those aircraft with 59+ passenger seats and/or more than 18,000 pounds payload. Air taxi operations have fewer than 59 passenger seats and/or less than 18,000 pounds payload. General aviation operations include a wide range of activity from personal to business and corporate uses. Military operations include those operations conducted by various branches of the U.S. military.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and commercial use since business aircraft are used primarily to transport passengers from one location to another.

Exhibit 1M, presented previously, showed the historical operations by category at Philip Billard Municipal Airport since 1990. In 2012, the airport experienced 51,615 operations. Of this total, 68 percent were itinerant in nature and 32 percent were local operations. The 2012 operations count represents a return to growth in operations. Operations had been declining each year since 2007. In 2006, the airport experienced more than 71,000 annual operations. The airport averaged more than 67,000 annual operations prior to the national recession and slow recovery beginning in late 2007.

It is clear, from an operations perspective, that the airport was significantly impacted by the recession beginning in 2007. This is true of general aviation airports across the country. While all segments of aviation were affected, local training operations were particularly hit hard. At Philip Billard Municipal Airport, local operations fell by half from 30,000 in 2006 to less than 15,000 in 2011. Itinerant operations also declined over the same time period but not to the same extent as local operations.

EXISTING TOTAL OPERATIONS FORECASTS

There are several existing forecasts of total operations for Philip Billard Municipal Airport which are presented in **Table 2L**. These have been interpolated and extrapolated to the plan years of this master plan. When interpolating the operations forecast from the 2002 master plan, a 2012 figure of 83,228 operations results. This is considerably higher than the actual 2012 figure of 51,615. In the last 20 years, the airport has never achieved this level of operations. The 2002 master plan forecasts are more than 10 years old and do not consider the turbulent aviation environment of the last 10 years; therefore, this forecast is not considered reasonable but it does serve as a high end limit for consideration.

TABLE 2L
Existing Total Operations Forecasts
Philip Billard Municipal Airport

Year	2002 Master Plan[1]	2009 KASP[2]	2013 TAF[3]	2012 FAA Form 5010[4]	2012 TAF State Growth Rate
2012	83,228	66,603	50,577	57,403	50,577
2017	91,303	69,448	50,537	58,444	50,908
2022	100,636	72,414	50,497	59,326	51,241
2032	119,114	78,732	50,417	61,130	51,915
AAGR 2012-2032	1.81%	0.84%	-0.02%	0.30%	0.13%

[1]2002 Airport Master Plan - Interpolated and Extrapolated to Plan Years
[2]2009 *Kansas Aviation System Plan* - Interpolated and Extrapolated to Plan Years
[3]TAF - FAA *Terminal Area Forecast* Draft for 2013
[4]FAA Form 5010 with FAA National GA Forecast Growth Rate of 0.3% from 2012-2032

Source: Coffman Associates analysis

The 2009 KASP estimated 66,603 operations for 2012 and, when extrapolated, a 2032 figure of 78,732. The KASP forecast does not appear unreasonable. The airport has experienced total operations in the 70,000s in the recent past.

The Draft 2013 TAF from the FAA presents a slightly declining forecast through 2032 and it has a base year (2012) estimate of 50,577 operations. The long term forecast estimates only 50,417 annual operations. The TAF appears not to consider a potential growth scenario for the airport. As stated, in the recent past the airport has experienced sustained operations near 70,000.

FAA Form 5010 reflects a single year annual operations figure. For 2012, the 5010 Form estimated that there were 57,403 operations at Philip Billard Municipal Airport. When applying the FAA's overall national growth rate for operations (0.3 percent), a long term forecast of 61,130 operations results. While the 2012 figure from FAA Form 5010 is higher than the actual operations level, the long term estimate of 61,130 could be reasonable in a modest growth scenario.

The FAA indicates that the overall growth rate for the state from the TAF can also be applied to individual airports to produce a forecast. The TAF growth rate for Kansas is 0.13 percent. This results in a long term forecast of 51,915 annual operations. The statewide TAF growth rate does not take into account local considerations, such as the recent past operations levels.

These existing forecasts form a reasonable range of total operations that the airport may experience over the next 20 years. The next step is to generate new operations forecasts which address each segment of activity (general aviation, air taxi, and military) from the local level.

GENERAL AVIATION OPERATIONS FORECAST

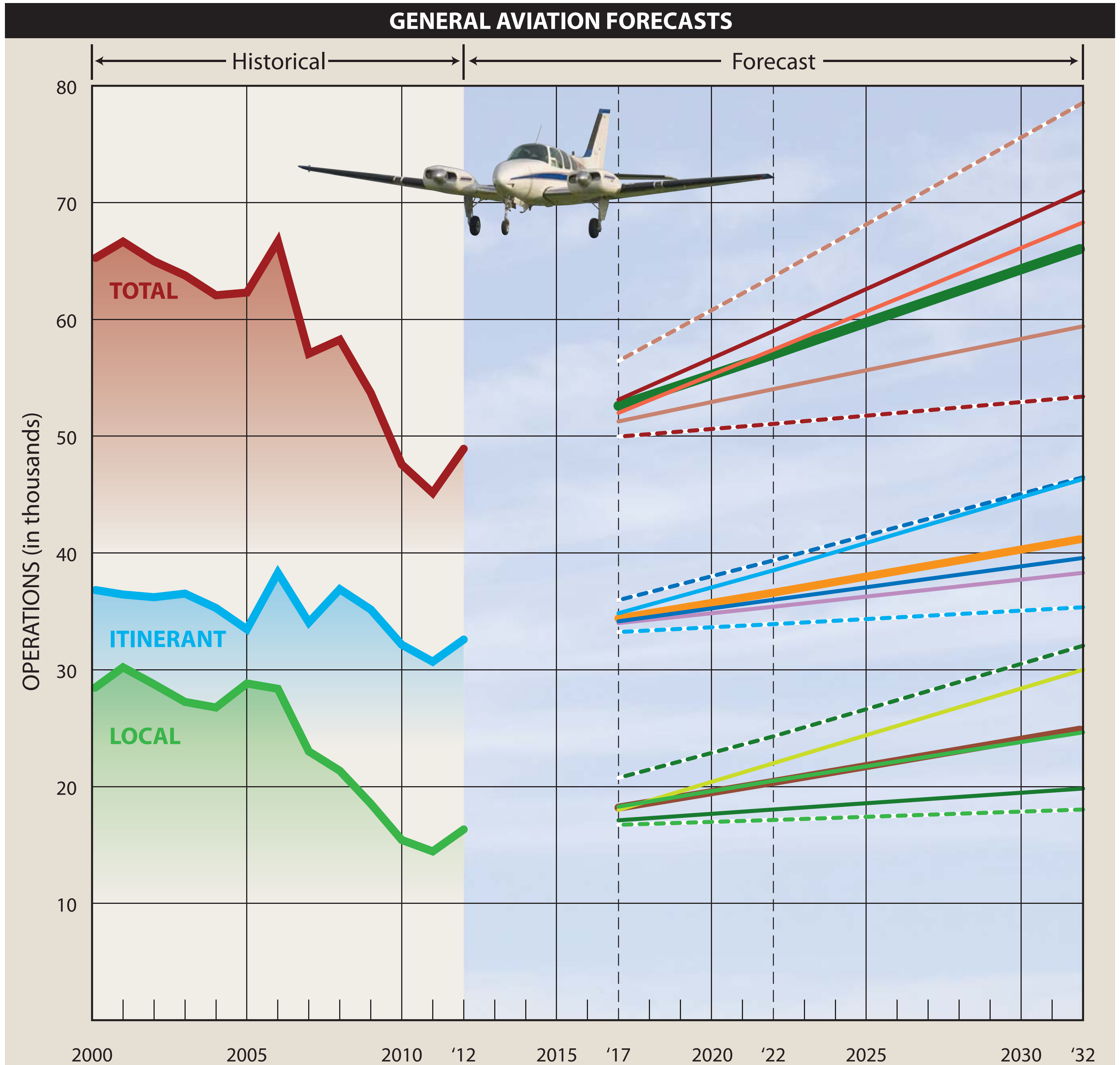
General aviation operations constitute the largest share of operations at Philip Billard Municipal Airport. In 2012, itinerant general aviation operations represented 67 percent of total general aviation operations. On average, general aviation itinerant operations have represented 58 percent of total general aviation since 1990.

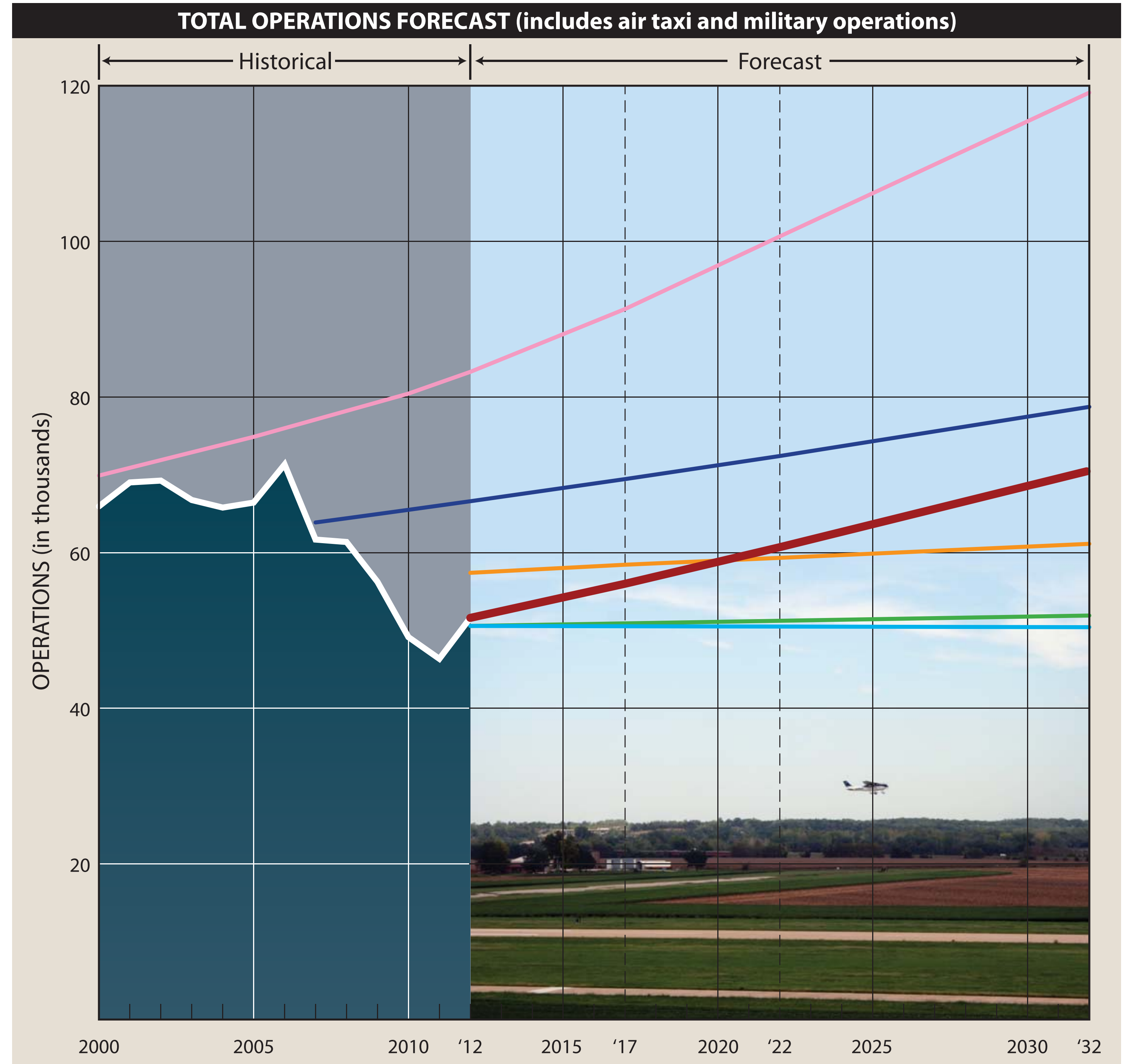
Distinguishing between local and itinerant operations is an important consideration for future facility planning. An airport with a large percentage of local operations may be in need of more aircraft storage units or fuel facilities. A high level of itinerant operations may be an indicator of a need for more transient apron, overnight storage, or improved navigational aids. **Exhibit 2E** presents a summary of the operations forecasts which follow.

Itinerant General Aviation Operations Forecast

Itinerant operations have generally fluctuated between 30,000 and 38,000 annually between 2000 and 2012. The market share of itinerant operations at Philip Billard Municipal Airport, as a percentage of general aviation itinerant operations at all towered airports, has generally increased since 2000. This is in large part due to the fact that itinerant operations nationally have decreased, while at Philip Billard Municipal Airport, itinerant operations have decreased at a slower pace. In 2000, Philip Billard Municipal Airport's market share of national itinerant general aviation operations was 0.1615 percent, and by 2012 that percentage had increased to 0.2289 percent. **Table 2M** presents several new forecasts of itinerant general aviation operations.

A total of five forecasts of general aviation itinerant operations are presented in the table. The first two forecasts consider the market share of total U.S. itinerant general aviation operations that Philip Billard Municipal Airport has experienced. The next two consider the ratio of itinerant general aviation operations to based aircraft at the airport. It should be noted that the historic based aircraft figures are a composite estimate beginning in 2000 with 100, as identified in the 2002 master plan, and ending in 2012 with the actual number of 88 based aircraft. The last forecast of itinerant general aviation operations considers the potential for the airport to recapture the high level of itinerant operations experienced within the last 10 years.





Local
- Historical
- Increasing Market Share
- Constant Market Share of 2012 Percent
- Constant Operations per Based Aircraft
- Increasing Operations per Based Aircraft
- Recapture 10-Year High of Operations
- Selected Forecast

Itinerant
- Historical
- Increasing Market Share
- Constant Market Share of 2012 Percent
- Constant Operations per Based Aircraft
- Increasing Operations per Based Aircraft
- Recapture 10-Year High of Operations
- Selected Forecast

Total
- Historical
- Increasing Market Share
- Constant Market Share of 2012 Percent
- Constant Operations per Based Aircraft
- Increasing Operations per Based Aircraft
- Recapture 10-Year High of Operations
- Selected Forecast

LEGEND
- 2002 Master Plan
- 2009 Kansas Aviation System Plan
- 2013 Terminal Area Forecast
- 2012 FAA Form 5010 with FAA National GA Forecast Growth Rate
- 2012 Terminal Area Forecast State Growht Rate
- Selected Forecast

TABLE 2M
General Aviation Itinerant Operations Forecast
Philip Billard Municipal Airport

Year	TOP GA Itinerant Ops[1]	US GA Itinerant Ops	Market Share Itinerant Ops	TOP Based Aircraft[2]	Itinerant Ops Per Based Aircraft
2000	36,892	22,844,100	0.1615%	100	369
2001	36,446	21,433,300	0.1700%	100	364
2002	36,214	21,450,500	0.1688%	100	362
2003	36,521	20,231,300	0.1805%	100	365
2004	35,294	20,007,200	0.1764%	98	360
2005	33,466	19,303,200	0.1734%	88	380
2006	38,301	18,707,100	0.2047%	88	435
2007	34,055	18,575,200	0.1833%	88	387
2008	36,900	17,492,700	0.2109%	62	595
2009	35,161	15,571,100	0.2258%	66	533
2010	32,147	14,863,900	0.2163%	67	480
2011	30,691	14,527,900	0.2113%	68	451
2012	32,588	14,235,600	0.2289%	88	370
Increasing Market Share (AAGR = 1.77%)					
2017	34,843	14,518,000	0.2400%	92	378
2022	38,513	14,812,500	0.2600%	97	396
2032	46,332	15,443,900	0.3000%	107	434
Constant Market Share of 2012 Percent (AAGR = 0.41%)					
2017	33,234	14,518,000	0.2289%	92	360
2022	33,909	14,812,500	0.2289%	97	349
2032	35,354	15,443,900	0.2289%	107	331
Constant Operations Per Based Aircraft (AAGR = 0.98%)					
2017	34,150	14,518,000	0.2352%	92	370
2022	35,993	14,812,500	0.2430%	97	370
2032	39,575	15,443,900	0.2562%	107	370
Increasing Operations Per Based Aircraft (AAGR = 1.79%)					
2017	35,965	14,518,000	0.2477%	92	390
2022	39,364	14,812,500	0.2657%	97	405
2032	46,487	15,443,900	0.3010%	107	435
Recapture 10-Year High of Operations (AAGR = 0.81)					
2017	34,000	14,518,000	0.2342%	92	369
2022	35,400	14,812,500	0.2390%	97	364
2032	38,300	15,443,900	0.2480%	107	358
Selected Forecast (AAGR = 1.18%)					
2017	34,400	14,518,000	0.2369%	92	373
2022	36,600	14,812,500	0.2471%	97	377
2032	41,200	15,443,900	0.2668%	107	386

[1] Historical data from ATCT records as reported to FAA.

[2] Based aircraft figure is a composite with year 2000 from the 2002 master plan, years 2001-2011 from the TAF, and 2012 begin actual

AAGR = Average annual growth rate from 2012 to 2032

Source: Coffman Associates analysis

The increasing market share of total U.S. itinerant general aviation operations is reflective of the trend over the past 12 years. This results in a long term forecast of 46,332 itinerant operations by 2032. The next forecast considers the airport maintaining a constant share of total U.S. itinerant operations. The result is a lower long term total of 35,354 itinerant operations.

The next forecast considers a 2012 constant market share of itinerant general aviation operations per based aircraft of 370. This results in a long term total of 39,575 itinerant general aviation operations for the airport. At 370 itinerant operations per based aircraft, this is well below levels achieved in the recent past. Therefore, an increasing forecast of itinerant operations per based aircraft is also considered. In this case, the long term forecast considers 435 itinerant general aviation operations per based aircraft, which has been achieved several times in the last 10 years. This results in a long term forecast of 46,487 itinerant general aviation operations.

The last forecast considers a long term figure of 38,300 itinerant general aviation operations, which represents a recapture of the high level achieved within the last 10 years.

These five forecasts of itinerant general aviation operations create the planning envelope. The selected forecast is the average of these five forecasts. By averaging the forecasts, the unknown future economic aviation environment is considered. By 2017, itinerant general aviation operations are estimated at 34,400 annually. By the long term, 41,200 annual itinerant general aviation operations are estimated. The overall average annual growth rate of this forecast is 1.18 percent.

Local General Aviation Operations

Local general aviation operations have declined significantly since 2007 as shown on **Table 2N**. From 2000 to 2007, the airport averaged nearly 28,000 annual local general aviation operations. By 2012, the airport registered only 16,331 local operations. A wide variety of factors could affect future local general aviation operational levels but the state of the economy will likely have a significant impact.

Five forecasts of local general aviation operations have been developed. Two consider the relationship to national local general aviation operations as counted at towered general aviation airports. Two consider the ratio of operations per based aircraft, and the last one considers the possibility of the airport recapturing the 2001 level of approximately 30,000 annual local general aviation operations.

The selected forecast is, once again, an average of the several forecasts presented. In the short term, local general aviation operations are forecast to increase from 16,331 in 2012 to 18,200 in 2017. In 2022, local general aviation operations are forecast to increase to 20,400 annually. By the long term, local general aviation operations are estimated at 24,900 annual operations. This forecast results in an average annual growth rate of 2.13 percent.

TABLE 2N
General Aviation Local Operations Forecast
Philip Billard Municipal Airport

Year	TOP GA Local Ops[1]	US GA Local Ops	Market Share Local Ops	TOP Based Aircraft[2]	Local Ops Per Based Aircraft
2000	28,289	17,034,400	0.1661%	100[2]	283
2001	30,211	16,193,700	0.1866%	100	302
2002	28,762	16,172,800	0.1778%	100	288
2003	27,251	15,292,700	0.1782%	100	273
2004	26,772	14,960,400	0.1790%	98	273
2005	28,829	14,843,600	0.1942%	88	328
2006	28,373	14,365,400	0.1975%	88	322
2007	23,012	14,556,800	0.1581%	88	262
2008	21,357	14,081,200	0.1517%	62	344
2009	18,538	12,448,000	0.1489%	66	281
2010	15,429	11,716,300	0.1317%	67	230
2011	14,452	11,437,000	0.1264%	68	213
2012	16,331	11,155,600	0.1464%	88	186
Increasing Market Share (AAGR = 2.08%)					
2017	18,282	11,426,500	0.1600%	92	198
2022	20,493	11,710,400	0.1750%	97	211
2032	24,643	12,321,500	0.2000%	107	231
Constant Market Share of 2012 Percent (AAGR = 0.50%)					
2017	16,728	11,426,500	0.1464%	92	181
2022	17,143	11,710,400	0.1464%	97	176
2032	18,038	12,321,500	0.1464%	107	169
Constant Operations Per Based Aircraft (AAGR = 0.98%)					
2017	17,114	11,426,500	0.1498%	92	186
2022	18,037	11,710,400	0.1540%	97	186
2032	19,832	12,321,500	0.1610%	107	186
Increasing Operations Per Based Aircraft (AAGR = 3.43%)					
2017	20,749	11,426,500	0.1816%	92	225
2022	24,299	11,710,400	0.2075%	97	250
2032	32,060	12,321,500	0.2602%	107	300
Recapture 10-year High of Operations (AAGR = 3.09%)					
2017	18,000	11,426,500	0.1575%	92	195
2022	22,000	11,710,400	0.1879%	97	226
2032	30,000	12,321,500	0.2435%	107	281
Selected Forecast (AAGR = 2.13%)					
2017	18,200	11,426,500	0.1593%	92	197
2022	20,400	11,710,400	0.1742%	97	210
2032	24,900	12,321,500	0.2021%	107	233

[1] Historical data from ATCT records as reported to FAA.

[2] Based aircraft figure is a composite with year 2000 from the 2002 master plan, years 2001-2011 from the TAF, and 2012 begin actual

AAGR = Average annual growth rate from 2012 to 2032

Source: Coffman Associates analysis

AIR TAXI AND MILITARY OPERATIONS FORECAST

Philip Billard Municipal Airport has experienced, on average, approximately 1,500 annual air taxi operations. Within the last decade, the low was 928 in 2011 and the high was 2,516 in 2002. The growth rate since 2001 is 3.10 percent annually. Air taxi operations can fluctuate significantly from year to year as well. A constant growth rate of 3.10 percent is considered for future air taxi operations. By 2017, approximately 1,900 air taxi operations are forecast and by 2032, approximately 3,000 are forecast. The air taxi estimate considers the airport ultimately recapturing its previous high of 2,500 and then growing somewhat beyond that in the long term.

Military operations can fluctuate significantly as well. As recently as 2007, the airport had more than 3,200 military operations. In 2012, this figure had decreased to 280. Because of the unpredictable nature of military activity and readiness, an average of the last 12 years of military operations is planned for future operations. **Table 2P** presents a summary of air taxi and military operations forecasts.

TABLE 2P
Air Taxi and Military Operations Forecasts
Philip Billard Municipal Airport

Year	Air Taxi Operations (Itinerant)	Military (Local)	Military (Itinerant)	Total Military
2001	1,163	173	575	748
2002	2,516	448	754	1,202
2003	1,214	724	1,038	1,762
2004	1,294	924	850	1,774
2005	1,329	1,118	1,312	2,430
2006	1,444	1,250	1,557	2,807
2007	1,952	1,654	1,550	3,204
2008	1,510	1,452	1,205	2,657
2009	1,622	869	731	1,600
2010	971	349	580	929
2011	928	378	218	596
2012	1,629	142	138	280
Selected Forecast				
2017	1,900	600	900	1,500
2022	2,200	600	900	1,500
2032	3,000	600	900	1,500

TOTAL OPERATIONS FORECAST

Table 2Q summarizes the selected operations forecast for Philip Billard Municipal Airport. In the short term, operations are forecast to increase from 51,615 in 2012 to 56,000 in 2017. By the long term planning period, total operations are forecast to reach 70,600 annual operations.

TABLE 2Q Total Operations Forecast Philip Billard Municipal Airport								
	Itinerant Operations				Local Operations			
Year	**Air Taxi/ Commuter**	**GA**	**Military**	**Total Itinerant**	**GA**	**Military**	**Total Local**	**Total Operations**
2012	1,692	32,588	614	34,894	16,331	390	16,721	51,615
2017	1,900	34,400	900	37,200	18,200	600	18,800	56,000
2022	2,200	36,600	900	39,700	20,400	600	21,000	60,700
2032	3,000	41,200	900	45,100	24,900	600	25,500	70,600
AAGR:	2.90%	1.18%	1.93%	1.29%	2.13%	2.18%	2.13%	1.58%

AAGR: Average annual growth rate
Source: Coffman Associates analysis

COMPARISON TO THE TAF

The FAA will review the forecasts of this airport master plan and compare them to the TAF. Where the 5- or 10-year forecasts exceed 100,000 total annual operations or 100 based aircraft, the FAA prefers that the forecasts differ by less than 10 percent in the 5-year period and 15 percent in the 10-year period. Where the forecasts do differ, supporting documentation should be provided.

Table 2R presents a direct comparison of the 2013 TAF (Draft) to the forecasts in this master plan. In the five-year time frame, the new forecast is 10.8 percent higher than the TAF. The 10-year forecast is 20.2 percent higher than the TAF. The primary reason for this is that the TAF has a slightly lower 2012 operations number. In 2012, the TAF estimated 50,577 operations when the actual number was 51,615. In addition, the TAF presents a negative growth scenario. From 2011 to 2012, the airport experienced 5,000 more total operations, growing by more than five percent in one year. The selected forecast reflects an annual growth rate of 1.58 percent. The long term forecast of 70,600 annual operations is slightly below the high operations total achieved as recently as 2006.

The based aircraft total also exceeds the 5- and 10-year TAF totals. Clearly, this is because the TAF has a 2012 base year of 68 based aircraft, when visual inspection determined that there were 88 based aircraft in 2012. By the long term, the master plan forecast and the TAF begin to align. The TAF shows an annual growth rate in based aircraft that is more than twice as much as the master plan forecasts. By the long term, the master plan forecast of 107 based aircraft converges with the TAF forecast of 105.

TABLE 2R Forecast Comparison to the Terminal Area Forecast Philip Billard Municipal Airport			
Year	**TOP Forecast**	**2013 FAA TAF**	**Percent Difference**
TOTAL OPERATIONS			
2012	51,615	50,577	2.1%
2017	56,000	50,537	10.8%
2022	60,700	50,497	20.2%
2027	70,600	50,417	40.0%
AAGR 2012-2032	1.58%	-0.02%	
BASED AIRCRAFT			
2012	88	68	29.4%
2017	92	77	19.5%
2022	97	86	12.8%
2027	107	105	1.9%
AAGR 2012-2032	0.98%	2.20%	
Source: Coffman Associates analysis			

ANNUAL INSTRUMENT APPROACHES (AIAs)

An instrument approach, as defined by the FAA, is "an approach to an airport with the intent to land an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude." To qualify as an instrument approach, aircraft must land at the airport after following one of the published instrument approach procedures. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities. Practice or training approaches do not count as annual AIAs.

While AIAs can be partially attributed to weather, they may be expected to increase as transient operations and operations by more sophisticated aircraft increase through the planning period. For this reason, AIA projections consider a constant percentage of 2.0 percent of annual itinerant operations. The projections are presented in **Table 2S**.

TABLE 2S Annual Instrument Approaches (AIAs) Philip Billard Municipal Airport			
Year	**AIAs**	**Itinerant Operations**	**Ratio**
2012	698	34,894	2.00%
2017	744	37,200	2.00%
2022	794	39,700	2.00%
2032	902	45,100	2.00%
Source: Coffman Associates analysis			

PEAKING CHARACTERISTICS

Many aspects of facility planning relate to levels of peaking activity – times when the airport is busiest. For example, the appropriate size of a terminal building can be estimated by determining the number of people that could reasonably be expected to use the facility at a given time. The following planning definitions apply to the peak periods:

- **Peak Month** -- The calendar month when peak aircraft operations occur.
- **Design Day** -- The average day in the peak month.
- **Busy Day** -- The busy day of a typical week in the peak month.
- **Design Hour** -- The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. The peak period forecasts represent reasonable planning standards that can be applied without overbuilding or being too restrictive.

The ATCT collects operational data that includes hourly, daily, monthly, and annual operations. In 2012, the peak month for operations was May when the airport experienced 5,291 operations. The peak month represented 10.04 percent of annual operations in 2012. Over the last three years, the peak month has represented, on average, 10.95 percent of annual operations.

Utilizing operational data for May 2012, the remaining peaking characteristics have been determined. The design day is equal to the number of operations in May 2012 divided by the number of days in the month (31) for a design day of 171.

The busy day is determined by first averaging the peak day of each week of the peak month and dividing by the number of operations for the four-week period. In this case, busy day operations represent, on average, 20.2 percent of weekly operations. By then multiplying the busy day percent by the number of days in the week (7), a busy day factor of 1.41 is determined (20.2*7=1.41). The busy day factor is then applied to the design day to determine the busy day operations number which is 241.

The design hour is 27 which is determined by multiplying the design day by 15.6 percent. It should be noted that a design hour average of 15.6 percent is slightly lower than is common at general aviation airports. This is an indication that operations are relatively spread out through the day. Utilizing these factors, the peaking characteristics for the future can be estimated as shown in **Table 2T**.

TABLE 2T
Total Peak Operations Forecast
Philip Billard Municipal Airport

	2012	2017	2022	2032
Annual Operations	51,615	56,000	60,700	70,600
Peak Month	5,291	6,131	6,646	7,730
Busy Day	241	288	312	363
Design Day	171	204	222	258
Design Hour	27	32	35	40

Source: Coffman Associates analysis

OPERATIONS FLEET MIX

Estimating the number of operations by aircraft type helps to identify facility requirements and various environmental impacts. Operations by multi-engine, turboprop, and business jet aircraft are generally considered itinerant in nature.

Table 2U presents the forecast operations activity by aircraft type. General assumptions based on typical aircraft utilization have been made and are applied to the fleet mix at Philip Billard Municipal Airport. Multi-engine piston activity is estimated at 200 operations per based aircraft, turboprops at 250 operations per based aircraft, jet activity at 300 operations per based aircraft, and helicopters at 400 operations per based aircraft. It is estimated that 60 percent of the air taxi operations are by turbine-powered aircraft. These operations estimates account for all activity by that aircraft type and are not estimates of the actual number of operations attributable to a particular based aircraft. Several sources were consulted to confirm the validity of these estimates including the FAAs Traffic Flow Management System Counts and Airport IQ.

TABLE 2U
Fleet Mix Operations Forecast
Philip Billard Municipal Airport

	2012	%	2017	%	2022	%	2032	%
Local Operations								
Piston	16,521	98.80%	18,400	97.87%	20,400	97.14%	24,700	96.86%
Helicopter	200	1.20%	400	2.13%	600	2.86%	800	3.14%
Total Local	16,721	100.00%	18,800	100.00%	21,000	100.00%	25,500	100.00%
Itinerant Operations								
Single Piston	31,930	91.51%	33,600	90.32%	35,650	89.80%	40,000	88.69%
Multi-Piston	1,200	3.44%	1,200	3.23%	1,200	3.02%	1,200	2.66%
Turboprop	444	1.27%	500	1.34%	750	1.89%	1,000	2.22%
Jet	520	1.49%	1,100	2.96%	1,300	3.27%	1,700	3.77%
Helicopters	800	2.29%	800	2.15%	800	2.02%	1,200	2.66%
Total Itinerant	34,894	100.00%	37,200	100.00%	39,700	100.00%	45,100	100.00%
Total Operations	51,615		56,000		60,700		70,600	

Assumptions:
Estimated operations per based aircraft type
Turboprop: 250
Jets: 300 operations per based aircraft
Helicopter: 400 operations per based aircraft
Air Taxi: 60 percent are turbine engines

Source: Coffman Associates analysis

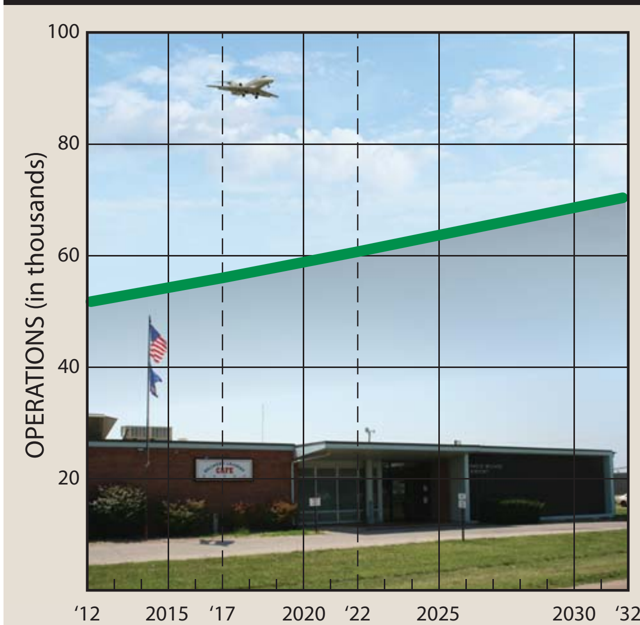
SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the next 20 years at Philip Billard Municipal Airport. **Exhibit 2F** presents a summary of the aviation demand forecasts. The baseline year for forecast data is 2012. The forecasting effort extends 20 years to the year 2032.

PHILIP BILLARD MUNICIPAL AIRPORT

	ACTUAL	FORECAST		
	2012	2017	2022	2032
ANNUAL OPERATIONS FORECAST				
General Aviation				
Itinerant	32,588	34,400	36,600	41,200
Local	16,331	18,200	20,400	24,900
Military				
Itinerant	614	900	900	900
Local	390	600	600	600
Air Taxi (Itinerant)	1,692	1,900	2,200	3,000
Total Itinerant	34,894	37,200	39,700	45,100
Total Local	16,721	18,800	21,000	25,500
Total Operations	**51,615**	**56,000**	**60,700**	**70,600**
BASED AIRCRAFT FORECAST				
Single Engine Piston	74	76	79	85
Multi-Engine Piston	6	6	6	6
Turboprop	1	2	3	4
Business Jet	2	3	4	5
Helicopter	2	2	2	3
Experimental/Other	3	3	3	4
Total Based Aircraft	**88**	**92**	**97**	**107**

ANNUAL OPERATIONS FORECAST



BASED AIRCRAFT FORECAST

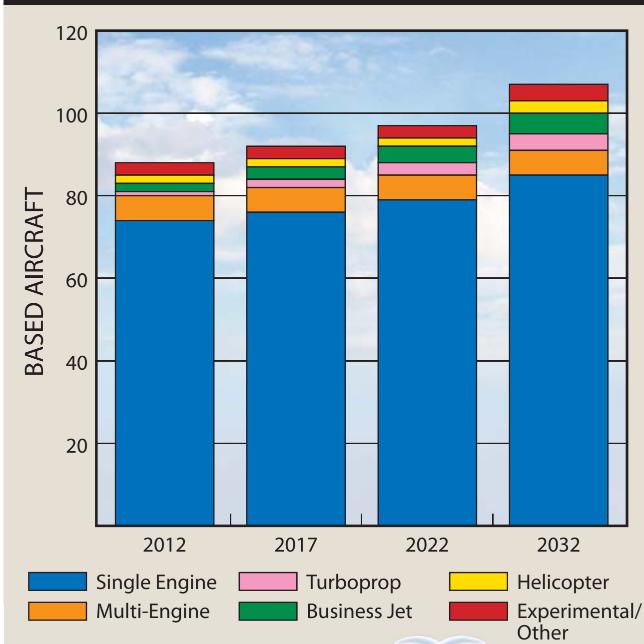


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Exhibit 2F
FORECAST SUMMARY

Philip Billard Municipal Airport is a general aviation facility as defined by the FAA. The primary runway, Runway 13-31, is 5,099 feet long and 100 feet wide. Crosswind Runway 18-36 is 4,331 feet long and 75 feet wide. Crosswind Runway 4-22 is 3,001 feet long and 100 feet wide. The airport provides several sophisticated instrument approaches, including an instrument landing system (ILS) that allows pilots to land even in poor visibility conditions to Runway 13.

General aviation activity often trends with national and local economies. The country was in a recessionary period from December 2007 through the third quarter of 2009 and has been slow to recover. Activity at both commercial service airports and general aviation airports has been down. Philip Billard Municipal Airport has, to date, weathered the economic downturn fairly well. The number of based aircraft has remained fairly steady. The most significant change has been the decline in local general aviation operations.

Forecasts of aviation activity, including based aircraft and operations, is key to determining future facility requirements. There are currently 88 aircraft based at the airport, and this is forecast to grow to 107 aircraft by 2032. The airport experienced 51,615 operations in 2012. This is forecast to grow to approximately 70,600 operations annually by 2032.

The fleet mix operations, or type and frequency of aircraft use, is important in determining facility requirements and environmental impacts. While single engine piston-powered aircraft are expected to represent the majority of based aircraft, the long term forecast considers the possibility of three additional turboprop aircraft and growth in business jets from two currently to five by 2032.

The next step in the Master Plan process is to use the forecasts to determine development needs for the airport through 2032. Chapter Three – Facility Requirements will address airside elements, such as safety areas, runways, taxiways, lighting, and navigational aids, as well as landside requirements, including hangars, aircraft aprons, and support services. As a general observation, Philip Billard Municipal Airport is well-positioned for growth into the future. The remaining portions of the Master Plan will lay out how that growth can be accommodated in an orderly, efficient, and cost-effective manner.

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Chapter Three

AIRPORT FACILITY REQUIREMENTS

Chapter Three

AIRPORT FACILITY REQUIREMENTS

To properly plan for the future of Philip Billard Municipal Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve the identified demand. This chapter uses the results of the forecasts presented in Chapter Two, as well as established planning criteria, to determine the airside (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, aircraft parking apron, and automobile parking) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities and outline what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four - Alternatives to determine the most cost-effective and efficient means for implementation.

PLANNING HORIZONS

An updated set of aviation demand forecasts for Philip Billard Municipal Airport has been established. These activity forecasts include annual operations, based aircraft, fleet mix, and peaking characteristics. With this information, specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is **demand-based** rather than time-based, a series of

planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections. The planning horizons are the Short Term (approximately years 1-5), the Intermediate Term (years 6-10), and the Long Term (years 11-20).

It is important to consider that the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand. It is important for the plan to accommodate these changes so that airport officials can respond to unexpected changes in a timely fashion.

The most important reason for utilizing milestones is it allows airport management the flexibility to make decisions and develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program.

DESIGN STANDARDS

The FAA publishes Advisory Circular (AC) 150/5300-13A, *Airport Design*, to guide airport planning. The AC provides guidance on various design elements of an airport intended to maintain or improve safety at airports. The design standards include airport elements such as runways, taxiways, safety areas, and separation distances. According to the AC, *"airport planning should consider both the present and potential aviation needs and demand associated with the airport."* Consideration should be given to planning runway and taxiway locations that will meet future separation requirements even if the width, strength, and length must increase later. Such decisions should be supported by the aviation demand forecasts and coordinated with the FAA and shown on the Airport Layout Plan (ALP).

FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, was published on September 28, 2012. It is intended to replace AC 150/5300-13, *Airport Design*, which was dated September 29, 1989. The latter was subject to 18 published changes over 23 years.

The previous Airport Design AC established the design standards based primarily on the Airport Reference Code (ARC). Paragraph 4 defined the ARC as "*a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport."*

In the current AC, the definition of the Airport Reference Code is found in Paragraph 102.i. and reads, *"An airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport."*

The current Airport Design AC introduces not only the Runway Design Code (RDC), but also the Runway Reference Code (RRC). The RDC is defined in Paragraph 102.mmm as, *"A code signifying the design standards to which the runway is to be built."* Paragraph 105.c. indicates that the Aircraft Approach Category (AAC), the Airplane Design Group (ADG), and the approach visibility minimums combine to form the RDC of a particular runway.

These provide the information needed to determine certain design standards that apply.

The RRC is defined as, *"A code signifying the current operational capabilities of a runway and associated parallel taxiway."* Like the RDC, the RRC is composed of the same three components: the AAC, ADG, and runway visibility minimums. The RDC, however, is based upon planned development with no operational component, while the RRC describes the current operational capabilities of a runway where no special operating procedures are necessary.

The RRC for a runway is established based upon the minimum runway to taxiway centerline separation.

DESIGN AIRCRAFT

The selection of appropriate Federal Aviation Administration (FAA) design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use the airport. The critical design aircraft is used to define the design parameters for the airport. In most cases, the design aircraft is a composite aircraft representing a collection of aircraft classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). In the case of an airport with multiple runways, a design aircraft is selected for each runway. The first consideration is the safe operation of aircraft likely to use the airport. Any operation of an aircraft that exceeds design criteria of the airport may result in either an unsafe operation or a lesser safety margin; however, it is not the usual practice to base the airport design on an aircraft that uses the airport infrequently.

The design aircraft is defined as the most demanding category of aircraft, or family of aircraft, which conducts at least 500 operations per year at the airport. Planning for future aircraft use is of particular importance since the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short term development does not preclude the long range potential needs of the airport.

Exhibit 3A summarizes representative design aircraft categories. As shown on the exhibit, the airport does not currently, nor is it expected to, regularly serve larger commercial transport aircraft such as Boeing 737, 747, 757, or 767. Large transport aircraft are used by commercial carriers which do not currently use, nor are they expected to use, the airport through the planning period. However, some of the largest business jets, such as the Gulfstream V, are capable of operating at the airport under certain conditions.

In order to determine airfield design requirements, a design aircraft, or group of aircraft with similar characteristics, is determined for each runway. This begins with a review of aircraft currently using the airport and those expected to use the airport through the 20-year planning period.

Runway Design Code (RDC)

The AAC, ADG, and approach visibility minimums are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by runway visual range (RVR) values in feet of 1,200, 1,600, 2,400, 4,000, and 5,000. The third component should read "VIS" for runways designed for visual approach use only. Generally, runway standards are related to aircraft approach speed, aircraft wingspan, and designated or planned approach visibility minimums. **Table 3A** presents the RDC parameters.

TABLE 3A
Runway Design Code Parameters

Aircraft Approach Category (AAC)		
Category	**Approach Speed**	
A	less than 91 knots	
B	91 knots or more but less than 121 knots	
C	121 knots or more but less than 141 knots	
D	141 knots or more but less than 166 knots	
E	166 knots or more	
Airplane Design Group (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20-<30	49-<79
III	30-<45	70-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262
Visibility Minimums		
RVR (ft)	**Flight Visibility Category (statute miles)**	
VIS	3-mile or greater visibility minimums	
5,000	Lower than 3 miles but not lower than 1-mile	
4,000	Lower than 1-mile but not lower than ¾-mile (APV ≥ ¾ but < 1-mile)	
2,400	Lower than ¾-mile but not lower than ½-mile (CAT-I PA)	
1,600	Lower than ½-mile but not lower than ¼-mile (CAT-II PA)	
1,200	Lower than ¼-mile (CAT-III PA)	

RVR: Runway Visual Range
APV: Approach Procedure with Vertical Guidance
PA: Precision Approach
Source: FAA AC 150/5300-13A, Airport Design

Taxiway Design Group (TDG)

The TDG relates to the undercarriage dimensions of the design aircraft. Taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements are determined by TDG. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

The TDG standards are based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements

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A-I

- Beech Baron 55
- **Beech Bonanza**
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- Eclipse 500/550
- Piper Archer
- Piper Seneca

B-I

- Beech Baron 58
- Beech King Air 100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I (525)

B-II

- Super King Air 200
- Cessna 441
- DHC Twin Otter
- Super King Air 350
- Beech 1900
- Citation Excel (560), Sovereign (680)
- Falcon 50, 900, 2000
- **Citation Bravo (550)**
- Embraer 120

A-III, B-III

- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

C-I, D-I

- Beech 400
- **Lear** 31, **35**, 45, 60
- Israeli Westwind

C-II, D-II

- **Cessna Citation X (750)**
- Gulfstream 100, 200,300
- Challenger 300/600
- ERJ-135, 140, 145
- CRJ-200/700
- Embraer Regional Jet
- Lockheed JetStar
- Hawker 800

C-III, D-III *less than 100,000 lbs.*

- ERJ-170
- CRJ 705, 900
- Falcon 7X
- **Gulfstream 500**, 550, 650
- Global Express, Global 5000
- Q-400

C-III, D-III *over 100,000 lbs.*

- ERJ-90
- Boeing Business Jet
- B-727
- **B-737**-300, **700,** 800
- MD-80, DC-9
- A319, A320

C-IV, D-IV

- **B-757**
- B-767
- C-130 Hercules
- DC-8-70
- MD-11

D-V

- **B-747-400**
- B-777
- B-787
- A-330, A-340

Note: Aircraft pictured is identified in bold type.

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Exhibit 3A
AIRCRAFT REFERENCE CODES

such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces.

CURRENT DESIGN AIRCRAFT

The critical design aircraft is defined as the most demanding category of aircraft which conduct 500 or more itinerant operations at the airport each year. In some cases, more than one specific make and model of aircraft comprises the airport's critical design aircraft. One category of aircraft may be the most critical in terms of approach speed, while another is most critical in terms of wingspan and/or tail height, which affects runway/taxiway width and separation design standards. The critical design aircraft for a general aviation airport may be a specific aircraft model or it can be a combination of several aircraft within the same design code, that when combined, exceed the 500 operations threshold.

A critical design aircraft will be determined for each runway. The largest design aircraft in terms of approach speed and airplane design group will determine the appropriate design standards for primary Runway 13-31 and the associated taxiways. The two crosswind runways may have the same or different design aircraft. The first determination is the most critical design aircraft for Runway 13-31.

General aviation aircraft using the airport include a variety of single and multi-engine piston-powered aircraft, turboprops, business jets, and helicopters. While the airport is used by helicopters, they are not included in this determination as they are not assigned an approach speed or an airplane design group.

Based Aircraft

The determination of the design aircraft (or family of aircraft) will first examine the types of based aircraft followed by an analysis of itinerant activity. The majority of the based aircraft are single and multi-engine piston-powered aircraft which fall within approach categories A and B and ADG I and II. These smaller aircraft are often used for local operations which are not included in the critical aircraft determination.

The next step is to identify the larger based aircraft including turboprops and business jets that may contribute to meeting the itinerant operations threshold of 500 annual operations. These aircraft types typically have higher utilization rates than smaller aircraft and rarely perform local operations. These aircraft types can represent the critical aircraft on their own, due to high utilization, or in combination with other aircraft with similar characteristics.

The Kansas Highway Patrol maintains and operates the state-owned King Air 350. This large turboprop aircraft falls within AAC-B and ADG-II. There are two based business jets at the airport, a Lear 45 and a Cessna Citation Bravo 550. The Lear 45 falls within ACC-D and ADG-I. The Bravo 500 falls within AAC-B and ADG-II.

The FAA maintains the *Traffic Flow Management System Counts* (TFMSC) database. This database documents aircraft operations by type for specific airports. In 2012, King Air 350 aircraft accounted for 254 operations. Lear 45 aircraft accounted for 126 operations and Citation Bravo 550's accounted for 84 operations. These counts represent all operations by that aircraft type as captured by the FAA and do not necessarily represent operations by a specific aircraft.

Itinerant Aircraft

The FAA maintains the TFMSC database which documents certain aircraft operations at certain airports. Information is added to the TFMSC database when pilots file flight plans and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to factors such as incomplete flight plans and limited radar coverage, TFMSC data cannot account for all aircraft activity at an airport. Therefore, it is likely that there are more operations at an airport than are captured by this methodology. Nonetheless, FAA estimates that more than 95 percent of activity is captured.

Since business jets are larger and faster, they will typically have a greater impact on airport design standards than smaller aircraft. The following analysis will focus on itinerant activity by jets at Philip Billard Municipal Airport. The TFMSC database is the primary source for business jet activity at the airport. A secondary source, www.airportiq.com, was also consulted.

Exhibit 3B presents the TFMSC jet activity at Philip Billard Municipal Airport from 2002 through 2012. As can be seen, most types and sizes of business jets can and do operate at the airport. From 2002 through 2012, the airport has averaged 410 annual business jet operations. The range of operations has been fairly narrow with a low of 262 operations in 2005 and a high of 514 operations in 2012.

The exhibit also shows the breakout of these business jets by approach category and airplane design group. Over a sample period, 76 percent of the business jet activity was by aircraft in approach category B, 17 percent in approach category C, and seven (7) percent in approach category D.

Runway 13-31 Design Aircraft

Philip Billard Municipal Airport experiences frequent business jet operations and should be designed and planned to continue to accommodate these types of aircraft. In 2012, the airport had over 500 business jet operations; however, no single approach category of business jets accounted to 500 operations.

The current ALP for the airport defines the airport as an ARC C-II facility (Note: The new AC would classify Runway 13-31 as RDC C-II). Unless there is a discernible decreasing trend in operations by aircraft in this category, an airport should not be downgraded. In fact, the opposite is true for Philip Billard Municipal Airport where business jet operations are increasing, having established a new high mark in 2012. In addition, the percent of business jet operations by those aircraft in AAC C and D is increasing as a percentage of the whole. **Therefore, this master plan will consider an existing RDC of C-II as applied to Runway 13-31.**

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JET OPERATIONS BY AIRPORT REFERENCE CODE *(MINIMUM)*

ARC	Aircraft Type	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	Eclipse 500	-	-	-	-	-	-	-	10	2	30	28
	Premier 390	2	2	2	4	4	4	12	18	4	8	2
	Beechjet 400/T-1/Hawker 400	32	16	18	14	22	26	50	50	42	42	44
	Cessna 500/Citation I	6	4	6	16	10	2	8	2	20	22	2
	Cessna 501/Citation I/SP	-	4	-	2	10	2	4	-	6	2	-
B-I	Cessna Mustang 510	-	-	-	-	-	2	-	-	4	8	6
	Cessna 525 CitationJet/CJ1	36	22	38	16	42	24	46	16	-	-	12
	Embraer Phenom 100	-	-	-	-	-	-	-	-	2	-	2
	Falcon 10	-	-	6	2	6	-	-	2	-	-	-
	Mitsubishi MU-300	92	68	104	72	92	76	108	84	84	6	2
	Rockwell Saber 40/60	-	-	6	-	-	-	-	2	4	2	-
Total B-I		**168**	**116**	**180**	**126**	**186**	**136**	**228**	**184**	**168**	**120**	**98**
	Cessna 525A (CJ2)	18	24	14	6	6	6	10	6	8	4	2
	Cessna 525B (CJ3)	-	-	-	14	20	20	22	14	26	10	6
	Cessna Citation Bravo 550	16	22	52	38	92	108	110	68	102	82	84
	Cessna Citation V/Ultra/Encore 560	20	34	26	24	50	66	20	12	34	18	30
	Cessna 560 XLS	2	8	10	4	8	26	13	28	26	22	28
B-II	Cessna Citation III/VI/VII 650	12	4	4	6	2	4	6	4	12	6	10
	Cessna Citation Sovereign 680	-	-	4	2	2	2	4	2	14	12	34
	Falcon 20	4	4	2	2	-	-	-	-	2	20	2
	Falcon 50	4	4	6	2	6	8	4	2	2	-	4
	Falcon 900	-	2	4	-	-	-	-	4	4	-	2
	Falcon 2000	2	2	2	-	6	6	2	4	4	-	10
Total B-II		**78**	**104**	**124**	**98**	**192**	**246**	**191**	**144**	**234**	**174**	**212**
	BAe HS 125-1/2/3/400/600	2	4	-	-	-	-	-	-	-	-	-
	BAe HS 125/700-800/Hawker 800	16	14	24	12	10	18	16	22	12	8	26
	Learjet 23/24	-	-	2	-	4	-	-	-	-	-	-
C-I	Learjet 25/28	6	6	2	4	8	4	4	4	4	-	-
	Learjet 31 A/B	-	10	8	-	8	12	6	6	4	4	4
	Learjet 55	4	2	-	-	4	-	-	-	2	2	-
	IAI Westwind	2	4	4	2	2	2	4	2	-	-	2
Total C-I		**30**	**40**	**40**	**18**	**36**	**36**	**30**	**34**	**22**	**14**	**32**
	IAI Astra 1125	2	-	4	2	4	2	-	2	-	-	-
	IAI Galaxy/Gulfstream G200	-	-	-	-	-	2	4	-	6	2	6
	Cessna Citation 750 (X)	14	6	8	2	4	6	6	-	12	-	8
	Challenger 300	-	-	-	-	2	2	2	4	-	4	4
C-II	Challenger 600/604	10	-	4	4	4	6	4	4	4	2	24
	Lockheed 1329 Jetstar	-	-	-	-	-	4	-	-	-	-	-
	Gulfstream III/G300	-	2	-	-	2	-	-	-	-	-	2
	Hawker 800XP, 1000, 4000	-	-	-	-	-	2	-	2	-	-	-
	Falcon 900EX & F-Series	-	-	-	-	-	-	-	-	-	-	-
Total C-II		**26**	**8**	**16**	**8**	**16**	**24**	**16**	**12**	**22**	**8**	**44**
C-III	Global Express/5000	-	2	-	-	-	-	-	-	-	-	-
	Gulfstream V/G-500/G550	-	-	-	-	2	2	-	2	-	-	2
Total C-III		**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
	Learjet 35/36	10	10	14	10	8	4	6	12	6	16	10
D-I	Learjet 45	4	6	4	-	4	6	14	10	14	102	130
	Learjet 60	-	10	2	-	-	2	4	6	8	4	2
Total D-I		**14**	**26**	**20**	**10**	**12**	**12**	**24**	**28**	**28**	**122**	**142**
	Gulfstream G150	-	-	-	-	-	-	-	-	2	2	-
D-II	Gulfstream II	-	2	2	-	-	-	2	-	-	-	-
	Gulfstream IV/G400	5	4	-	2	6	8	-	-	2	-	4
Total D-II		**5**	**6**	**2**	**2**	**6**	**8**	**2**	**0**	**4**	**2**	**4**
Total Jet Activity		**321**	**302**	**382**	**262**	**450**	**464**	**491**	**404**	**478**	**440**	**534**

TOTAL JET OPERATIONS BY APPROACH CATEGORY AND AIRPLANE DESIGN GROUP

Aircraft Approach Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
B	246	220	304	224	378	382	419	328	402	294	310
C	56	50	56	26	54	62	46	48	44	22	78
D	19	32	22	12	18	20	26	28	32	124	146
Aircraft Approach Category	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
I	212	182	240	154	234	184	282	246	218	256	272
II	109	118	142	108	214	278	209	156	260	184	260
III	0	2	0	0	2	2	0	2	0	0	2

Source: Traffic Flow Management System Counts (TFMSC) - FAA activity database.

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Exhibit 3B
BUSINESS JET ACTIVITY

Runway 18-36 Design Aircraft

The primary determining factor for the design of a crosswind runway, such as Runway 18-36, is the nature of crosswinds potentially affecting aircraft operating at the airport. As will be discussed in detail later in this chapter, a crosswind runway is necessary to provide at least 95 percent total wind coverage for small aircraft in RDC A/B-I when winds are at 10.5 knots. Thus, at a minimum, Runway 18-36 should be designed to these design standards.

The current ALP indicates that Runway 18-36 is designed to RDC B-II design standards. This design category should be maintained because there are more than 500 annual itinerant operations by aircraft in design group II. Downgrading the applicable design standards for Runway 18-36 would have an adverse impact to airport operations and safety since Runway 18-36 accounts for more than 70 percent of total operations. **Therefore, it is recommended that Runway 18-36 maintain the application of design standards associated with RDC B-II.**

Runway 4-22 Design Aircraft

Runway 4-22 is a secondary crosswind runway that provides for the lowest wind coverage of the three runways. This runway is not currently eligible for FAA grant funding; therefore, the airport sponsor must provide direct funding for the maintenance of this runway. As discussed in Chapter One – Inventory, the location of this runway contributes to an identified hot spot on the airfield at the intersection with Taxiways A and D. The current ALP for the airport indicates that Runway 4-22 is to be closed in the future. In the alternatives discussion of this master plan several options for Runway 4-22 will be considered including potential closure, conversion to a taxiway, or preservation. Until some alternate action is taken, Runway 4-22 should be maintained to RDC A/B-II design standards.

FUTURE DESIGN AIRCRAFT

Since 2006, total business jet activity has consistently been above 400 annual operations even through the most recent recession and slow recovery. A trend has emerged where medium and large business jet (approach categories C and D) activity has also increased over time. This is not unexpected as medium and large business jets are representing a greater percentage of business jet deliveries over the last 10 years.

The aviation demand forecasts indicate the potential for continued growth in business jet activity at the airport. This includes a forecast of five (5) based business jets by the long term planning horizon. The type and size of business jets using the airport regularly can impact the design standards to be applied to the airport system. Therefore, it is important to have an understanding of what type of aircraft may use the airport in the future. Factors such as population and employment growth in the airport service area, the proximity and level of service of other regional airports, and development at the airport can influence future activity.

In 2001, approximately 47 percent of business jets manufactured were in approach category B with the remaining 53 percent being larger business jets in approach categories C and D. By 2011, only 40 percent were in approach category B and 60 percent were in approach categories C and D as shown in **Table 3B**. Thus, the trend in business jet manufacturing is toward larger aircraft. This trend provides an indication that the airport should at least maintain ARC C-II design standards through the long term planning period.

TABLE 3B Business Jet Deliveries by ARC for 2001 and 2011				
ARC	**2001 Business Jets Manufactured**	**Percent**	**2011 Business Jets Manufactured**	**Percent**
B-I	104	13%	92	14%
B-II	265	34%	177	26%
Total B-II and Smaller	**369**	**47%**	**269**	**40%**
C-I	17	2%	5	1%
C-II	185	24%	201	30%
C-III	50	6%	73	11%
D-I	92	12%	43	6%
D-II	36	5%	0	0%
D-III	35	4%	90	13%
Total C-I and Larger	**415**	**53%**	**412**	**60%**
TOTAL	**784**		**681**	
Source: General Aviation Manufacturers Association				

The trend toward manufacturing of a larger percentage of medium and large business jets, those in approach categories C and D, may lead to greater utilization of these aircraft at Philip Billard Municipal Airport. **Table 3C** presents a forecast estimate of future business jet operations at Philip Billard Municipal Airport.

TABLE 3C Jet Operations Forecast By Design Category Philip Billard Municipal Airport								
	HISTORICAL JET OPERATIONS*				**FORECAST JET OPERATIONS**			
Design Categories	**2002**	**Percent**	**2012**	**Percent**	**Short Term**	**Inter. Term**	**Long Term**	**2032 Percent**
Approach Category B	246	77%	296	58%	440	600	900	45%
Approach Category C	56	17%	76	15%	320	516	900	45%
Approach Category D	19	6%	142	28%	40	84	200	10%
Total	**321**	**100%**	**514**	**100%**	**800**	**1,200**	**2,000**	**100%**
Airplane Design Group I	212	66%	262	51%	440	600	800	40%
Airplane Design Group II	109	34%	250	49%	344	564	1,080	54%
Airplane Design Group III	0	0%	2	0%	16	36	120	6%
Total	**321**	**100%**	**514**	**100%**	**800**	**1,200**	**2,000**	**100%**
** Traffic Flow Management System Counts (TFMSC) - FAA activity database.*								

Business jet operations are forecast to increase from approximately 514 in 2012 to approximately 800 within five years. The majority of these operations are anticipated by those jets in aircraft approach category B. Over time, operations by business jets in aircraft approach categories C and D are anticipated to represent the majority. By the intermediate planning horizon, business jets in approach categories C and D are anticipated to consistently be above 500. While aircraft operations by those in approach category D are forecast to increase, they are not anticipated to consistently exceed the 500 operations threshold. **Therefore, the future critical design aircraft for Runway 13-31 is projected to remain in RDC C-II.**

Runway 18-36 is currently designed to RDC B-II design standards. The majority of operations are to this runway and it provides the best wind coverage at the airport as winds in the region are predominantly from the south to the north from spring to fall and from the north to the south in the winter months. This runway serves as the primary calm wind runway as well. To maintain its versatility, **Runway 18-36 is recommended to be maintained utilizing design standards associated with RDC B-II**.

As discussed previously, Runway 4-22 should be maintained to RDC A/B-II design standards until a decision is made to close the runway, convert it to a taxiway, or maintain it.

AIRFIELD CAPACITY

Airfield capacity is measured in a variety of different ways. The **hourly capacity** measures the maximum number of aircraft operations that can take place in an hour. Very rarely will any runway reach its absolute capacity, so this measuring tool is not an effective way to determine airfield needs. The airfield **annual service volume (ASV)** is an annual level of service that is used to define airfield congestion and delay as a runway nears its hourly capacity. The airfield's calculated ASV is not the point at which gridlock occurs; rather, it is the point at which operational delays become exponential. **Aircraft delay** is the total delay incurred by aircraft using the airfield during a given timeframe. FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, provides a methodology for examining the operational capacity of an airfield for planning purposes. This analysis takes into account specific factors about the airfield. These various factors are depicted in **Exhibit 3C**. The following describes the input factors as they relate to Philip Billard Municipal Airport:

- **Runway Configuration** – Runway 13-31 is 5,099 feet long and 100 feet wide. Runway 18-36, the crosswind runway, is 4,331 feet in long and 75 feet wide. The runways intersect less than 2,000 feet from both thresholds. Runway 4-22 is not considered in the capacity analysis because it is so infrequently used and is being considered for closure.

- **Runway Use** – Runway use will be controlled by wind and/or airspace conditions. The direction of takeoffs and landings are generally determined by the speed and direction of the wind. It is generally safest for aircraft to take-off and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components. Runway 18-36 is utilized the most, estimated at 70 percent of the time. The availability of instrument approaches is also considered. While all runways provide instrument approach capability, Runway 13-31 is primarily utilized in instrument weather conditions.

- **Exit Taxiways** – Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determines the occupancy time of an aircraft on the runway. For Philip Billard Municipal Airport, those taxiway exits (located between 2,000 and 4,000 feet from the runway threshold) count in the capacity determination. Landings to Runway 13 have one exit and landings to Runway 31 have two exits. Landings to Runway 18 have one exit and landings to Runway 36 have two exits.

- **Weather Conditions** – The airport operates under visual flight rules (VFR) 87.75 percent of the time. When cloud ceilings are between 500 and 1,000 feet and visibility is between one and three miles, IFR conditions apply, which is approximately 9.11 percent of the year. Poor visibility conditions (PVC) apply when cloud ceilings are below 500 feet and visibility is below one mile. PVC conditions occur 3.14 percent of the year. **Table 3D** summarizes the weather conditions between 2001 and 2011.

TABLE 3D
Annual Weather Conditions
Philip Billard Municipal Airport

Condition	Cloud Ceiling	Visibility	Observations	Percent
Visual (VFR)	>1,000'	> 3 mi.	114,943	87.75%
Instrument (IFR)	≤ 1,000' and > 500'	≤ 3 mi. and Vis > 1 mi.	11,929	9.11%
Poor Visibility (PVC)	≤ 500'	≤ 1 mi.	4,117	3.14%
		TOTAL	**130,989**	**100.00%**

Source: National Oceanic and Atmospheric Administration (NOAA). Ten years of data from the on-airport ASOS from 2001-2011.

- **Aircraft Mix** – Aircraft mix for the capacity analysis is defined in terms of four aircraft classes. Classes A and B consist of small and medium-sized propeller and some jet aircraft, all weighing 12,500 pounds or less. These aircraft are associated primarily with general aviation activity, but do include some air taxi, air cargo, and commuter aircraft. Class C consists of aircraft weighing between 12,500 pounds and 300,000 pounds, which include most business jets and some turboprop aircraft. Class D aircraft consists of large aircraft weighing more than 300,000 pounds. The airport does not experience operations by Class D aircraft; however, Class C operations are estimated to be 3.4 percent of total annual operations. This is forecast to grow to 6.6 percent by the long term planning period. The remaining are operations by Class A and Class B aircraft.

- **Percent Arrivals** – Percent arrivals generally follow the typical 50/50 percent split.

- **Touch-and-Go Activity** – Approximately 30 percent of general aviation operations are considered touch-and-go in nature. By the long term planning period this figure increases to approximately 34 percent.

- **Peak Period Operations** – For the airfield capacity analysis, average daily operations and average peak hour operations during the peak month, as calculated in the previous chapter, are utilized. Typical operations activity is important in the calculation of an airport's annual service volume as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times throughout the year.

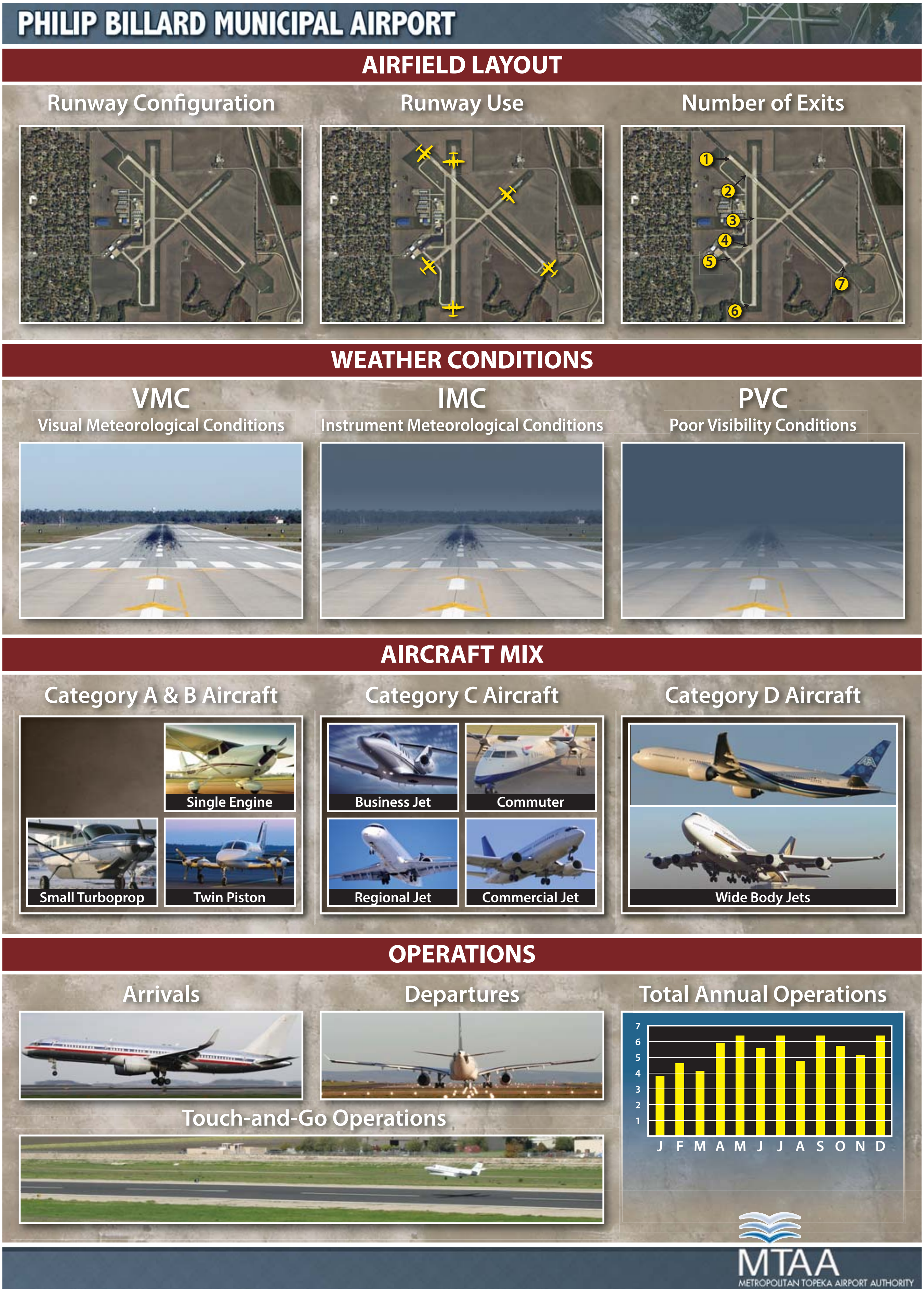


Exhibit 3C
AIRFIELD CAPACITY FACTORS

Given the factors outlined above, the airfield ASV is estimated at 194,000. The ASV does not indicate a point of absolute gridlock for the airfield; however, it does represent the point at which operational delay for each aircraft operation will increase exponentially. The current operations level estimated for Philip Billard Municipal Airport represents 26.61 percent of the airfield's ASV. By the end of the planning period, total annual operations are expected to represent 39.89 percent of the airfield's ASV. **Table 3E** summarizes the capacity analysis for Philip Billard Municipal Airport.

TABLE 3E
Airfield Demand/Capacity Summary
Philip Billard Municipal Airport

	PLANNING HORIZON			
	Current	**Short Term**	**Intermediate Term**	**Long Term**
Operational Demand				
Annual	51,615	56,000	60,700	70,600
Design Hour	27	32	35	40
Capacity				
Annual Service Volume	194,000	177,000	174,000	177,000
Percent Capacity	26.61%	31.64%	34.89%	39.89%
Weighted Hourly Capacity	101	101	100	100
Delay				
Per Operation (Minutes)	0.20	0.25	0.30	0.35
Total Annual (Hours)	172	233	304	412

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

FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. This is an approximate level to begin the detailed planning of capacity improvements. At the 80 percent level, the planned improvements should be under design or construction. Based on current and projected operations developed for this study, improvements specifically designed to enhance capacity are not necessary during the 20-year scope of this master plan.

AIRFIELD REQUIREMENTS

As indicated earlier, airport facilities include both airfield and landside components. Airfield facilities include those facilities that are related to the arrival, departure, and ground movement of aircraft. These components include:

- Runway Configuration
- Safety Area Design Standards
- Runways
- Taxiways
- Navigational Approach Aids
- Lighting, Marking, and Signage

RUNWAY CONFIGURATION

The airport is currently served by a three-runway system, which intersect to create a triangle. Primary Runway 13-31 is 5,099 feet long and is orientated in a northwest to southeast manner. Runway 18-36 is the crosswind runway measuring 4,331 feet in length and is roughly oriented in a north to south manner. Runway 4-22 is 3,001 feet long and is oriented in a southwest to northeast manner.

For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

FAA Advisory Circular 150/5300-13A, *Airport Design,* recommends that a crosswind runway be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of the crosswind component not exceeding 10.5 knots (12 mph) for RDC A-I and B-I, 13 knots (15 mph) for RDC A-II and B-II, and 16 knots (18 mph) for RDC A-III, B-III, C-I through C-III, and D-I through D-III.

Weather data specific to the airport was obtained from the National Oceanic Atmospheric Administration (NOAA) National Climatic Data Center. This data was collected from the on-field automated surface observing system (ASOS) over a continuous 10-year period from 2001 to 2011. A total of 130,989 observations of wind direction and other data points were made.

Runway 13-31 provides 93.04 percent wind coverage for 10.5 knot crosswinds, 96.85 percent coverage at 13 knots, and 99.35 percent at 16 knots. Runway 18-36 provides for 94.32 percent wind coverage at 10.5 knots, 97.12 percent at 13 knots, and 99.36 percent at 16 knots. Runway 4-22 provides 89.18 percent wind coverage for 10.5 knot crosswinds, 93.78 percent coverage at 13 knots, and 97.47 percent at 16 knots. The combined wind coverage at 10.5 knots is 99.86 percent. **Exhibit 3D** presents both the all-weather and IFR wind rose for the airport.

The airport should maintain, at a minimum, a two-runway system, as no single runway orientation provides the full 95 percent wind coverage. The crosswind runway should, at a minimum, meet the design standards for aircraft in RDC A/B-I. As discussed previously, Runway 18-36 should be maintained as the crosswind runway and Runway 4-22 should be planned for closure.

RUNWAY DESIGN STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions that could affect their safe operation. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ).

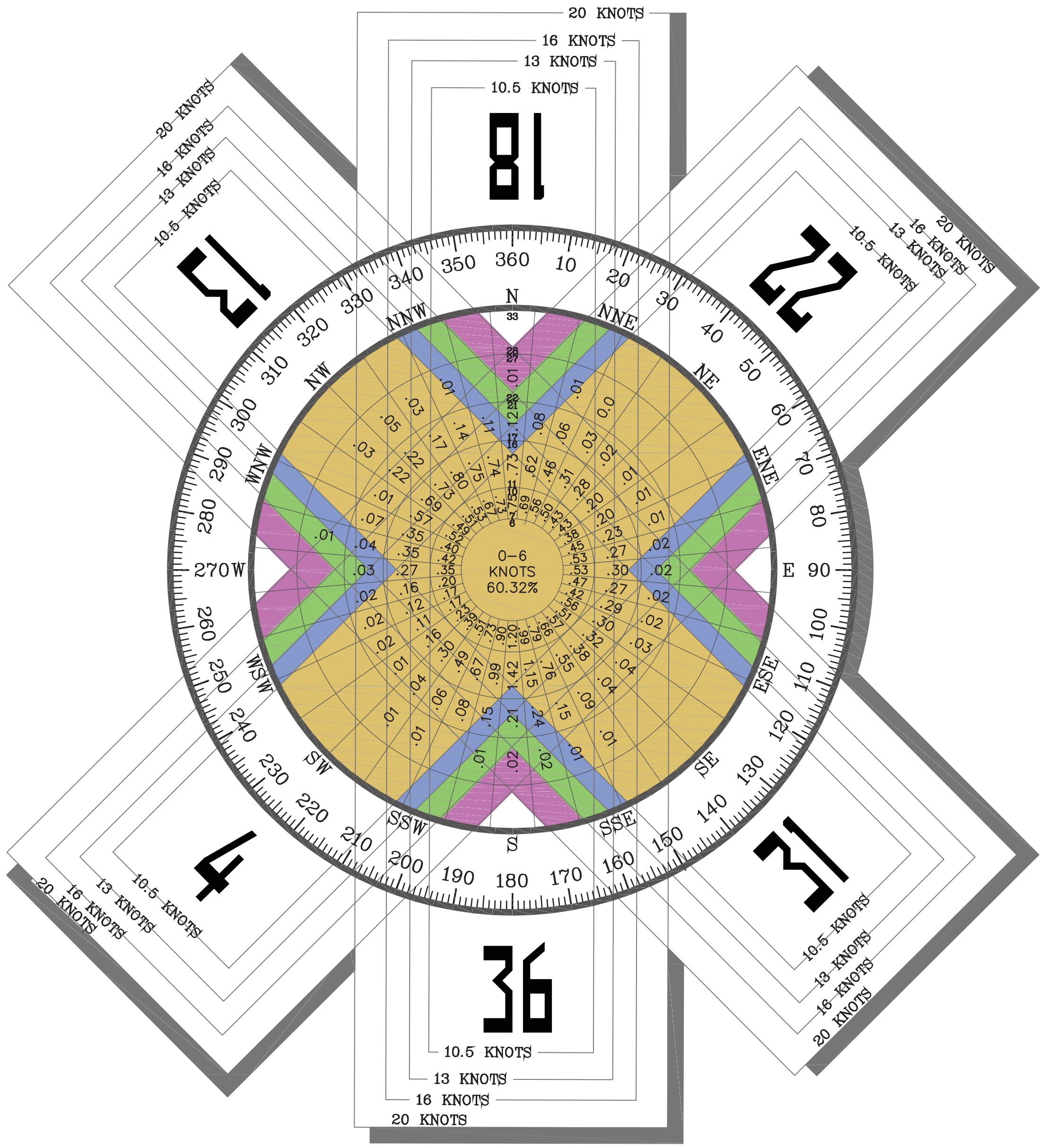
The entire RSA, ROFA, and ROFZ must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. The RPZ should also be under airport ownership. An alternative to outright

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4–22	*89.18%*	*93.78%*	*97.47%*	*99.17%*
Runway 13–31	*93.04%*	*96.85%*	*99.35%*	*99.90%*
Runway 18–36	*94.32%*	*97.12%*	*99.36%*	*99.90%*
Combined	*99.86%*	*99.98%*	*100.00%*	*100.00%*

IFR WIND COVERAGE

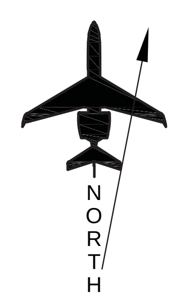
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4–22	*89.19%*	*93.78%*	*97.47%*	*99.17%*
Runway 13–31	*92.97%*	*96.71%*	*99.37%*	*99.91%*
Runway 18–36	*92.01%*	*95.61%*	*98.83%*	*99.75%*
Combined	*99.69%*	*99.93%*	*99.99%*	*100.00%*



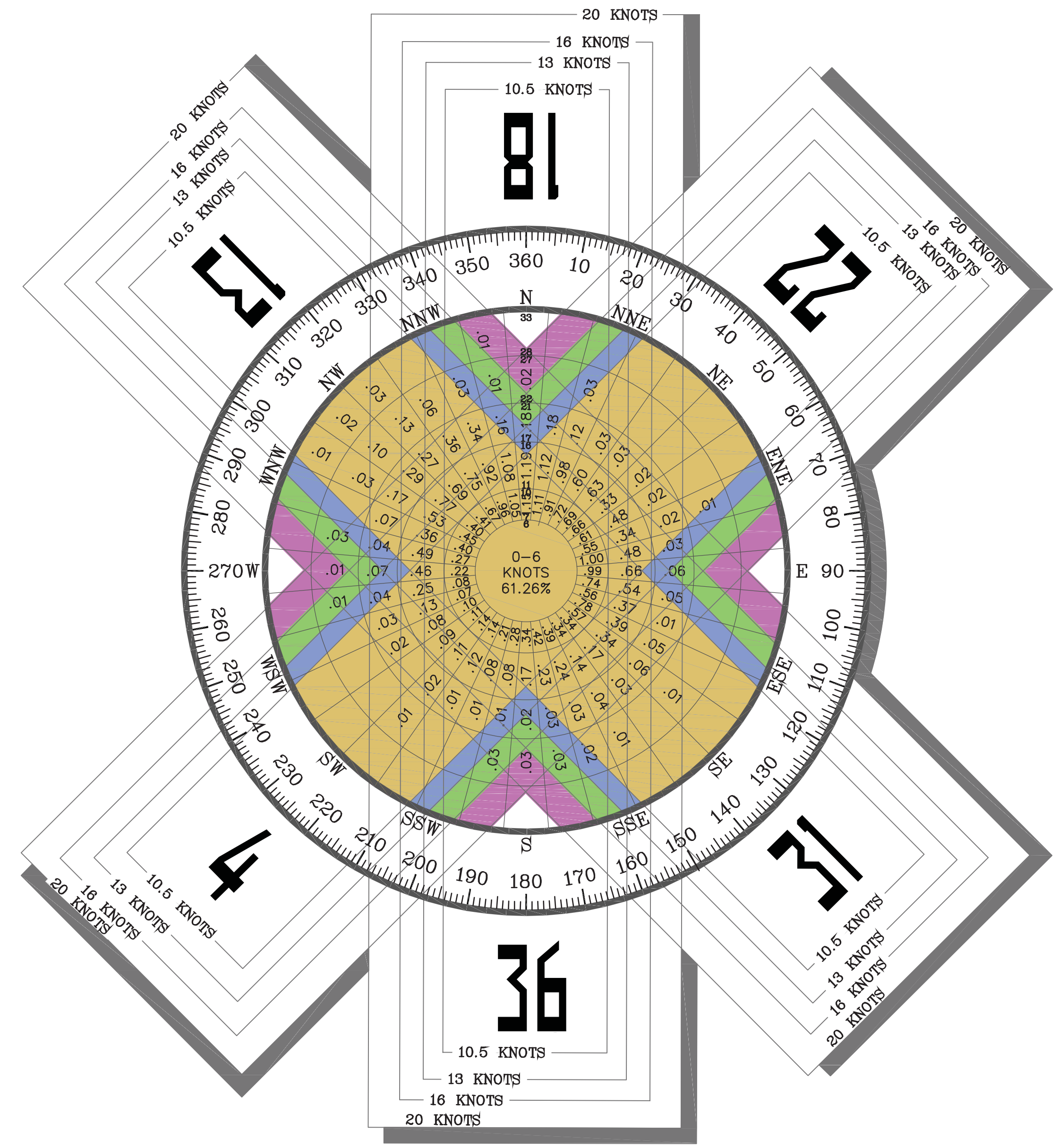
SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Topeka/Billard Municipal Airport
Topeka, Kansas

OBSERVATIONS:
119,060 All Weather Observations
2000-2011

11,929 IFR Observations
2002-2011



Magnetic Declination
2° 52' East (September 2012)
Annual Rate of Change
00° 07' West (September 2012)



ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in places which ensure the RPZ remains free of incompatible development. The various airport safety areas are presented on **Exhibit 3E**.

Dimensional standards for the various safety areas associated with the runways are a function of the type of aircraft expected to use the runways as well as the instrument approach capability. **Table 3F** presents the FAA design standards as they apply to the runways at Philip Billard Municipal Airport.

TABLE 3F
Runway Design Standards
Philip Billard Municipal Airport

	Runway 13-31	**Runway 18-36***
Runway Design Code	**C-II**	**B-II**
Visibility Minimums	**½-Mile (13)/1-Mile(31)**	**1 Mile**
RUNWAY DESIGN		
Runway Width	100	75
Runway Shoulder Width	10	10
RUNWAY PROTECTION		
Runway Safety Area (RSA)		
Width	500	150
Length Beyond Departure End	1,000	300
Length Prior to Threshold	600	300
Runway Object Free Area (ROFA)		
Width	800	500
Length Beyond Departure End	1,000	300
Length Prior to Threshold	600	300
Runway Obstacle Free Zone (ROFZ)		
Width	400	400
Length Beyond End	200	200
Precision Obstacle Free Zone (POFZ)		
Width	800	NA
Length	200	NA
Approach Runway Protection Zone (RPZ)		
Length	2,500 (13)/1,700 (31)	1,000
Inner Width	1,000 (13)/500 (31)	500
Outer Width	1,750 (13)/1,010 (31)	700
Departure Runway Protection Zone (RPZ)		
Length	1,700	1,000
Inner Width	500	500
Outer Width	1,010	700
RUNWAY SEPARATION		
Runway Centerline to:		
Holding Position	250	200
Parallel Taxiway	400	240
Aircraft Parking Area	500	250

* These design standards also apply to Runway 4-22 currently.
Note: All dimensions in feet
Source: FAA AC 150/5300-13A, Airport Design

Runway Safety Area (RSA)

The RSA is defined in FAA Advisory Circular (AC) 150/5300-13A, *Airport Design,* as a "surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of undershoot, overshoot, or excursion from the runway." The RSA is centered on the runway and dimensioned in accordance to the approach speed of the critical design aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose such as runway edge lights or approach lights.

The FAA has placed a higher significance on maintaining adequate RSA at all airports. Under Order 5200.8, effective October 1, 1999, the FAA established the *Runway Safety Area Program.* The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports…shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

The RSA standards are met for all runways at Philip Billard Municipal Airport.

Runway Object Free Area (ROFA)

The runway OFA is "a two-dimensional ground area, surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The OFA does not have to be graded and level like the RSA; instead, the primary requirement for the OFA is that no object in the OFA penetrates the lateral elevation of the RSA. The runway OFA is centered on the runway, extending out in accordance to the critical design aircraft utilizing the runway.

The OFA standards are met for all runways at Philip Billard Municipal Airport.

Runway Obstacle Free Zone (ROFZ)

The OFZ is an imaginary volume of airspace which precludes object penetrations, including taxiing and parked aircraft. The only allowance for OFZ obstructions is navigational aids mounted on frangible bases which are fixed in their location by function, such as airfield signs. The OFZ is established to ensure the safety of aircraft operations. If the OFZ is obstructed, the airport's approaches could be removed or approach minimums could be increased.

The OFZ standards are met for all runways at Philip Billard Municipal Airport.

A precision obstacle free zone (POFZ) is further defined for runway ends with a precision approach, such as the ILS approach to Runway 13. The POFZ is 800 feet wide and extends from the runway threshold to a distance of 200 feet. The POFZ is in effect when the following conditions are met:

a) The runway supports a vertically guided approach.
b) Reported ceiling is below 250 feet and/or visibility is less than ¾-mile.
c) An aircraft is on final approach within two miles of the runway threshold.

PHILIP BILLARD MUNICIPAL AIRPORT

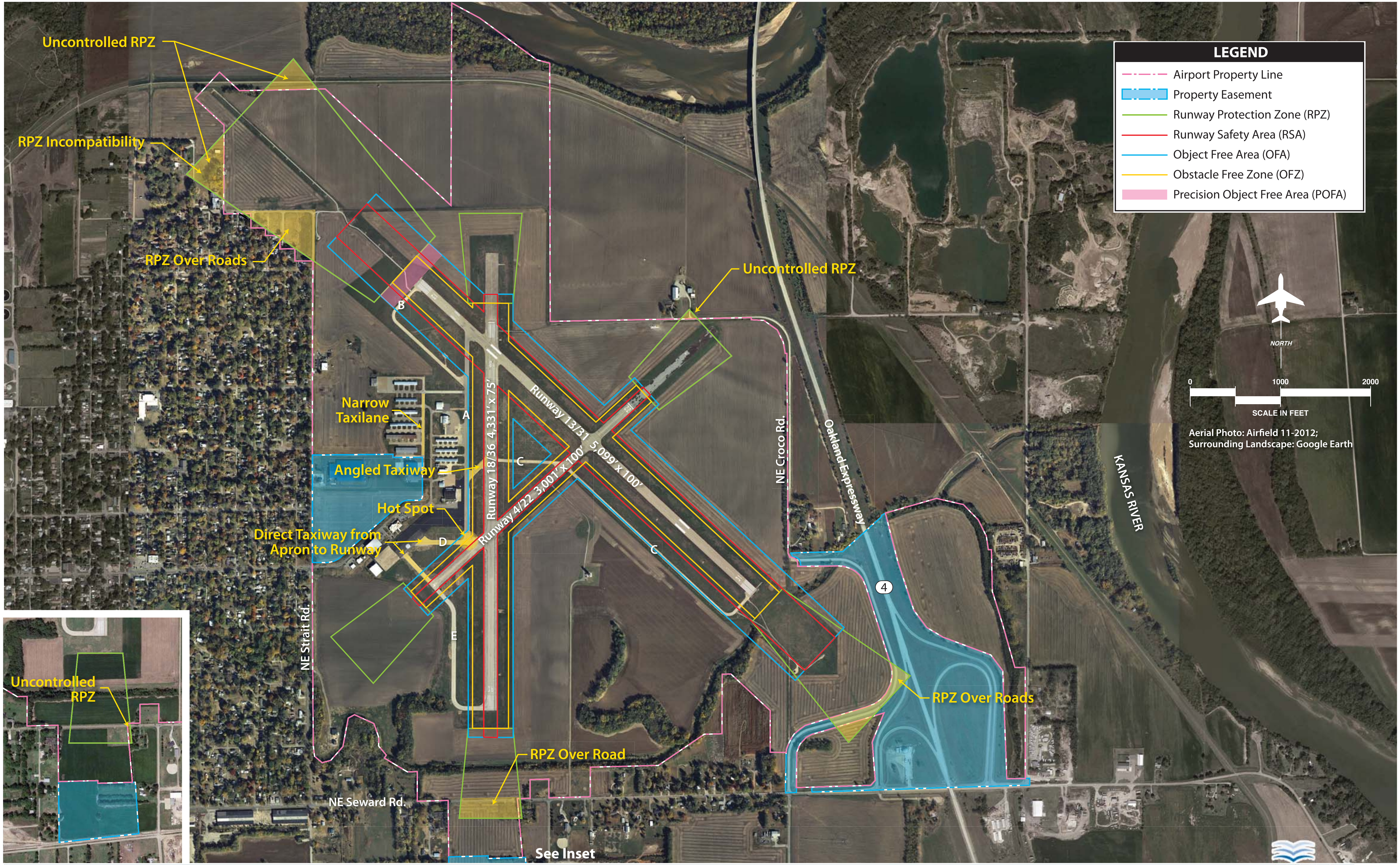


Exhibit 3E
SAFETY AREAS/AREAS OF CONCERN

When the POFZ is in effect, a wing of an aircraft holding on a taxiway may penetrate the POFZ; however, neither the fuselage nor the tail may infringe on the POFZ.

The POFZ standards are met for all applicable runways at Philip Billard Municipal Airport.

Runway Protection Zones (RPZ)

The RPZ is a trapezoidal area centered on the runway, typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses, in order to enhance the protection of people and property on the ground. The RPZ is comprised of the central portion of the RPZ and the controlled activity area. The central portion of the RPZ extends from the beginning to the end of the RPZ, is centered on the runway, and is the width of the ROFA. The controlled activity area is any remaining portions of the RPZ. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft (design aircraft) operating on the runway.

While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 159/5300-13A, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements,
- Irrigation channels as long as they do not attract birds,
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable,
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed-by-function in regard to the RPZ.

Any other land uses considered within RPZ land owned by the airport sponsor must be evaluated and approved by the FAA Office of Airports. The FAA has published, *Interim Guidance on Land Uses within a Runway Protection Zone* (9.27.2012), which identifies several potential land uses that must be evaluated and approved prior to implementation. The specific land uses requiring FAA evaluation and approval include:

- Buildings and structures (Examples include, but are not limited to: residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.)
- Recreational land use (Examples include, but are not limited to: golf courses, sports fields, amusement parks, other places of public assembly, etc.)
- Transportation facilities. Examples include, but are not limited to:
  - -- Rail facilities - light or heavy, passenger or freight
  - -- Public roads/highways
  - -- Vehicular parking facilities
- Fuel storage facilities (above and below ground)
- Hazardous material storage (above and below ground)
- Wastewater treatment facilities
- Above-ground utility infrastructure (i.e., electrical substations), including any type of solar panel installations.

The *Interim Guidance on Land within a Runway Protection Zone* states, "RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses."

Currently, the RPZ review standards are applicable to any new or modified RPZ. The following actions or events could alter the size of an RPZ, potentially introducing an incompatibility:

- An airfield project (e.g., runway extension, runway shift),
- A change in the critical design aircraft that increases the RPZ dimensions,
- A new or revised instrument approach procedure that increases the size of the RPZ,
- A local development proposal in the RPZ (either new or reconfigured)

Since the Interim guidance only addresses new or modified RPZs, existing incompatibilities are essentially grandfathered under certain circumstances. While it is still necessary for the airport sponsor to take all reasonable actions to meet the RPZ design standard, FAA funding priority for certain actions, such as relocating existing roads in the RPZ, will be determined on a case by case basis.

The existing RPZs associated with the ends of Runways 18 and 4 fully meet the design standards for RPZs. Each of the other RPZs has incompatibilities that must be addressed during the master planning process.

The Runway 36 RPZ is traversed by NE Seward Avenue. The Runway 31 RPZ is traversed by NE Croco Road and a corner of the RPZ is traversed by the exit ramp from the Oakland Expressway to NE Seward Avenue. A corner of the Runway 22 RPZ is traversed by NE Croco Road and a private driveway. This portion of the Runway 22 RPZ extends over private property and the airport does not currently own an easement of this property.

The RPZ serving Runway 13 has several incompatibilities at the southwest edge. There are several public streets that traverse a portion of the RPZ. There are several structures that are within the RPZ and some that are partially within the RPZ. These incompatibilities are on private property and the airport does not currently own easement rights.

Runway/Taxiway Separation

The design standards for the separation between runways and parallel taxiways are a function of the critical design aircraft and the instrument approach visibility minimum. The separation standard for RDC C-II with ½-mile visibility minimums is 400 feet from the runway centerline to the parallel taxiway centerline. This standard applies to those taxiway segments that are parallel to Runway 13-31. Taxiway B is 500 feet from the runway and Taxiway C is 400 feet from the runway. Therefore, the taxiways parallel to Runway 13-31 meet separation design standards.

The separation standard for taxiways parallel to Runways 18-36 and 4-22 is 240 feet. Taxiway A is 275 feet from Runway 18-36 and Taxiway E is 412 feet from the runway. There are no taxiways parallel to Runway 4-22. These taxiways also meet separation design standards.

Agricultural Separation Standards

The FAA has developed separation standards between agricultural activities that occur on or adjacent to airport property and certain airport features including runways, taxiways, and aprons. **Table 3G** presents these standards. To meet standards for RDC C-II with ½-mile visibility minimums, such as Runway 13-31, the crop line can be no closer than 575 feet to the runway centerline. From the runway end, the distance must be at least 1,000 feet. For RDC B-II, such as Runways 18-36 and 4-22, crops can be no closer than 250 feet from the runway centerline and 400 feet from the end of the runway. All object clearing areas must also be clear of crops.

TABLE 3G
Agriculture Crop Separation Standards

AAC & ADG	Distance from Runway Centerline to Crop		Distance From Runway End to Crop		Distance from Taxiway Centerline to Crop	Distance from Apron to Crop
	≥ ¾-mile	< ¾-mile	≥ ¾-mile	< ¾-mile		
Category A and B Aircraft						
Group I	200'	400'	300'	600'	45'	40'
Group II[1]	250'	400'	400'	600'	66'	58'
Category C and D Aircraft						
Group I	530'	575'	1,000'	1,000'	45'	40'
Group II[2]	530'	575'	1,000'	1,000'	66'	58'
Group III	530'	575'	1,000'	1,000'	93'	81'

[1]Applicable to Runways 18-36 and 4-22
[2]Applicable to Runway 13-31
AAC: Aircraft Approach Category relates to approach speed
ADG: Aircraft Design Group relates to wingspan
Source: AC 150/5300-13A, Airport Design

RUNWAYS

The adequacy of the existing runway system at Philip Billard Municipal Airport has been analyzed from a number of perspectives, including runway orientation and adherence to safety area standards. From this information, requirements for runway improvements were determined for the airport. Runway elements, such as length, width, and strength, are now presented.

Runway Length

The determination of runway length requirements for the airport is based on five primary factors:

- Mean maximum temperature of the hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month for Philip Billard Municipal Airport is 89.1 degrees Fahrenheit (F), which occurs in July. The airport elevation is 881 feet above mean sea level (MSL). The runway elevation difference is four feet for Runway 13-31, one foot for both Runway 18-36 and Runway 4-22. The gradient of all runways is 0.1 percent which conforms to FAA design standards for gradient. The RDC for Runway 13-31 is C-II, and for Runway 18-36 and 4-22 the RDC is B-II. Aircraft stage length can vary but a reasonable maximum to consider would be the distance to reach both coasts non-stop, approximately 1,200 miles to New York and 1,500 miles to Seattle.

Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. Airplanes operate on a wide variety of available runway lengths. Many factors will govern the suitability of those runway lengths for aircraft such as elevation, temperature, wind, aircraft weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that can maximize the suitability of the runway length. Policies, such as area zoning and height and hazard restricting, can protect an airport's runway length. Airport ownership (fee simple or easement) of land leading to the runways ends can reduce the possibility of natural growth or man-made obstructions. Planning of runways should include an evaluation of aircraft types expected to use the airport, or a particular runway now and in the future. Future plans should be realistic and supported by the FAA approved forecasts and should be based on the critical design aircraft (or family of aircraft).

The first step in evaluating runway length is to determine general runway length requirements for the majority of aircraft operating at the airport. The majority of operations at Philip Billard Municipal Airport are conducted using smaller single engine piston-powered aircraft weighing less than 12,500 pounds. Following guidance from AC 150/5325-4B, to accommodate 95 percent of small aircraft with less than 10 passenger seats, a runway length of 3,400 feet is recommended. To accommodate 100 percent of these small aircraft, a runway length of 4,000 feet is recommended. Small aircraft with 10 or more passenger seats require a runway length of 4,300 feet.

Runway length requirements for business jets weighing less than 60,000 pounds have also been calculated. These calculations take into consideration the runway gradient and landing length requirements for contaminated runways (wet). Business jets tend to need greater runway length when landing on a wet surface because of their increased approach speeds. AC 150/5325-4B stipulates that runway length determination for business jets consider a grouping of airplanes with similar operating characteristics. The AC provides two separate "family groupings of airplanes" each based upon their representative percentage of aircraft in the national fleet. The first grouping is those business jets that make up 75 percent of the national fleet, and the second group is those making up 100 percent of the national fleet. **Table 3H** presents a partial list of common aircraft in each aircraft grouping. A third group considers business jets weighing more than 60,000 pounds. Runway length determination for these aircraft must be based on the performance characteristics of the individual aircraft.

TABLE 3H
Business Jet Categories for Runway Length Determination

75 percent of the national fleet	MTOW	75-100 percent of the national fleet	MTOW	Greater than 60,000 pounds	MTOW
Lear 35	20,350	Lear 55	21,500	Gulfstream II	65,500
Lear 45	20,500	Lear 60	23,500	Gulfstream IV	73,200
Cessna 550	14,100	Hawker 800XP	28,000	Gulfstream V	90,500
Cessna 560XL	20,000	Hawker 1000	31,000	Global Express	98,000
Cessna 650 (VII)	22,000	Cessna 650 (III/IV)	22,000		
IAI Westwind	23,500	Cessna 750 (X)	36,100		
Beechjet 400	15,800	Challenger 604	47,600		
Falcon 50	18,500	IAI Astra	23,500		

MTOW: Maximum Take Off Weight
Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design

Table 3J presents the results of the runway length analysis for business jets developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,500 feet is recommended. This length is derived from a raw length of 4,777 feet that is adjusted, as recommended, for runway gradient and consideration of landing length needs on a contaminated runway (wet and slippery). Dry runways would require approximately 4,800 feet, while 5,500 feet is needed to accommodate business jets landing in wet conditions. To accommodate 100 percent of the business jet fleet at 60 percent useful load, a runway length of 5,700 feet is recommended.

TABLE 3J
Runway Length Requirements
Philip Billard Municipal Airport

Airport Elevation	881 feet above mean sea level
Average High Monthly Temp.	89 degrees (July)
Runway Gradient	5' Runway 13-31

Fleet Mix Category	Raw Runway Length from FAA AC	Runway Length With Gradient Adjustment (+50')	Wet Surface Landing Length for Jets (+15%)*	Final Runway Length
75% of fleet at 60% useful load	4,777'	4,827'	5,493'	5,500'
100% of fleet at 60% useful load	5,628’	5,678’	5,500’	5,700’
75% of fleet at 90% useful load	6,677’	6,727’	7,000’	7,000’
100% of fleet at 90% useful load	8,566'	8,616'	7,000'	8,600'

*Max 5,500' for 60% useful load and max 7,000' for 90% useful load in wet conditions
Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design.

Utilization of the 90 percent category for runway length determination is generally not considered by the FAA unless there is a demonstrated need at the airport. This could be documented activity by a cargo carrier or by a business jet operator that flies out frequently with heavy loads. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 7,000 feet is recommended. To accommodate 100 percent of business jets at 90 percent useful load, a runway length of 8,600 feet is recommended.

Another method to determine runway length requirements at Philip Billard Municipal Airport is to examine aircraft flight planning manuals under conditions specific to the airport. Several aircraft that are known to operate at the airport were analyzed for takeoff length required under maximum loading conditions when the temperature is 89 degree. **Table 3K** shows the runway length results.

Several of the example aircraft would require a runway length greater that the 5,099 feet currently available on Runway 13-31. Of particular note is the Lear 45, one of which is based at the airport, which would require a runway length of 6,300 feet under the example conditions.

TABLE 3K
Select Business Jet Takeoff Length Requirements
Philip Billard Municipal Airport

Assumptions:
Mean Maximum Temp of Hottest Month: 89 degrees
Runway Gradient: 5-foot runway elevation difference
Airport Elevation: 881 feet

Aircraft	75% or 100% Category of National Fleet	ARC	MTOW	Takeoff Length
Beechjet 400	75% Category	B-I	16,100	4,900
Cessna 550	75% Category	B-II	14,100	4,300
Cessna 560	75% Category	B-II	16,830	4,400
Lear 45	75% Category	D-I	21,500	6,300
Cessna 525	75% Category	B-I	10,700	3,700
Cessna 560XL	75% Category	B-II	20,200	4,500
Cessna 750	100% Category	C-II	36,100	6,400
Cessna 680	100% Category	B-II	30,300	4,600
Hawker 800XP	100% Category	C-II	26,000	6,300
Lear 60	100% Category	D-I	23,500	7,300
Gulfstream IV	> 60,000 pounds	D-II	73,900	6,900
Gulfstream V	> 60,000 pounds	D-III	91,000	7,400

ARC: Aircraft Reference Code
MTOW: Maximum Certified Takeoff Weight
Source: Aircraft Flight Planning Manuals

Runway 13-31 Length

Runway 13-31 is the primary runway and it is 5,099 feet long. This runway should be capable of accommodating at least 75 percent of the business jet fleet at 60 percent useful load. This would indicate a minimum runway length of 5,500 feet. To accommodate the next category of business jets, 100 percent at 60 percent useful load, a runway length of 5,700 feet is recommended.

The alternatives chapter will assess the maximum runway length that the airport site can accommodate up to 5,700 feet. Justification would come when a specific aircraft, or a combination of aircraft in the 100 percent category, account for 500 annual operations.

The forecast of business jet operations does not indicate that the airport will exceed the 500 operations threshold by business jets utilizing at least 90 percent useful load; therefore, the runway length required to fully accommodate these aircraft will not be considered in the alternatives chapter.

Runway 18-36 Length

Runway 18-36 is the crosswind runway and it is 4,311 feet long. This runway is the most heavily used runway and accounts for approximately 70 percent of all airport operations. Wind conditions at the airport indicate that this runway should, at a minimum, accommodate small aircraft. The minimum recommended runway length for this category of aircraft is 4,300 feet. Since this runway meets the design standards for all small aircraft, those under 12,500 pounds, extension of this runway for capacity purposes will not be considered in the alternatives chapter.

Runway 4-22 Length

At 3,001 feet in length, Runway 4-22 is intended to accommodate a portion of the small aircraft fleet. The alternatives section of this master plan will analyze options for this runway including long term preservation, conversion to a taxiway, or potential closure. Until a decision is presented, the current runway length should be maintained.

Runway Width

The width of the runway is a function of the airplane design group (ADG) for each runway. Runway 13-31 is currently, and is forecast to remain, in ADG II. The runway width design standard for ADG II is 100 feet. The existing width of Runway 13-31 should be maintained throughout the planning period.

Runway 18-36 is 75 feet wide which meets the design standard width for this runway. The width should be maintained. Runway 4-22 is 100 feet wide, which exceeds the 75-foot design standard. Since this runway is planned to be closed, no additional action is necessary.

Runway Strength

An important feature of airfield pavement is its ability to withstand repeated use by aircraft. The FAA Airport/Facility Directory places the pavement strength for Runway 13-31 at 50,000 pounds single wheel loading (S), 72,000 pounds dual wheel loading (D), and 110,000 dual tandem wheel loading (DT). These strength ratings refer to the configuration of the aircraft landing gear. For example, S indicates an aircraft with a single wheel on each landing gear. The strength ratings of a runway do not preclude operations by aircraft that weigh more; however, frequent activity by heavier aircraft can shorten the useful life of that pavement.

The strength rating for Runway 13-31 is adequate and should be maintained through the planning period. Runway 18-36 is strength-rated at 60,000 pounds S, 80,000 pounds D, and 96,000 pounds DT. The strength of this runway is adequate through the long term planning period. Runway 4-22 is strength-rated at 29,000 pounds S. This is adequate and should be maintained until the runway is closed.

Runway Reference Code

FAA AC 150/5399-13A, *Airport Design*, introduces the Runway Reference Code

(RRC). The RRC is defined as, *"A code signifying the current operational capabilities of a runway and associated parallel taxiway."* Like the RDC, the RRC is composed of the same three components: AAC, ADG, and runway visibility minimums. The RDC, however, is based upon planned development with no operational component, while the RRC describes the current operational capabilities of a runway where no special operating procedures are necessary.

The RRC for a runway is established based upon the minimum runway to taxiway centerline separation.

At Philip Billard Municipal Airport, there are partial parallel taxiways serving two of the three runways. The RRC for Runway 13-31 is identified as "RRC C-II-2400," which indicates a minimum runway/taxiway separation of 400 feet (400 feet currently exists). The RRC for Runway 18-36 is B-II-4000 which identifies a minimum runway/taxiway separation of 240 feet (270 feet currently exists). The RRC for Runway 4-22 is B-II-5000; however, there in not a parallel taxiway.

TAXIWAYS

The design standards associated with taxiways are determined by the taxiway design group (TDG) or the airplane design group (ADG) of the critical design aircraft. As determined previously, the applicable ADG for all runways now and into the future is ADG-II. **Table 3L** presents the various taxiway design standards related to ADG II.

TABLE 3L
Taxiway Dimensions and Standards
Philip Billard Municipal Airport

STANDARDS BASED ON WINGSPAN	ADG II	
Taxiway Protection		
Taxiway Safety Area (TSA) width	79'	
Taxiway Object Free Area (TOFA) width	131'	
Taxilane Object Free Area width	115'	
Taxiway Separation		
Taxiway Centerline to:		
Fixed or Movable Object	65.5'	
Parallel Taxiway/Taxilane	105'	
Taxilane Centerline to:		
Fixed or Movable Object	57.5'	
Parallel Taxilane	97'	
Taxiway Centerline to:		
Runway 13-31 Centerline	400'	
Runway 18-36 Centerline	240'	
Wingtip Clearance		
Taxiway Wingtip Clearance	26'	
Taxilane Wingtip Clearance	18'	
STANDARDS BASED ON TDG	**TDG 2**	**TDG 3**
Taxiway Width Standard	35'	50'
Taxiway Edge Safety Margin	7.5'	10'
Taxiway Shoulder Width	10'	20'

ADG: Airplane Design Group
TDG: Taxiway Design Group
Source: FAA AC 150/5300-13A, Airport Design

The table also shows those taxiway design standards related to TDG. The TDG standards are based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance of the critical design aircraft expected to use those taxiways. Different taxiway/taxilane pavements can and should be designed to the most appropriate TDG design standards.

For aircraft utilizing Runway 13-31, the critical TDG is 3. This means that the taxiways associated with this runway should be 50 feet wide. The taxiway standards for Runway 18-36 and Runway 4-22 should utilize design standards for TDG 2. Therefore, these taxiways should be 35 feet wide.

Table 3M presents the existing taxiway dimensions and separation distances at the airport. A critical design aircraft utilizing Runway 13-31 may have a need to access all taxiways except Taxiway E, which serves the Runway 36 threshold. Therefore, all taxiways except Taxiway E should be 50 feet wide.

TABLE 3M
Existing Taxiway Condition
Philip Billard Municipal Airport

Existing Taxiway Widths	
Taxiway A	50'
Taxiway B	35'
Taxiway C (West of Rwy 18-36)	50'
Taxiway C (East of Rwy 18-36)	35'
Taxiway D	50'
Taxiway E	50'
Existing Taxiway Separations	
Taxiway A to Runway 18-36	275'
Taxiway B to Runway 13-31	500'
Taxiway C to Rwy 13-31	400'
Taxiway E to Rwy 18-36	412'

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

Taxiway Design Considerations

FAA AC 150/5300-13A, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as, "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

The taxiway system at Philip Billard Municipal Airport generally provides for the efficient movement of aircraft; however, recently published AC 150/5300-13A, *Airport Design*, provides recommendations for taxiway design. The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation:

1. **Taxi Method**: Taxiways are designed for "cockpit over centerline" taxiing with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate "judgemental oversteering," which is where the pilot must intentionally steer the cockpit, outside the marked centerline, in order to assure the aircraft remains on the taxiway pavement.
2. **Steering Angle**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.

3. **Three-Node Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right and left angle turns and a continuation straight ahead.
4. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.
5. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three node" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.
   - *Avoid "high energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
   - *Increase Visibility*: Right angle intersections, both between taxiways and runways, provide the best visibility. Acute angle runway exits provide for greater efficiency in runway usage, but should not be used as runway entrance or crossing points. A right angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
   - *Avoid "dual purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
   - *Indirect Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
   - *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.
6. **Runway/Taxiway Intersections**:
   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe

aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs so they are visible to pilots.

- *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.
- *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement making it difficult to provide proper signage, marking, and lighting.

7. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and makes lighting and marking more difficult.
   - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout that forces pilots to make a conscious decision to turn.
   - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

FAA *AC 150/5300-13A, Airport Design*, states that, "existing taxiway geometry should be improved whenever feasible, with emphasis on designated "hot spots." To the extent practicable, the removal of existing pavement may be necessary to correct confusing layouts.

There are several taxiway locations at Philip Billard Municipal Airport that will be analyzed in the alternatives section of this master plan for compliance to the recommended taxiway design standards.

The first and foremost area to consider is the "hot spot" at the intersection of Taxiways A, D, and Runway 4-22. At this location, Taxiway A and D intersect inside the RSA for Runway 4-22. The intersection of these two taxiways then creates a wide expanse of pavement at the intersection with the runway. The taxiway entrance to the runway is at an angle as well. Finally, the hold lines on Taxiways A and D at this location are prior to the intersection of the two taxiways. Hold lines are typically associated with an approaching runway, not a taxiway; therefore, this layout may be confusing to pilots.

Taxiway C, west of Runway 18-36, is at an angle. This portion of the taxiway should be at a right angle if possible. Taxiway C intersects Runway 18-36 at the mid-point of the runway. This should be avoided if possible. The western portion of Taxiway C intersects with Runway 4-22 at an angle.

Taxiway D provides direct access from the main terminal area apron to Runway

4-22. Taxiway E provides direct access to the Runway 36 threshold. Taxiways leading from an apron directly to a runway threshold should be avoided.

Taxiway A enters Runway 13-31 at an angle and it terminates at this point. Pilots could inadvertently enter the runway environment expecting to cross the runway in order to arrive at the threshold of Runway 18.

The alternatives chapter of this master plan will consider various operations for improving the taxiway layout.

Taxilane Design Considerations

Taxilanes are distinguished from taxiways in that they do not provide access to or from the runway system directly. Taxilanes typically provide access to hangar areas. As a result, taxilanes can be designed to varying design standards depending on the type of aircraft utilizing the taxilane. For example, a taxilane leading to a T-hangar area only needs to be designed to accommodate those aircraft typically accessing a T-hangar.

There are numerous taxilanes in the terminal area at Philip Billard Municipal Airport. The main central taxilane that leads to the Kansas Highway Patrol hangar presents several challenges to airport movement from both aviation and a vehicular perspective. The hangar access road is a public road and is not gated; therefore, people who may not be familiar with the airport could inadvertently enter an aircraft movement area. The distance from the taxilane centerline to an object should be at least 57.5 feet. There is pavement at the end of two T-hangar rows that is as close at 25 feet to the taxilane centerline. If there were a vehicle or aircraft parked on that pavement, then other aircraft may not be capable of passing safely. In fact, through interviews with the KHP, there have been times when they have had to wing-walk the state-owned King Air 350 down the taxiway to insure safe passage.

The alternatives chapter will present options for improving the safe movement of aircraft on this taxilane. In addition, options will be developed to reduce the possibility of vehicles entering active taxilanes.

INSTRUMENT NAVIGATIONAL AIDS

The airport has a sophisticated ILS (CAT-I) instrument approach to Runway 13. This approach provides for visibility minimums as low as ½-mile and cloud ceilings down to 200 feet. An LPV (Localizer Performance with Vertical Guidance) instrument approach is also available to Runway 13. This approach utilizes the constellation of GPS satellites to provide both vertical and horizontal guidance for approaching aircraft without the need for extensive ground-based equipment. The LPV approach to Runway 13 provides CAT-I minimums. All other runways have non-precision instrument approaches with 1-mile visibility minimums. These are excellent instrument approaches providing all-weather capability for the airport and they should be maintained in the future.

Recent advancements in the accuracy of GPS instrument approaches has led to the possibility of new or improved approach visibility minimums across the country at little or no expense to the airport. Currently, LPV approaches with visibility minimums as low as ¾-mile are being implemented at airports without any additional ground-based navigational aids such as approach lighting systems; however, they are recommended.

At Philip Billard Municipal Airport, consideration will be given to the potential for improved instrument approaches to both ends of Runway 18-36 and to Runway 31. Specifically, the impacts of LPV instrument approaches with ¾-mile visibility minimums will be considered for these runway ends. Improved instrument approaches may change the size of the associated RPZ. RPZ standards preclude changes to the RPZ size that would introduce new incompatibilities.

VISUAL NAVIGATION AIDS

The airport beacon is located in the terminal area. The beacon rests atop a single pole that is hinged to allow for quick repairs. The beacon should be maintained.

As discussed in Chapter One – Inventory, both ends of Runway 18-36 and Runway 31 are equipped with 4-light visual approach slope indicators (VASIs). These are owned and maintained by the FAA and should be maintained for their useful life. If replacement is needed for the VASIs, consideration should be given to upgrading the precision approach path indicator (PAPIs).

Runway end identification lights (REIL) are strobe lights set to either side of the runway. These lights provide rapid identification of the runway threshold. REILs should be installed at runway ends not currently providing an approach lighting system but supporting instrument operations. Runway 31 and Runway 18 are equipped with an REIL system. The existing REILs should be maintained and consideration should be given to installing REILs on the Runway 36 end.

The FAA recommends an approach lighting system for instrument approaches not lower that ¾-mile and requires one for lower visibility minimums. Runway 13 has a medium intensity approach lighting system with runway alignment indicator lights (MALSR). This system is required as part of the ILS approach and allows for the visibility minimums to be ½-mile. This system should be maintained.

Approach lighting systems (ALS) are recommended for instrument approaches of less than 1-mile. If instrument approaches with ¾-mile visibility minimums or less are planned to any runway ends other than Runway 13, then an ALS should be planned. Acceptable systems would include ODALS, MALS, SSALS and SALS. To achieve CAT-I minimums, a more sophisticated MALSR or similar approach lighting system is required.

WEATHER AND COMMNUICATION AIDS

Philip Billard Municipal Airport has two lighted windsocks: one located at the northern end of the airfield and one located at the southern end near the terminal area. There is an additional unlit supplemental windsock near the Runway 31 end. These wind indicators should be maintained. The airport also has a lighted wind-tee centrally located in the middle of the airfield between the runways. This system should be maintained for its useful life. Ultimately, the wind-tee may be considered for replacement by a third lighted windsock.

Philip Billard Municipal Airport is equipped with an Automated Surface Observing System (ASOS). This is an important system that automatically records weather conditions such as wind speed, wind gust, wind direction, temperature, dew point, altimeter setting, visibility, fog/haze condition, precipitation, and cloud height. This information is then transmitted at regular intervals (usually once per hour). Aircraft in the vicinity can receive this information if they have their radio tuned to the correct frequency (121.275 MHz). In addition, pilots and individuals can call a published telephone number and receive the information via an automated voice recording. This system should be maintained through the planning period.

The airport has an airport traffic control tower (ATCT) that is included as part of FAA's Contract Tower Program. The cost of operating the tower, including controller compensation, is funded by the FAA provided tower activity meets a minimum cost-benefit analysis. If the cost-benefit ratio falls below a certain threshold for three years in a row, then further FAA, funding may be limited. Currently, tower operations meet the FAA threshold. The tower is open from 7:00am to 7:00pm daily.

A summary of the airside needs at Philip Billard Municipal Airport is presented on **Exhibit 3F**.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each element was examined in relation to projected demand to identify future landside facility needs. This includes components for general aviation needs such as:

- Aircraft Hangars
- Aircraft Parking Aprons
- Terminal Building Services
- Auto Parking and Access
- Airport Support Facilities

HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation, whether single or multi-engine aircraft, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the airport in the future. However, hangar development should be based upon actual demand trends and financial investment conditions.

While a majority of aircraft owners prefer enclosed aircraft storage, a number of based aircraft owners may still tie-down outside (due to the lack of hangar availability, hangar rental rates, and/or operational needs). Therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft. At Philip Billard Municipal Airport, nearly all aircraft are stored in a covered facility and outside aircraft tie-down storage is typically temporary. Therefore, hangar availability will be planned for all based aircraft.

There are three general types of aircraft storage hangars: T-hangars, box hangars, and conventional hangars. T-hangars are similar in size and will typically house a single engine piston-powered aircraft. Some multi-engine aircraft owners may elect to utilize these facilities as well. There are typically many T-hangar units "nested" within a single structure. There are 76 T-hangar units at the airport encompassing an estimated 89,500 square

PHILIP BILLARD MUNICIPAL AIRPORT

	AVAILABLE	SHORT TERM	LONG TERM
RUNWAYS			
	**Runway 13-31**	**Runway 13-31**	**Runway 13-31**
	RDC C-II-2,400	RDC C-II-2,400	RDC C-II-2,400
	RRC C-II-2,400	RRC C-II-2,400	RRC C-II-2,400
	5,099' x 100'	Maintain	Consider 5,700' x 100'
	50-S; 72-D; 110-DT	Maintain	60-S; 90-D; 110-DT
	Standard RSA, OFA, OFZ, POFZ	Maintain	Maintain
	RPZs under partial ownership	Purchase and Clear RPZs	Remove RPZ incompatibilities when RPZ size/location changes
	Precision marking (13)	Maintain	Maintain
	Non-precision marking (31)	Maintain	Maintain
	HIRL	Maintain	Maintain
	**Runway 18-36**	**Runway 18-36**	**Runway 18-36**
	RDC B-II-4,000	Maintain	Maintain
	RRC B-II-4,000	Maintain	Maintain
	4,331' x 75'	Maintain	Maintain
	12.5-S; 15.6-D	Maintain	Maintain
	Standard RSA, OFA, OFZ	Maintain	Maintain
	RPZ - Road in Rwy 36 RPZ	Maintain	Remove RPZ incompatibilities when RPZ size/location changes
	Non-precision marking	Maintain	Maintain
	MIRL	Maintain	Maintain
	**Runway 4-22**	**Runway 4-22**	**Runway 4-22**
	RDC B-II-4,000	Maintain Locally or Close Runway	Same
	RRC B-II-4,000	Maintain Locally or Close Runway	Same
	29-S	Maintain Locally or Close Runway	Same

KEY

RDC - Runway Design Code
RRC - Runway Reference Code
RSA - Runway Safety Area
OFA - Object Free Area
OFZ/POFZ - Obstacle Free Zone/Presicion Obstacle Free Zone
RPZ - Runway Protection Zone
TDG - Taxiway Design Code
PAPI - Precision Approach Path Indicator
LPV - GPS with Localizer Performance and Vertical Guidance
VOR - Very-High Frequency Omni-Directional Radar
REIL - Runway End Identification Lights
MIRL/HIRL - Medium/High Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
ASOS - Automated Surface Observation System
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
NPI - Non-precision Instrument
##-S/D/DT - Runway Strength Rating in Thousands of Pounds for Single (S), Dual (D), and Dual Tandem (DT) Wheel Struts

	AVAILABLE	SHORT TERM	LONG TERM
TAXIWAYS			
	TDG-3	TDG-3	TDG-3
	Centerline marking	Maintain	Maintain
	Taxiway B is 35' wide	Increase width to 50'	Maintain
	Taxiway C is 35' wide east of Rwy 18-36	Maintain	Increase to 50' wide
	Taxiways A, D, E are 50'	Maintain	Maintain
	MITL	Maintain	Maintain
	Hot Spot and layout deficiencies	Correct Hot Spot	Redesign layout concerns
NAVIGATIONAL AND WEATHER AIDS			
	ASOS, 2 lighted and 1 supplemental windsock, beacon, wind-tee, ATCT	Maintain	Maintain
	Runway 13-31	**Runway 13-31**	**Runway 13-31**
	CAT I ILS Rwy 13	Maintain	Maintain
	1-mile NPI Rwy 31	Consider ¾-mile LPV Rwy 31	Maintain
	Runway 18-36	**Runway 18-36**	**Runway 18-36**
	1-mile NPI	Consider ¾-mile LPV	Maintain
	Runway 4-22	**Runway 4-22**	**Runway 4-22**
	1-mile NPI (Rwy 22)	Same or Close Runway	Same or Close Runway
	VOR Circling (Rwy 22)	Same or Close Runway	Same or Close Runway
VISUAL AIDS			
	**Runway 13-31**	**Runway 13-31**	**Runway 13-31**
	VASI-4L (Rwy 31)	Maintain	Upgrade to PAPI-4L (Rwy 31)
	MALSR (Rwy 13)	Maintain	Maintain
	REIL (Rwy 31)	Maintain	Consider REIL (Rwy 31)
	Runway 18-36	**Runway 18-36**	**Runway 18-36**
	VASI-4L (Rwy 18)/ VASI-4R (Rwy 36)	Maintain	Upgrade to PAPI-4L
	REIL (Rwy 18)	Maintain	Consider REIL (Rwy 36)
	Runway 4-22	**Runway 4-22**	**Runway 4-22**
	None	Same	Same

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Exhibit 3F
AIRFIELD REQUIREMENTS

feet of floor space. For determining future aircraft storage needs, a planning standard of 1,200 square feet per based aircraft is utilized for T-hangars.

Box hangars are open-space facilities with no interfering supporting structure. Box hangars can vary in size and can either be attached to others or be standalone hangars. Typically, box hangars will house larger multi-engine, turboprop, or jet aircraft. At Philip Billard Municipal Airport, there are four box hangars with estimated space for eight aircraft and a total of approximately 15,500 square feet of floor space. For future planning, a standard of 2,500 square feet per aircraft is utilized for box hangars.

Conventional hangars are the familiar large hangars with open floor plans that can store several aircraft. At Philip Billard Municipal Airport, there are four conventional hangars, which include the Kansas Highway Patrol hangar. It is estimated that these hangars have the capability of housing up to 20 aircraft; however, at least one of these is primarily used for transient aircraft maintenance. Conventional hangars are estimated to encompass 43,800 square feet of floor space. For future planning needs, 2,500 square feet per aircraft is utilized for conventional hangars.

Table 3N presents aircraft storage needs based on the demand forecasts. Assumptions have been made on owner preferences for a hangar type based on trends at general aviation airports. All turboprops, business jets, and helicopters are assumed to be stored in box or conventional hangars. T-hangars are assumed to house single engine piston aircraft and a small portion of multi-engine piston aircraft.

TABLE 3N
Hangar Needs
Philip Billard Municipal Airport

	Currently Supply	Short Term	Intermediate Term	Long Term	Total Need Less Current Supply
Based Aircraft	88	92	97	107	
Aircraft to be Hangared	88	92	97	107	19
T-Hangar Positions	76	68	70	76	0
Box Hangar Positions	8	11	12	14	6
Conventional Hangar Positions	20	13	14	17	0
Hangar Area Requirements					
T-Hangar Area	89,500	81,000	84,000	91,000	1,500
Box Hangar Area	15,500	28,000	31,000	34,000	18,500
Conventional Hangar Area	43,800	33,000	35,000	43,000	-800
Total Storage Area (s.f.)	**148,800**	**142,000**	**150,000**	**168,000**	**19,200**
Maintenance Area	22,600	16,000	17,000	19,000	-3,600

Source: Coffman Associates analysis.

A portion of executive box and conventional hangars often are utilized primarily for maintenance activities or for office space. A planning standard of 175 square feet per based aircraft is considered for these purposes and is considered in addition to the aircraft storage needs. Nested T-hangar facilities typically have small storage units on the end as well.

It is estimated that there are 148,800 square feet of hangar storage space available currently. This includes 89,500 square feet for T-hangars, 15,500 square feet for box hangars, and 43,800 square feet for conventional hangars. In the short term, there is a forecast need for an additional 12,500 square feet of box space. T-hangar and conventional hangar space appears adequate currently. By the long term planning period, a total of 168,000 square feet of aircraft hangar space is forecast as needed. This is approximately 19,200 square feet of additional hangar space.

Hangar requirements are general in nature and are based on standard hangar size estimates. If a private developer desires to construct or lease a large hangar to house one plane, any extra space in that hangar may not be available for other aircraft. The actual hangar area needs will be dependent on the usage within each hangar.

AIRCRAFT PARKING APRON

The aircraft parking apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near the airside entry point, such as the terminal building or FBO facility. Ideally, the main apron is large enough to accommodate transient airport users as well as a portion of locally based aircraft. Often, smaller aprons are available adjacent to FBO hangars and at other locations around the airport. The apron layout at Philip Billard Municipal Airport follows this typical pattern.

Exhibit 1K previously documented the various aircraft aprons at the airport. The terminal area apron encompasses approximately 12,000 square yards. There are 11 marked transient tie-down positions on this apron. Adjacent and to the northeast is the primary local tie-down apron which encompasses approximately 6,300 square yards and has 17 marked positions. There are several other aircraft aprons associated with various hangars at the airport.

FAA Advisory Circular 150/5300-13, *Airport Design*, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. At Philip Billard Municipal Airport, the number of itinerant spaces required is estimated at 13 percent of the busy-day itinerant operations (166 x 0.13 = 21). This results in a current need for 21 itinerant aircraft parking spaces. Of these, 17 (approximately 80 percent) should be for small aircraft and four should be for turboprops and business jets. By the long term planning period, 30 spaces are estimated to be needed, with 24 identified for small aircraft and six for larger planes.

A planning criterion of 800 square yards per aircraft was applied to determine future transient apron area requirements for single and multi-engine aircraft. For turboprops and business jets (which can be much larger), a planning criterion of 1,600 square yards per aircraft position was used. The current need for transient apron area is 20,700 square yards. By the long term planning period, approximately 29,300 square yards is estimated.

An aircraft parking apron should provide space for the number of locally based aircraft that are not stored in hangars, transient aircraft, and for maintenance activity. For local tie-down needs, an additional ten spaces are identified for maintenance activity. Maintenance activity would include the movement of aircraft into and out of hangar facilities and temporary storage of aircraft on the ramp. Calculations indicated that local aircraft tie-down positions are adequate through the long term planning period. Total apron parking requirements are presented in **Table 3P**. The alternatives chapter will examine the potential for apron expansion at the airport.

TABLE 3P
Aircraft Apron Requirements
Philip Billard Municipal Airport

			FORECAST		
	Currently Available (2012)	**Calculated Need (2012)**	**Short Term**	**Intermediate Term**	**Long Term**
Local Apron Positions	17	10	10	10	10
Local Apron Area (s.y.)	14,600	3,500	3,500	3,500	3,500
Transient Apron Positions	11	22	25	27	31
Piston Transient Positions	8	17	20	21	24
Turbine Transient Positions	3	4	5	5	6
Transient Apron Area (s.y.)	12,000	20,700	23,800	25,500	29,300
Total Apron Area (s.y)	26,600	24,200	27,300	29,000	32,800

Source: Coffman Associates analysis

TERMINAL BUILDING FACILITIES

General aviation terminal facilities have several functions. Space is necessary for a pilots' lounge, flight planning, concessions, management, and storage. More advanced airports will have leasable space in the terminal building for such features as a restaurant, FBO line services, and other needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by FBOs in their hangars for these functions and services.

The methodology used in estimating general aviation terminal facility needs is based on the number of airport users expected to utilize general aviation facilities during the design hour. General aviation space requirements were then based upon providing 120 square feet per design hour itinerant passenger. Design hour itinerant passengers are determined by multiplying design hour itinerant operations by the number of passengers on the aircraft (multiplier). An increasing passenger count (from 1.9 to 2.3) is used to account for the likely increase in the number of passengers utilizing general aviation services. **Table 3Q** outlines the general aviation terminal facility space requirements for Philip Billard Municipal Airport.

TABLE 3Q
General Aviation Terminal Area Facilities
Philip Billard Municipal Airport

	Existing	Short Term	Intermediate Term	Long Term
Design Hour Operations	27	32	35	41
Design Hour Itinerant Operations	18	21	23	26
Multiplier	1.9	2.0	2.1	2.3
Total Design Hour Itinerant Passengers	35	43	48	60
Terminal Building Public Space (s.f.)[1]	4,350	5,100	5,700	7,200
Terminal Building Lease Space[2]	5,800	MTAA Business Decision		
Total Terminal Building Space	10,150	MTAA Business Decision		

[1]Includes FBO, MTAA, and other general aviation user functions.
[2]Includes restaurant and leasable office space.
Source: Coffman Associates analysis

The terminal building at Philip Billard Municipal Airport encompasses approximately 10,150 square feet of floor space. Of this total, 5,800 feet are leasable space that currently includes the restaurant and two offices. A total of 4,350 square feet is currently used for general aviation functions, which include the FBO line services, flight planning, and the pilots' lounge.

Terminal building calculations based on forecast passenger activity indicates that 7,200 square feet of space may be needed for general aviation function by the long term planning period. Options for utilizing existing space in the terminal building or for expanding the terminal building will be considered in the alternatives chapter of this master plan.

The airport terminal building is the entrance to the community for most air passengers utilizing the airport. It should be assumed that these passengers include decision-makers who may be considering investment in the community. Therefore, it is recommended that the airport sponsor be cognizant of the appearance of the airport and the terminal building in particular. Some communities will provide a separate general aviation terminal building, which may include additional amenities such as a restaurant or community conference room.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airside or landside facilities have also been identified. These other areas provide certain functions related to the overall operation of the airport.

AUTOMOBILE PARKING

Planning for adequate automobile parking is a necessary element for any airport. Parking needs can effectively be divided between transient airport users, locally based users, and airport business needs. Transient users include those employed at the airport and visitors, while locally based users primarily include those attending to their based aircraft. A planning standard of 1.9 times the design hour passenger count provides the minimum number of vehicle spaces needed for transient users. Locally based parking spaces are calculated as one-half the number of based aircraft.

A planning standard of 315 square feet per space is utilized to determine total vehicle parking area necessary, which includes area needed for circulation and handicap clearances. Parking requirements for the airport are summarized in **Table 3R**.

TABLE 3R
GA Vehicle Parking Requirements
Philip Billard Municipal Airport

	Existing	Short Term	Intermediate Term	Long Term
Design Hour Itinerant Passengers	35	43	48	60
VEHICLE PARKING SPACES				
GA Itinerant Spaces	96	81	91	114
GA Based Spaces	70	46	49	54
Airport Business/Office Parking Spaces	34	Individual Business Decision		
Total Parking Spaces	200	127	139	168
VEHICLE PARKING AREA				
GA Itinerant Parking Area (s.f.)	35,900	25,000	29,000	36,000
GA Based Parking Area (s.f.)	20,000	14,000	15,000	17,000
Airport Business Parking Area (s.f.)	7,000	Individual Business Decision		
Total Parking Area (s.f.)	62,900	39,000	44,000	53,000

Source: Coffman Associates analysis

There appears to be enough designated vehicle parking through the long term planning period. Parking should be made available in close proximity to the terminal building and airport businesses. In an effort to limit the level of vehicle traffic on the aircraft movement areas, many general aviation airports are providing separate parking in support of facilities with multiple aircraft parking positions, such as T-hangars. Vehicle parking spaces will be considered in conjunction with additional facility needs in the alternatives chapter.

AIRPORT ACCESS ROADS

NE Sardou Avenue is the main airport access road. This road provides access to the terminal area including the terminal building and the businesses located in the terminal area. NE Sardou Avenue terminates near the "Stone" hangar. An airport road then continues north to provide access to various hangars and airport businesses. This road provides direct access to the taxilanes and, ultimately, the runway and taxiway system. In an effort to limit the possibility of a driver who may be unfamiliar with the airport from entering aircraft movement areas, alternatives will be developed to restrict access to airport users.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF) FACILITIES

Only those airports that are certificated under Title 14 Code of Federal Regulations (CFR), Part 139, are required to have on-site firefighting capabilities. Philip Billard Municipal Airport is not a Part 139 airport and, therefore, is not required to have on-site firefighting capabilities.

Instead, the local fire department responds to airport emergencies. Topeka Fire Department, Station No. 6 is the closest to the airport. It is located at 1419 NE Seward, approximately 1.7 drive miles west of the airport. Station No. 7 is located north of the Kansas River at 934 NE Quincy St. This fire station is approximately 2.1 drive miles west of the airport.

FUEL STORAGE

The airport maintains an underground fuel farm on the apron in the north terminal area. There are two tanks: a 9,000 gallon tank for AvGas and an 8,000 gallon tank for Jet A. The airport FBO maintains four fuel delivery trucks. Two of the trucks are for AvGas and have capacities of 2,200 gallons and 750 gallons. Two of the trucks are for Jet A fuel and have capacities of 3,000 gallons and 2,200 gallons.

Additional fuel storage capacity should be planned when the airport is unable to maintain an adequate supply and reserve. While each airport (or FBO) determines their own desired reserve, a 14-day reserve is common for general aviation airports. When additional capacity is needed, it should be planned in 10,000 to 12,000 gallon increments. Common fuel tanker trucks have an 8,000-gallon capacity.

Table 3S presents a forecast of fuel demand through the planning period. Jet A fuel needs were forecast based on an average of 40 gallons purchased per air taxi operations. An additional 10 gallons per itinerant general aviation operation was assumed. For AvGas aviation fuel, five gallons per local operation was assumed.

TABLE 3S
Fuel Storage Requirements
Philip Billard Municipal Airport

		Planning Horizon		
	Current Capacity	**Short Term**	**Intermediate Term**	**Long Term**
Jet A Requirements	13,200			
Annual Usage (gal.)		425,500	459,500	537,500
Daily Usage (gal.)		1,166	1,259	1,473
14-Day Storage (gal.)		16,321	17,625	20,616
Avgas Requirements	11,950			
Annual Usage (gal.)		94,000	105,000	127,500
Daily Usage (gal.)		258	288	349
14-Day Storage (gal.)		3,605	4,027	4,890

Assumptions:

Jet A	40 gallons per air taxi operation.
	10 gallons per itinerant general aviation operation.
Avgas	5 gallons per general aviation local operation.

Source: FBO fuel sales; Coffman Associates analysis

By the estimates developed, the current capacity of AvGas is adequate through the long term planning period. The current capacity of Jet A fuel may be inadequate to maintain a two-week supply.

In addition to the need for greater capacity, underground fuel farms pose potential dangers from leaks. Where feasible, aged underground fuel storage should be replaced with above-ground facilities which are easier to monitor. In the alternatives chapter, an appropriate site for a new above-ground fuel farm will be considered.

PERIMETER FENCING

As discussed in Chapter One – Inventory, portions of the airport property have perimeter fencing. In the terminal area, there is three-foot high chain link fencing. There is six-foot high fencing surrounding the Kansas Highway Patrol facilities. Other areas of the airport property have intermittent fencing.

As a safety matter, additional fencing and perhaps key card access gates should be considered in the hangar areas to limit public access to these facilities. In addition, the airport is situated adjacent to the Kansas River which is a wildlife attractant. Consideration will be given to additional perimeter fencing that has the effect of limiting access to the airport by wildlife.

A summary of landside and support needs is presented on **Exhibit 3G**.

SECURITY RECOMMENDATIONS

In cooperation with representatives of the general aviation community, the Transportation Security Administration (TSA) published security guidelines for general aviation airports. These guidelines are contained in the publication entitled, *Security Guidelines for General Aviation Airports*, published in May 2004. Within this publication, the TSA recognized that general aviation is not a specific threat to national security. However, the TSA does believe that general aviation may be vulnerable to misuse by terrorists as security is enhanced in the commercial portions of aviation and at other transportation links.

To assist in defining which security methods are most appropriate for a general aviation airport, the TSA defined a series of airport characteristics that potentially affect an airport's security posture. These include:

1. Airport Location – An airport's proximity to areas with over 100,000 residents or sensitive sites that can affect its security posture. Greater security emphasis should be given to airports within 30 miles of mass population centers (areas with over 100,000 residents) or sensitive areas such as military installations, nuclear and chemical plants, centers of government, national monuments, and/or international ports.

2. Based Aircraft – A smaller number of based aircraft increases the likelihood that illegal activities will be identified more quickly. Airports with based aircraft weighing more than 12,500 pounds warrant greater security measures.

3. Runways – Airports with longer paved runways are able to serve larger aircraft. Shorter runways are less attractive as they cannot accommodate the larger aircraft which have more potential for damage.

4. Operations – The number and type of operations should be considered in the security assessment.

Table 3T summarizes the recommended airport characteristics and ranking criterion. The TSA suggests that an airport rank its security posture according to this scale to determine the types of security enhancements that may be appropriate. As shown in the table, the Philip Billard Municipal Airport ranking on this scale is 33. Points are assessed for the airport being located near a center of government, in this case the state capital of Kansas. Points are also assessed for a based aircraft count of 88, having a runway greater than 5,001 feet in length, having a paved runway surface, having 14 CFR Part 135 charter operations, and for having flight training and rental aircraft activities at the airport. In addition, the airport having more than 50,000 annual operations, and major airframe maintenance and repair capabilities, enhances the need for adequate security.

TABLE 3T
General Aviation Airport Security Measurement Tool
Transportation Security Administration

	Assessment Scale	
Security Characteristic	**Public Use Airport**	**Philip Billard Municipal Airport**
Location		
Within 20nm of mass population areas[1]	5	0
Within 30nm of a sensitive site[2]	4	4
Falls within outer perimeter of Class B airspace	3	0
Falls within boundaries of restricted airspace	3	0
Based Aircraft		
Greater than 101 based aircraft	3	0
26-100 based aircraft	2	2
11-25 based aircraft	1	0
10 or fewer based aircraft	0	0
Based aircraft over 12,500 pounds	3	0
Runways		
Runway length greater than 5,001 feet	5	5
Runways less than 5,000 feet and greater than 2,001 feet	4	0
Runway length less than 2,000 feet	2	0
Asphalt or concrete runway	1	1
Operations		
Over 50,000 annual operations	4	4
Part 135 operations (Air taxi and fractionals)	3	3
Part 137 operations (Agricultural aircraft)	3	3
Part 125 operations (20 or more passenger seats)	3	0
Flight training	3	3
Flight training in aircraft over 12,500 pounds	4	0
Rental aircraft	4	4
Maintenance, repair, and overhaul facilities conducting long-term storage of aircraft over 12,500 pounds	4	4
Totals	**64**	**33**

[1] An area with a population over 100,000
[2] Sensitive sites include military installations, nuclear and chemical plants, centers of government, national monuments, and/or international ports

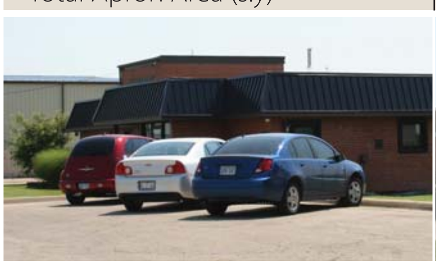
Source: Security Guidelines for General Aviation Airports (TSA 2004)

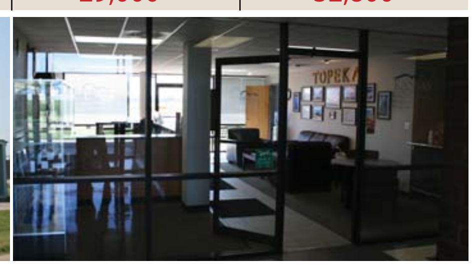
PHILIP BILLARD MUNICIPAL AIRPORT

	Base Year (2012)	Short Term	Intermediate Term	Long Term
Based Aircraft	**88**	**92**	**97**	**107**
Aircraft to be Hangared				
Single Engine	74	76	79	85
Multi-Engine	6	6	6	6
Turboprop	1	2	3	4
Jet	2	3	4	5
Helicopter	2	2	2	3
Other/Experimental	3	3	3	4
Total to be Hangared	**88**	**92**	**97**	**107**



	Base Year (2012)	Short Term	Intermediate Term	Long Term
Hangar Positions				
T-Hangars Positions	76	68	70	76
Box Hangar Positions	8	11	12	14
Conventional Hangar Positions	20	13	14	17
Hangar Area				
T-Hangars (s.f.)	89,500	81,000	84,000	91,000
Executive Box Hangar (s.f.)	15,500	28,000	31,000	34,000
Conventional Hangar (s.f.)	43,800	33,000	35,000	43,000
Maintenance Area (s.f.)	22,600	16,000	17,000	19,000
Aircraft Parking				
Local Apron Positions	17	10	10	10
Local Apron Area (s.y.)	14,600	3,500	3,500	3,500
Transient Apron Positions	11	25	27	31
Piston Transient Positions	8	20	21	24
Turbine Transient Positions	3	5	5	6
Transient Apron Area (s.y.)	12,000	23,800	25,500	29,300
Total Apron Area (s.y)	26,600	27,300	29,000	32,800





	Base Year (2012)	Short Term	Intermediate Term	Long Term
Auto Parking				
Total Spaces	200	127	139	168
Total Area (s.f.)	62,900	39,000	44,000	53,000
Terminal Building				
Area (s.f.)	4,350	5,100	5,700	7,200

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Exhibit 3G
LANDSIDE REQUIREMENTS

As shown in **Table 3U**, a rating of 33 points places Philip Billard Municipal Airport in the second tier ranking of security measures by the TSA. This rating clearly illustrates the importance of meeting security needs at Philip Billard Municipal Airport as the activity at the airport grows. The airport is not projected to transition to the first tier during the planning period. Based upon the results of the security assessment, the TSA recommends 13 potential security enhancements for Philip Billard Municipal Airport. These enhancements are discussed in detail as follows:

TABLE 3U
Recommended Security Enhancements

	Points Determined Through Airport Security Characteristics Assessment			
Security Enhancements	**Tier 1 > 45**	**Tier 2 25-44**	**Tier 3 15-24**	**Tier 4 0-14**
Fencing	■			
Hangars	■			
Closed-Circuit Television (CCTV)	■			
Intrusion Detection System	■			
Access Controls	■	■		
Lighting System	■	■		
Personal ID/Vehicle ID System	■	■		
Challenge Procedures	■	■		
Law Enforcement Support	■	■	■	
Security Committee	■	■	■	
Transient Pilot Sign-in/Sign-Out Procedures	■	■	■	
Signs	■	■	■	
Documented Security Procedures	■	■	■	■
Positive/Passenger/Cargo/Baggage ID	■	■	■	■
Aircraft Security	■	■	■	■
Community Watch Program	■	■	■	■
Contact List	■	■	■	■

Source: Security Guidelines for General Aviation Airports

Access Controls: To delineate and adequately protect security areas from unauthorized access, it is important to consider boundary measures such as fencing, walls, or other physical barriers, electronic boundaries (e.g., sensor lines, alarms), and/or natural barriers. Physical barriers can be used to deter and delay the access of unauthorized persons onto sensitive areas of airports. Such structures are usually permanent and are designed to be a visual and psychological deterrent as well as a physical barrier. The airport provides perimeter fencing with access control gates for both vehicles and pedestrians.

Lighting System: Protective lighting provides a means of continuing a degree of protection from theft, vandalism, or other illegal activity at night. Security lighting systems should be connected to an emergency power source, if available.

Personal ID System: This refers to a method of identifying airport employees or authorized tenants and allowing access to various areas of the airport through badges or biometric controls.

Vehicle ID System: This refers to an identification system which can assist airport personnel and law enforcement in identifying authorized vehicles. Vehicles can be identified through the use of decals, stickers, or hang tags.

Challenge Procedures: This involves an airport watch program which is implemented in cooperation with airport users and tenants to be on guard for unauthorized and potentially illegal activities at the airport.

Law Enforcement Support: This involves establishing and maintaining a liaison with appropriate law enforcement including local, state, and federal agencies. These organizations can better serve the airport when they are familiar with airport operating procedures, facilities, and normal activities. Procedures may be developed to have local law enforcement personnel regularly or randomly patrol ramps and aircraft hangar areas, with increased patrols during periods of heightened security.

Security Committee: This committee should be composed of airport tenants and users drawn from all segments of the airport community. The main goal of this group is to involve airport stakeholders in developing effective and reasonable security measures and disseminating timely security information.

Transient Pilot Sign-in/Sign-Out Procedures: This involves establishing procedures to identify non-based pilots and aircraft using their facilities, and implementing sign-in/sign-out procedures for all transient operators and associating them with their parked aircraft. Having assigned spots for transient parking areas can help to easily identify transient aircraft on an apron.

Signs: The use of signs provides a deterrent by warning of facility boundaries as well as notifying of the consequences for violation.

Documented Security Procedures: This refers to having a written security plan. This plan would include documenting the security initiatives already in place at Philip Billard Municipal Airport, as well as any new enhancements. This document should consist of airport and local law enforcement contact information, and include utilization of a program to increase airport user awareness of security precautions such as an airport watch program.

Positive/Passenger/Cargo/Baggage ID: A key point to remember regarding general aviation passengers is that the persons boarding these flights are generally better known to airport personnel and aircraft operators than the typical passenger on a commercial airliner. Recreational general aviation passengers are typically friends, family, or acquaintances of the pilot in command. Charter/ sightseeing passengers typically will meet with the pilot or other flight department personnel well in advance of any flights. Suspicious activities, such as use of cash for flights or probing or inappropriate questions, are more likely to be quickly noted and authorities could be alerted. For corporate operations, typically all parties onboard the aircraft are known to the pilots. Airport operators should develop methods by which individuals visiting the airport can be escorted into and out of aircraft movement and parking areas.

Aircraft Security: The main goal of this security enhancement is to prevent the intentional misuse of general aviation aircraft for criminal purposes. Proper securing of aircraft is the most basic method of enhancing general aviation airport security. Pilots should employ multiple methods of securing their aircraft to make it as difficult as possible for an unauthorized person to gain access to it. Some basic methods of securing a general aviation aircraft include: ensuring that door locks are consistently used to prevent unauthorized access or tampering with the aircraft; using keyed ignitions where appropriate; storing the aircraft in a hangar, if available; and locking hangar doors, using an auxiliary lock to further protect aircraft from unauthorized use (i.e., propeller, throttle, and/or tie-down locks); and ensuring that aircraft ignition keys are not stored inside the aircraft.

Community Watch Program: The vigilance of airport users is one of the most prevalent methods of enhancing security at general aviation airports. Typically, the user population is familiar with those individuals who have a valid purpose for being on the airport property. Consequently, new faces are quickly noticed. A watch program should include elements similar to those listed below. These recommendations are not all-inclusive. Additional measures that are specific to each airport should be added as appropriate, including:

- Coordinate the program with all appropriate stakeholders, including airport officials, pilots, businesses, and/or other airport users.

- Hold periodic meetings with the airport community.

- Develop and circulate reporting procedures to all who have a regular presence on the airport.

- Encourage proactive participation in aircraft and facility security and heightened awareness measures. This should include encouraging airport and line staff to "query" unknowns on ramps, near aircraft, etc.

- Post signs promoting the program, warning that the airport is watched. Include appropriate emergency phone numbers on the sign.

- Install a bulletin board for posting security information and meeting notices.

- Provide training to all involved for recognizing suspicious activity and appropriate response tactics.

Contact List: This involves the development of a comprehensive list of responsible personnel/agencies to be contacted in the event of an emergency procedure. The list should be distributed to all appropriate individuals. Additionally, in the event of a security incident, it is essential that first responders and airport management have the capability to communicate. Where possible, coordinate radio communication and establish common frequencies and procedures to establish a radio communications network with local law enforcement.

Other security measures may be considered by the airport as the local need demands. The additional measures include full perimeter fencing, hangar availability, closed-circuit television, and intrusion detection systems.

FRACTIONAL JET OPERATOR SECURITY REQUIREMENTS

The major fractional jet operators have established minimum standards for airports serving their aircraft. These minimum standard documents specify the following general security requirements:

Identification: The airport should issue unique identification badges for employees who have access to the aircraft operations areas. Unescorted passenger access to the ramp is prohibited.

Employees: The airport must conduct FAA-compliant background checks on each employee. The airport must have pre-employment drug screening.

Aircraft Security: Aircraft cannot be left unattended when the ground power unit or auxiliary power unit is operating. Aircraft must be locked when unattended. Aircraft must be parked in well-lit, highly visible areas with a minimum of six-foot chain link fencing. Security cameras are preferred. Sightseers or visitors are not allowed access aboard or near aircraft.

Facility Security: Visual surveillance of all aircraft operational areas belonging to the airport is required. The airport shall establish controlled access to the aircraft operational areas. The airport should maintain at least six feet between safety fence and parked ground equipment. Bushes and shrubs must be less than four feet in height.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demand projected for Philip Billard Municipal Airport for the next 20 years. In an effort to provide a more flexible master plan, the yearly forecasts from Chapter Two have been converted to planning horizon levels. The short term roughly corresponds to a five-year time frame, the intermediate term is approximately 10 years, and the long term is 20 years. By utilizing planning horizons, airport management can focus on demand indicators for initiating projects and grant requests rather than on specific dates in the future.

Runway 13-31 has been planned and designed to meet FAA design standards associated with RDC C-II-2400. This category includes most small- and medium-size business jets, such as the Cessna Citation X, Dassault Falcon 900EX, and Bombardier Challenger 604. Operational trends at the airport indicate that a larger percentage of business jet activity is by larger aircraft; however, their numbers are not anticipated to change the current RDC for the runway.

Runway 18-36 and Runway 4-22 are planned and designed to RDC B-II-NPI1. This standard is to be maintained for Runway 18-36. Runway 4-22 is planned to be closed in the future primarily due to its redundancy with Runway 18-36, local cost to maintain, and contribution to the airfield hot spot.

As a general aviation airport that experiences frequent activity by business jets, the FAA recommends a runway length of 5,500 feet to accommodate the needs of 75 percent of the business jet fleet at 60 percent useful load. At 5,099 feet in length, Runway 13-31 does not currently meet this recommendation. To meet the needs of 100 percent of business jets at 60 percent useful load, a runway length of 5,700 feet is recommended. The alternatives chapter will explore options for extending the runway to 5,500 and 5,700 feet.

Runway 18-36, at 4,331 feet in length, meets the needs for a crosswind runway. This runway should be maintained in its current configuration. Runway 4-22 is not eligible for capital grant funding from the FAA. As such, the runway has been planned for closure in the past. While closure is one option, the alternatives discussion will consider alternatives such as conversion to a taxiway, or long term preservation. Each option for the runway will impact the planned geometry of the taxiway system.

On the landside, planning calculations show a need for additional hangars. Specifically, there is a need for additional box hangar space. Hangar space will largely depend on individual desires and may not precisely follow the forecast. If demand indicates a desire for additional T-hangars, then these should be the first priority. The availability of additional hangar space is a significant factor as to whether the airport will experience and can accommodate the forecast growth in based aircraft.

Surface road access to the airport is an important planning consideration. Of particular concern is the current layout of the road providing direct access to the taxilane and, ultimately, the runway system. Potential intermixing of aircraft and vehicles in this manner should be avoided.

The next chapter, Alternatives, will examine potential improvements to the airfield system and the landside. Most of the alternatives discussion will focus on those capital improvements that would be eligible for federal grant funds. Other projects of local concern will also be presented. On the landside, several facility layouts that meet the forecast demands over the next 20 years will be presented. Ultimately, an overall airport layout that presents a vision beyond the 20-year scope of the master plan will be developed.

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Chapter 4

ALTERNATIVES

Chapter Four

ALTERNATIVES

In the previous chapter, airside and landside facilities required to satisfy the demand through the long range planning period were identified. The next step in the planning process is to evaluate reasonable ways these facilities can be provided. There can be numerous combinations of design alternatives, but the alternatives presented here are those with the perceived greatest potential for implementation.

Any development proposed for a master plan is evolved from an analysis of projected needs for a set period of time. Though the needs were determined by utilizing industry accepted statistical methodologies, unforeseen future events could impact the timing of the needs identified. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands for the next 20 years. However, no plan of action should be developed which may be inconsistent with the future goals and objectives of the Metropolitan Topeka Airport Authority and the citizens of Topeka, who have a vested interest in the development and operation of the airport.

The development alternatives for Philip Billard Municipal Airport can be categorized into two functional areas: the **airside** (runways, navigational aids, taxiways, etc.) and **landside** (hangars, apron, and terminal area). Within each of these areas, specific capabilities and facilities is required or desired. In addition, the utilization of airport property to provide revenue support for the airport and to benefit the economic development and well-being of the region must be considered.

Each functional area interrelates and affects the development potential of the others. Therefore, all areas are examined individually and then coordinated as a

whole to ensure the final plan is functional, efficient, and cost-effective. The total impact of all these factors on the existing airport must be evaluated to determine if the investment in Philip Billard Municipal Airport will meet the needs of the community, both during and beyond the 20-year planning period.

The alternatives considered are compared using environmental, economic, and aviation factors to determine which of the alternatives will best fulfill the local aviation needs. With this information, as well as input from various airport stakeholders, a final airport concept can evolve into a realistic development plan.

NON-DEVELOPMENT ALTERNATIVES

Prior to the presentation of development alternatives, for Philip Billard Municipal Airport there are several non-development options that should be considered. Non-development alternatives include a "no-build" or "do-nothing" alternative, development of a new replacement airport at a new location, or closure of the existing airport and the transfer of services to another existing airport.

There are two airports serving the aviation needs of the citizens of Topeka and the surrounding region: Topeka Regional Airport and Philip Billard Municipal Airport. The airports are approximately ten driving miles apart. There is some cross-over of services provided by the two airports; however, each provides some unique services that the other does not.

Philip Billard Municipal Airport is classified as a local general aviation airport in the *National Plan of Integrated Airport Systems* (NPIAS). It is classified as a Regional airport in the *2009 Kansas Airport System Plan* (KASP). Topeka Regional Airport is classified as a nonhub primary commercial service airport in the NPIAS. It is classified as a commercial service airport in the 2009 KASP. Philip Billard Municipal Airport supports approximately 57,000 annual operations, while Topeka Regional Airport experiences approximately 24,000 annual operations.

Philip Billard Municipal Airport serves the needs of the general aviation community. It has a fixed base operator and a dedicated aircraft maintenance business, as well as several other aviation and non-aviation businesses. The airport also supports the Kansas Highway Patrol (KHP) operations which include operations of state-owned aircraft, including one utilized by the governor, and facilities. Philip Billard Municipal Airport is also closer to the central business district and the capital.

Topeka Regional Airport serves a larger component of the aviation industry and it has a significant role to play in national defense. Military service members from nearby Fort Riley use the airfield as a departure and arrival point for deployments. The 190th Air Refueling Wing of the Kansas Air National Guard bases 12 KC-135 aircraft at the airport and conducts daily training at the airport. Topeka Regional Airport shares access to the airfield with the Army National Guard and the Kansas Air National Guard.

The airports are independent economic engines for the Topeka region. The 2010 *Kansas Aviation Economic Impact Study* showed that both airports have a significant impact on the local economy. Philip Billard Municipal Airport is responsible for 199 jobs, $6.8 million in total payroll and $14.3 million in total output. Topeka Regional Airport is responsible for 1,303 jobs, $54.1 million in total payroll, and $100 million in total output.

Both airports have benefited from various development grants over the years. Development grants come with certain grant assurances that the airport sponsor must meet to be in compliance with the award of the grant. One of the grant assurances is for the sponsor to maintain the improvement for its useful life, typically 20 years. Acceptance of development grants also obligates the airport sponsor to maintain the airport as an airport.

The following will present a discussion of the three primary non-development alternatives and the impact of pursuing each.

NO-BUILD/DO-NOTHING ALTERNATIVE

There is significant public and private investment at the airport. Pursuit of a non-development alternative would slowly devalue these investments, lead to infrastructure deterioration, and potentially the loss of significant levels of federal funding for airport improvements. Ultimately, the safety of aircraft, pilots, and persons on the ground could be jeopardized. Therefore, the no-build/do-nothing alternatives are not considered further.

RELOCATE AIRPORT ALTERNATIVE

This option considers constructing a new airport to replace the existing Philip Billard Municipal Airport. Typically, this option may be considered if the existing airport has been encroached upon by surrounding incompatible land uses to such a degree that safety has been compromised. This is not the situation for Philip Billard Municipal Airport. In addition, there is already a second airport in the region; therefore, replacing Philip Billard Municipal Airport with a newly constructed airport is not reasonable. Constructing a replacement airport will not be considered further.

TRANSFER SERVICE TO ANOTHER AIRPORT ALTERNATIVE

Under this scenario, Philip Billard Municipal Airport would be closed and all activity would be transferred to Topeka Regional Airport. Without consideration of the consequences, obligations, or costs of closure, Topeka Regional Airport could theoretically absorb a transfer of activity and facilities from Philip Billard Municipal Airport.

The Metropolitan Topeka Airport Authority is the governing body in charge of operating and managing Philip Billard Municipal Airport. As the airport sponsor, they would have to initiate and lead any effort to close the airport. From an economic standpoint, the Airport Authority would have to refund to the FAA the prorated portion of any federal dollars invested at the airport. The other option is to choose not to request or accept any further federal grants and wait for current grant obligations to expire.

The Airport Authority would have to also develop a plan to accommodate existing tenants and lease holders. This could be accomplished by buying out the remaining lease terms or allowing existing leases to expire. Any improvements made to existing hangars would also have to be reimbursed to the tenant. The Airport Authority would have to pay for the relocation of aircraft and other private property and there are additional costs associated with the relocation of existing businesses. The relocation costs would include through-the-fence operators that have agreement for access to the runway and taxiway system (e.g., Kansas Highway Patrol).

In addition, the Airport Authority would lose the investment they have made through the years to maintain and improve the airport. In short, it would be very time-consuming and costly to close Philip Billard Municipal Airport so as to relocate services to Topeka Regional Airport.

Closure of Philip Billard Municipal Airport should only be considered under certain circumstances. One would be if the airport is operating at a deficit to such a degree that the long term cost of closure would significantly outweigh the cost of maintaining the airport. The other possibility would be if political pressure were brought to bear to force consideration of transferring services.

SUMMARY

Philip Billard Municipal Airport plays a critical role in the economic development of the region and an important role in the continuity of the national aviation network. Pursuing a no-build/do-nothing alternative will directly lead to a deterioration of airport facilities including the runways and taxiways. Ultimately, safety could be compromised.

Construction of a replacement airport is not necessary as the airport is able to serve its defined role in the aviation system currently (that of general aviation activity). Since there is already another airport in the area, Topeka Regional Airport, construction of a replacement airport does not address any perceived duplication of service that may exist today.

Closure of Philip Billard Municipal Airport and transferring activity to Topeka Regional Airport is not considered feasible primarily due to legal obligations and the substantial costs associated with closure. Federal grant assurances necessitate that the airport remain in operation until grant assurances expire. Even if the Airport Authority were to wait for the expiration for grant assurances, the cost to relocate the current tenants, including the Kansas Highway Patrol, would be substantial.

Therefore, it is recommended that the Metropolitan Topeka Airport Authority continue to maintain the two-airport system to serve the aviation and economic development needs of the greater Topeka region. No further consideration will be given to the non-development alternatives.

AIRPORT DEVELOPMENT OBJECTIVES

It is the goal of this effort to produce a balanced development plan to best serve forecast aviation demands. However, before defining and evaluating specific alternatives, airport development objectives should be considered. As owner and operator, the Metropolitan Topeka Airport Authority provides the overall guidance for the operation and development of the airport. It is of primary concern that the airport is marketed, developed, and operated for the betterment of the community and its users. With this in mind, the following development objectives have been defined for this planning effort:

- To preserve and protect public and private investments in existing airport facilities.
- To develop a safe, attractive, and efficient aviation facility in accordance with applicable federal, state, and local regulations.

- To develop a balanced facility that is responsive to the current and long term needs of all general aviation users.

- To be reflective and supportive of the long term planning efforts currently applicable to the region.

- To develop a facility with a focus on self-sufficiency in both operational and developmental cost recovery.

- To ensure that future development is environmentally compatible.

REVIEW OF THE PREVIOUS AIRPORT PLAN

The last master plan was begun in 2000 and final approval was received in 2002. **Exhibit 4A** presents the master plan concept from 2002. On the airside, the previous plan considered the following major elements:

- Acquire and clear portions of the Runway 13 RPZ, including structures that are not currently owned by the airport. This encompasses approximately 11.13 acres.
- Various pavement maintenance projects.
- Narrow Runway 13-31 from 150 feet in width to 100 feet in width to meet design standards for ARC C-II aircraft.
- Extend Runway 13-31 to the southeast by 401 feet bringing the total length to 5,500 feet.
- Extend Taxiway C to the new Runway 31 threshold.
- Close/abandon Runway 4-22.
- Narrow all taxiways to 35 feet in width.

On the landside, the following major improvements were considered for the master plan:

- Incrementally expand the main terminal area aircraft apron to the southeast to accommodate additional tie-down positions and to provide access to future hangar development.
- Install terminal area airport perimeter fencing including auto access gates to restrict access to the western T-hangar area.
- Planning for additional conventional hangars and T-hangars in the southwest portion of the airport and box hangars west of the existing T-hangars.
- Widen the airport access road from 18 feet to 24 feet to better accommodate larger vehicles and additional vehicle parking.
- Areas west of the terminal area and north of the airport entrance road were identified for non-aviation related revenue enhancement development opportunities.

The previous airport master plan successfully provided the Airport Authority with development guidance for more than a decade. In this time, there have been many changes within the aviation industry and within the regulatory environment. Of particular note is the 2012 update of the primary airport planning guidance provided by the FAA. Application of the new guidance will have a direct impact on the planning potential for the airport.

The analysis to follow in this alternatives chapter will revisit the recommendations presented in the previous master plan. Some elements may be carried over to this master plan and others may be removed from future consideration.

AIRSIDE PLANNING CONSIDERATIONS

Generally, airside issues relate to those airport elements that contribute to the safe and efficient transition of aircraft and passengers from air transportation to the landside facilities at the airport. This includes the established design standard for the airport, the instrument approach capability, the capacity of the airfield, the length and strength of the runways, and the layout of the taxiways. Each of these elements was introduced in the previous chapters. This chapter will examine airside issues specific to Philip Billard Municipal Airport. These will then be applied to several airside development alternatives. **Exhibit 4B** presents a summary of the primary airside and landside planning issues to be considered in this alternatives analysis.

As discussed in the Facility Requirements chapter of this master plan, a Runway Design Code (RDC) is applied to each runway in order to identify the appropriate design standards to apply to the runway and taxiway system. The RDC for Runway 13-31 is planned to remain C-II. The RDC for Runway 18-36 and 4-22 is planned to remain in B-II. The applicable design standards were previously presented on Table 3F.

RUNWAY ALTERNATIVES

Runway 13-31

Runway 13-31 is 5,099 feet long and 100 feet wide. Analysis in Chapter Three - Facility Requirements indicated that a minimum recommended length would be 5,500 feet. At this length, the airport could fully accommodate 75 percent of business jets at 60 percent useful load. To accommodate 100 percent of business jets at 60 percent useful load, a runway length of 5,700 feet is recommended.

Option 1: Maintain Current Length

There are several options to consider with regard to the length of Runway 13-31. The first is to maintain the current length. At 5,099 feet in length, the runway is 401 feet short of the FAA recommended length. However, this has been the length of the runway for decades. On those occasions when operators may desire additional runway length, they have other options. They could take on less weight by reducing fuel load or passenger and baggage weight or they could utilize Topeka Regional Airport instead of Philip Billard Municipal Airport. Maintaining the current runway length is a viable option for MTAA considering that they have a two-airport system that can complement one another.

Option 2: Runway Extension

When considering a potential extension of Runway 13-31, there are several options available. Additional length could be added to one end or the other, or the planned extension could be split between the two ends. For planning purposes, runway extension options will consider adding a total of 601 feet in order to assess the potential impacts of the longest length to be considered.

The first extension option considered for Runway 13-31 is to add 601 feet of length to the Runway 31 end for a total length of 5,700 feet. There is enough space to accommodate the extension and the required safety areas; however, the runway protection zone (RPZ) would be shifted to

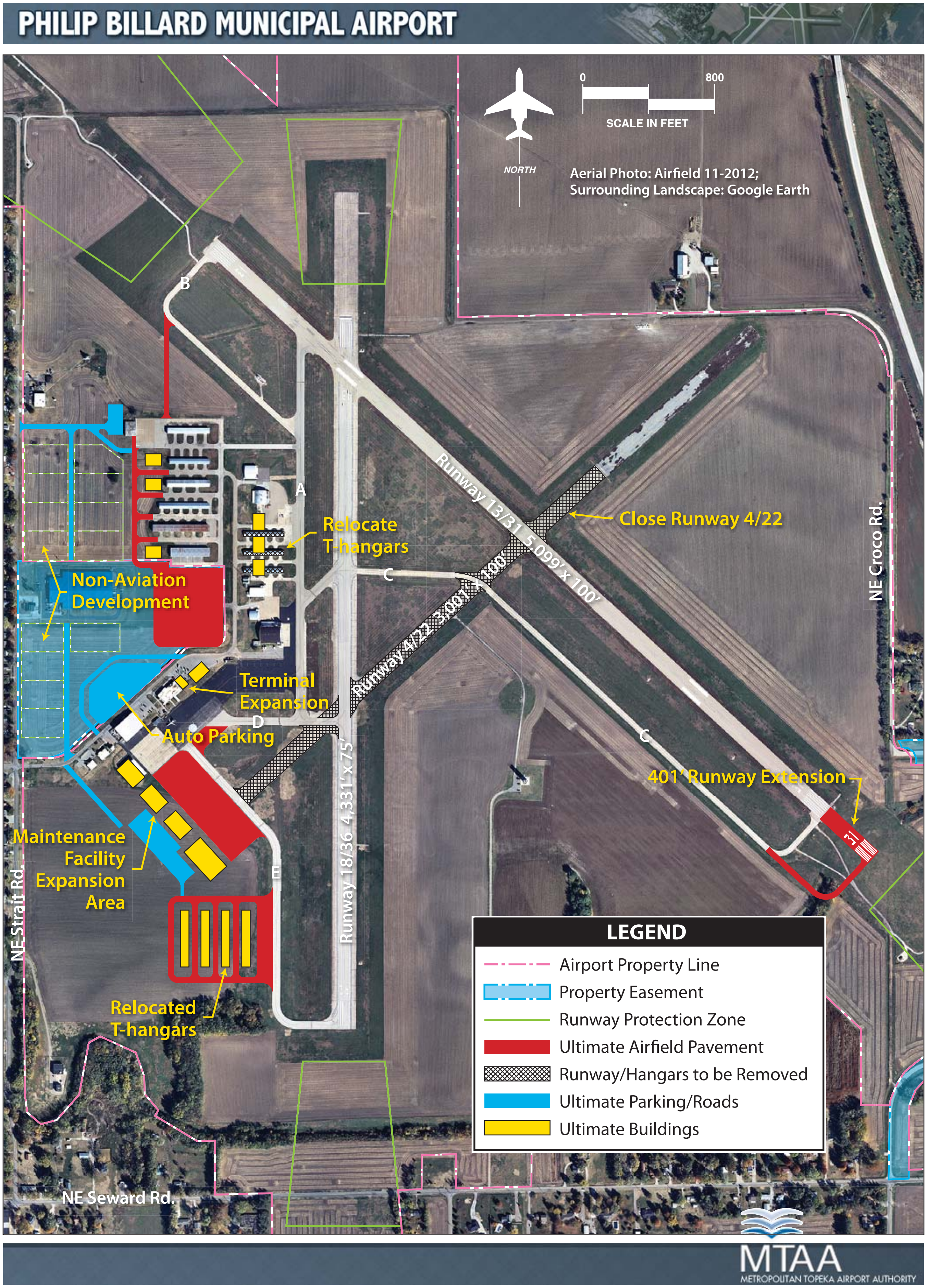

Exhibit 4A
2002 AIRPORT LAYOUT PLAN

PHILIP BILLARD MUNICIPAL AIRPORT

PRIMARY AIRSIDE PLANNING CONSIDERATION

- Primary Runway Length: Examine impacts of increasing the length of Runway 13-31 from 5,099 feet to 5,700 feet.
- Runway 18 Taxiway Access: Plan for threshold taxiway access to Runway 18 including option to extend the runway to provide access.
- Runway 4-22 Options: Consider closure, maintenance or resurfacing (including AvTurf)
- Hot Spot Mitigation: Examine alternatives to mitigate the FAA identified Hot Spot.
- Taxiway Layout: Analyze existing taxiway layout and redesign as necessary to meet current FAA design standards.
- Navigational Aids: Preserve the Instrument Landing System (ILS) to Runway 13. Consider improved instrument approach to Runway 31, 18, and 36.
- Safety Areas: Insure that any planned changes to the runway/taxiway system meets Runway Safety Area (RSA), Object Free Area (OFA), Obstacle Free Zone (OFZ), and Runway Protection Zones (RPZ), design standards.



PRIMARY LANDSIDE PLANNING CONSIDERATIONS

- Separation of Activity Levels: Plan facilities so that similar activity types are grouped together in order to limit potential interaction of large and small aircraft.
- Facility Layout: Maximize airport property for aviation related development.
- Examine options to reduce inadvertent automobile access to aircraft movement areas.
- Examine options to insure clearance standards are met surrounding taxilanes, particularly the taxilane leading to the Kansas Highway Patrol hangar.
- Airport Land Uses: Designate airport land uses for aviation and non-aviation revenue enhancement development.
- Strategic Land Acquisition: Provide recommendations and prioritization of land acquisition needs.
- Hangar Development: Identify areas for locating future T-hangars, box hangars, and conventional hangars.
- Long Term Vision: Provide a long term facility layout for the airport that extends beyond the 20-year scope of this master plan in order to preserve the very long term viability of the airport.



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Exhibit 4B
AIRPORT PLANNING CONSIDERATIONS

the southeast as well and would extend over the Oakland Expressway interchange at NE Seward Road. As discussed previously, the RPZ should be clear of incompatibilities, including public roads. While the current RPZ does cross over Crocos Road and a small portion of the exit ramp from southbound lanes of the Oakland Expressway, this current condition is generally considered acceptable because it existed before the publication of new guidance related to RPZs published in September 2012. In essence, the current condition is grandfathered. The extension would move the RPZ further to the southeast and would encompass more of the public roads. To pursue this option would require specific approval from FAA headquarters.

FAA approval of a shift of the Runway 31 RPZ to encompass more of the public roads would require a detailed analysis and justification. Since the extension is not critical to the current operations occurring at the airport, FAA support is unlikely. Therefore, extension of the runway to the southeast is not considered further.

The remaining option is to extend Runway 13 to the northwest by 601 feet. While space is available to accommodate the pavement extension, the runway safety area (RSA) and object free area (OFA) would cross two roads currently open to the public (Strait Ave. and NE Center Ave.). These roads would have to be closed to the public and graded to meet the RSA standards.

Runway 13 currently supports an approach lighting system (MALSR) that is a required component of the Instrument Landing System (ILS). The MALSR allows the airport to have the CAT-I instrument approach to Runway 13 (in conjunction with the localizer antenna and the glide slope antenna). The CAT-I instrument approach is desirable as it extends the capability of the airport to poor weather conditions (as low as ½-mile visibility and 200-foot cloud ceilings). Any extension of the runway to the northwest would require the MALSR to be physically relocated as well.

With the rapid advancement of NextGen (satellite navigation), the FAA has been reluctant to install or relocate ILS equipment except at busy commercial service airports. A possible scenario, if the runway were extended to the northwest, would be for the FAA to decommission the existing ILS and replace it with a GPS instrument approach. A new or relocated MALSR would still be required to maintain CAT-I minimums. As of 2013, standalone (without an underlying ILS) CAT-I GPS instrument approaches are rare; however, it is a goal of the FAA, through the NextGen initiative, to implement such instrument approaches.

Extending the runway to the northwest could lead to the loss of the ILS to Runway 13 for some period of time. To obtain an instrument approach with the same minimums as the current ILS, the MALSR would have to be relocated and a GPS instrument approach approved.

There are some benefits to planning for an extension of the runway to the northwest. The first is that the airport could fully accommodate 100 percent of the business jet fleet at 60 percent useful load with the additional runway length. The second is that the extension would necessarily shift the RPZ, thereby removing some incompatibilities from the RPZ. **Exhibit 4C** shows the current and potential future disposition of the incompatibilities within the Runway 13 RPZ. The result would be the removal of three structures from the RPZ and introduction of one new structure (a residence).

Runway 18-36

Runway 18-36 is 4,331 feet long and 75 feet wide. This runway currently meets the length and width recommendations for a crosswind runway at Philip Billard Municipal Airport. The most concerning issue with the runway is that there is no taxiway access to the Runway 18 threshold. Pilots desiring to depart to the south via Runway 18 must back-taxi on the runway or simply begin their takeoff run where they enter the runway (typically at the intersection off Runway 18-36 and Runway 13-31). Neither of these options is optimal and represents an unusual and potentially confusing maneuver that a pilot must make. Certainly, the potential for a runway incursion or an unsafe condition is elevated with the current layout.

Runway 18-36 is highly utilized at the airport accounting for as much as 70 percent of operations. Because of these high-activity levels, this runway should have a physical layout that is more familiar to pilots. In this case, there should be a threshold taxiway that is 90 degrees perpendicular to the Runway 18 threshold. Several factors must be considered when planning for this layout.

It is not feasible to simply construct a threshold taxiway to Runway 18 that connects with Taxiway A. This connection point would be on Runway 13-31 which would place holding aircraft on Runway 13-31. Instead, the threshold taxiway must allow for holding aircraft to be outside the RSA for any runway. As a result, the runway must either be shortened or lengthened to allow for threshold taxiway access. Shortening the runway is not considered feasible since the current runway length is the minimum recommended for a crosswind runway. Therefore, extension of Runway 18 to the north to a length that meets design standards and allows for aircraft to hold short is considered.

An extension of 469 feet would provide the necessary margin of safety for holding aircraft. Therefore, this option, as shown on **Exhibit 4D**, considers extending both Runway 18-36 and Taxiway A to the north. Planning for the extension of the runway is for safety purposes and not from a need for additional length. Nonetheless, the additional length would have a positive impact on the efficiency of aircraft operations. Many of those aircraft that cannot utilize Runway 18-36 due to length limitations may be able to utilize a runway that is 4,800 feet long. In fact, at 4,800 feet in length, the runway could accommodate a portion of the small and medium business jet fleet if necessary. Technically, at 4,800 feet in length the runway could accommodate 75 percent of business jets at 60 percent useful load in dry conditions. This would be an excellent benefit to the airport, especially for those times when Runway 13-31 is closed (e.g., maintenance, accident).

Runway 4-22

The future disposition of Runway 4-22 is an important consideration. As discussed in Chapter Three – Facility Requirements, the runway provides redundancy as a crosswind runway. It is not currently eligible for FAA development grants, including for maintenance issues; however, it is eligible for state grants. Runway 4-22 is the least utilized runway accounting for an estimate of five percent of annual operations.

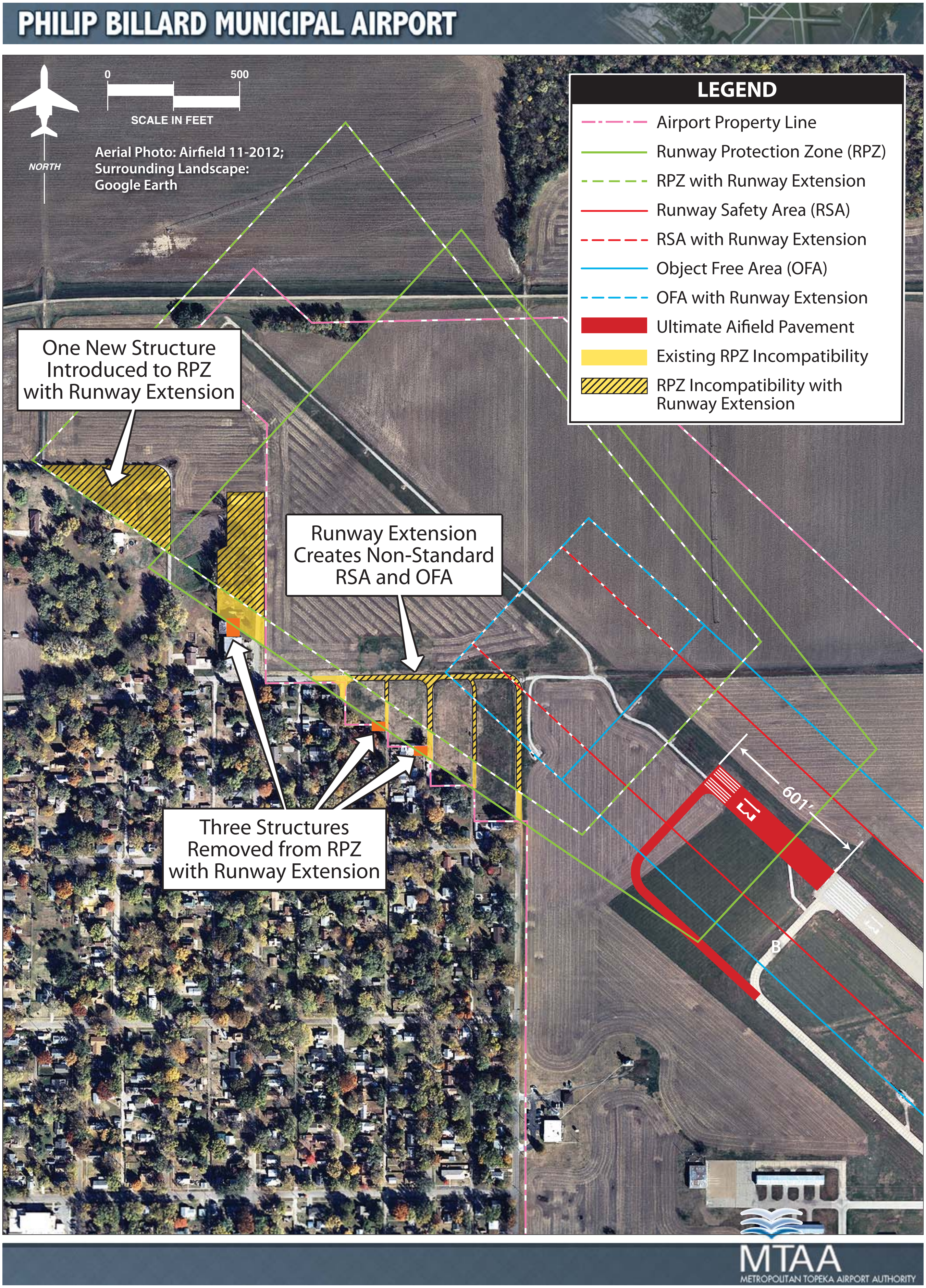

Exhibit 4C
RUNWAY 13 EXTENSION IMPACTS

PHILIP BILLARD MUNICIPAL AIRPORT

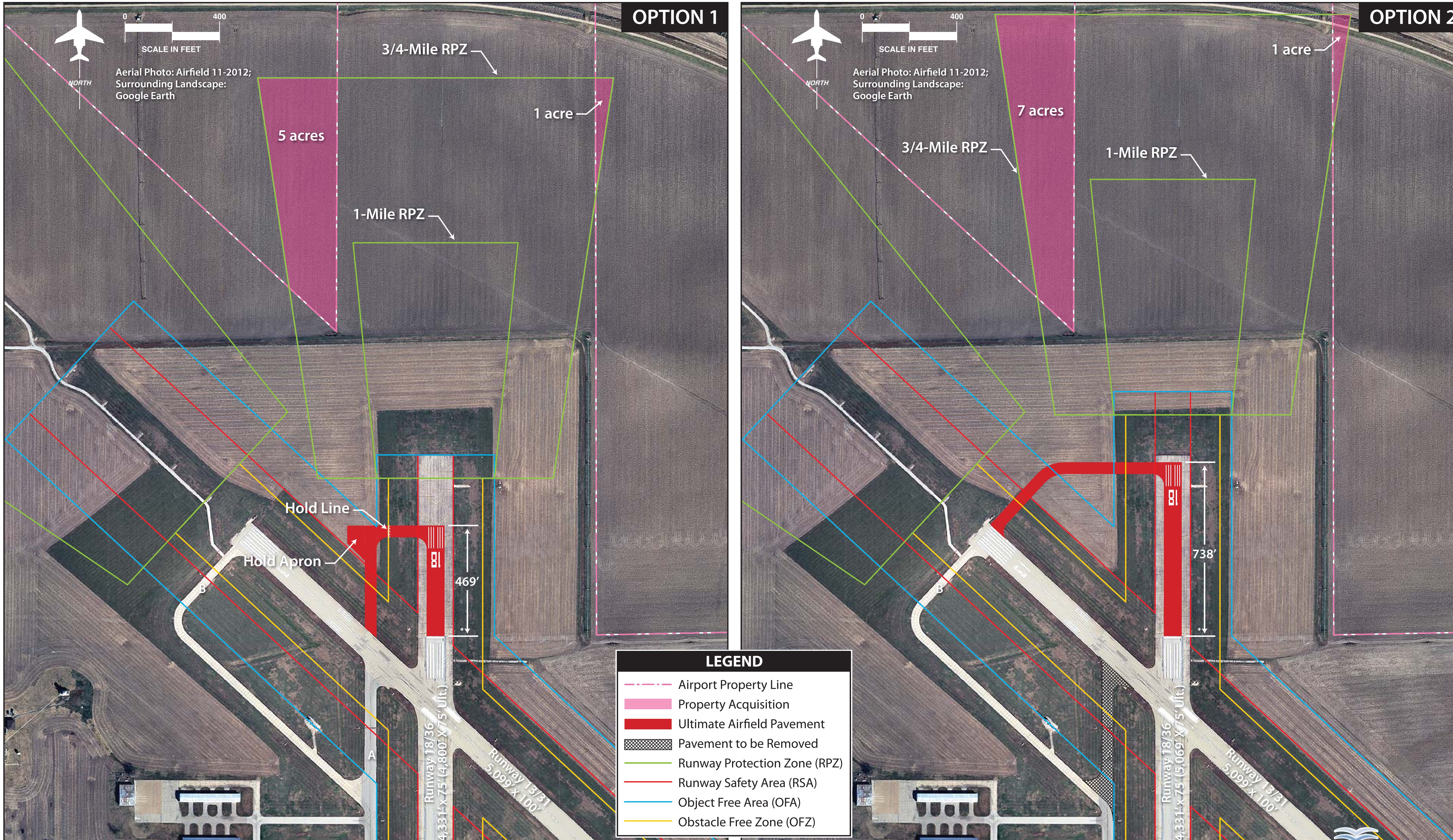

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Exhibit 4D
RUNWAY 18-36 IMPROVEMENT OPTIONS

Closure/Abandonment of Runway 4-22

The current ALP for the airport considers the ultimate closure or abandonment of Runway 4-22. This is a reasonable recommendation as maintaining the runway is a local expense that provides a limited benefit. The runway is currently in relatively poor condition with extensive cracking and grass and weed growth. The deteriorating pavement condition also leads to the development of foreign object debris (FOD). FOD is loose gravel/asphalt which can be dangerous to aircraft operations.

In addition, the location of the runway contributes to the FAA identified hot spot at the intersection with Taxiways A and D. Taxiway E connects directly from the main apron to the Runway 4 threshold, which is a design that should be avoided so that pilots do not inadvertently enter the runway environment.

The RPZ associated with Runway 22 extends beyond airport property and over a portion of Crocos Road and onto private property. Closure of the runway would alleviate this non-standard RPZ condition by eliminating the RPZ altogether.

If Runway 4-22 were to be closed/ abandoned, more landside development opportunities become available. The previous ALP considered additional hangar and apron development immediately southwest of the Runway 4 threshold. This area is not currently available for development due to the location of the runway. This is an ideal location for additional landside development because utilities are close and ground access is available.

The negatives to closing/abandoning the runway are few and may be considered inconveniences. For example, the airport would lose access to Runway 4, which is the closest runway to the terminal area. Pilots would have a slightly longer taxi distance to reach the terminal area.

Maintain Runway 4-22

It is within the purview of the MTAA to keep Runway 4-22 open and available to aviation activity. All maintenance and development costs would be the responsibility of MTAA as the runway is not eligible for federal development/maintenance grants. It should be noted that maintenance/development of the runway may be eligible for state aviation grants.

An alternate option for maintaining Runway 4-22 has emerged from consultation with the planning advisory committee (PAC) for the master plan development. That option considers the potential to overlay the existing runway with an all-weather surface that will not deteriorate like concrete and asphalt. The material considered is AvTurf, which can be secured to the ground over the existing runway. AvTurf is similar to Astroturf which has been used for sporting fields for years.

The Kansas Department of Transportation – Division of Aviation has expressed an interest in a pilot program to install AvTurf at an airport in Kansas. Runway 4-22 is considered a potential candidate for installation of AvTurf. It is estimated that the cost to install a 3,000-foot by 75-foot AvTurf runway would be approximately $562,500, or $2.50 per square foot.

A decision to maintain Runway 4-22, whether through traditional means of asphalt maintenance or through installation of AvTurf, is up to MTAA. Maintaining the runway has associated costs and potential liabilities. Any decision to maintain Runway 4-22 will still require plans to mitigate the hot spot and the taxiway layout deficiencies.

HOT SPOT MITIGATION – RUNWAY 4-22 CLOSURE

The intersection of Taxiways A and D with Runway 4-22 creates an FAA identified Hot Spot on the airfield. According to FAA documentation, this area is a Hot Spot because Taxiways A and D intersect inside the Runway 4-22 RSA. It should be noted that the intersection is actually within the OFZ, not the RSA. To address this situation, there are hold lines on both taxiways prior to the intersection. The hold lines themselves could be confusing as hold lines typically indicate an approaching runway, not an approaching taxiway. Once an aircraft holds on Taxiways A or D, when they proceed, they will first encounter a taxiway rather than the expected runway.

The ultimate disposition of Runway 4-22 (to be closed or maintained) will dictate the most feasible options for fixing the Hot Spot. **Exhibit 4E** presents those options considered based upon closure of the runway. While the exhibit shows various possibilities for removing unnecessary pavement, the ultimate remediation may include marking pavement as unusable or another method to indicate the area is not an aircraft movement area.

All options that consider closure of Runway 4-22 immediately solve one airfield issue, that being Taxiway E. Currently, Taxiway E provides direct access from the terminal area apron to the Runway 4 threshold. If Runway 4-22 is closed, abandoned, or converted to a taxiway, then the direct access issue is resolved.

Option 1

In this scenario, Runway 4-22 is simply closed and the pavement is removed (or marked unusable). Taxiways A and D become one continuous taxiway. This option preserves the multiple access points to the terminal area, which could be important at busy times. One negative consideration is that a common exit from Runway 18-36 is closed, which means there is a distance of approximately 2,800 feet between the Runway 36 threshold and the Taxiway C exit. From the north, the Taxiway C exit is 1,500 feet from the Runway 18 threshold. In essence, pilots landing to Runway 18-36 will likely have to run out the entire length of the runway before exiting.

Option 2

This option considers utilizing Taxiway D as an exit point from Runway 18-36. With the runway closed, there is no longer an intersection of Taxiways A and D within the OFZ. The remaining issue to consider is that Taxiway D would still provide direct access to the runway from the main terminal area. In this option, an island of unusable pavement is created at the entrance to Taxiway D from the apron, which would force pilots to make an additional turn prior to entering the taxiway system.

Option 3

The third option utilizes a portion of the closed runway as a taxiway. Under this option, Taxiway D is closed from the ter-

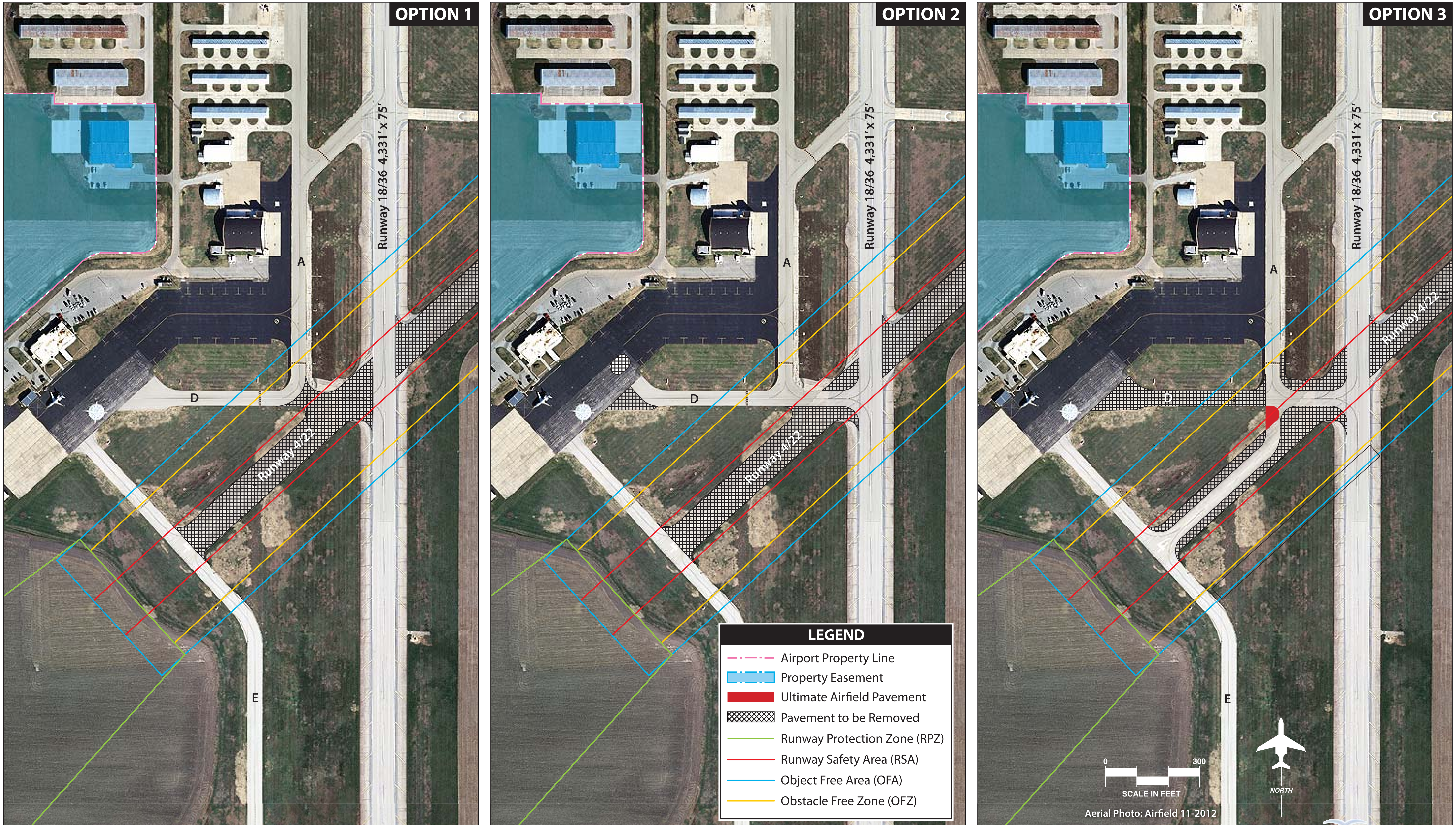

Exhibit 4E
RUNWAY 4/22 CLOSURE - HOT SPOT MITIGATION OPTION

minal area apron to the intersection with Taxiway A. An exit taxiway from the runway is then preserved. Taxiway A is extended south from the intersection with Taxiway D to the centerline of the closed Runway 4-22. The center portion of Runway 4-22 is then converted to the continuation of Taxiway A, which would ultimately terminate at Taxiway E.

HOT SPOT MITIGATION – RUNWAY 4-22 REMAINS OPEN

If a decision is made to keep Runway 4-22 open, then there are several options that should be considered for mitigating the Hot Spot. **Exhibit 4F** presents these options. Once again, where the exhibit indicated pavement to be removed, alternate options including marking the pavement as non-movement areas is also acceptable.

Option 1

Option 1 considers closing Taxiway D entirely as well as the southern 250 feet of Taxiway A. By closing these taxiway segments, there is no longer an intersection within the OFZ and the Hot Spot is removed.

Several consequences should be considered prior to implementing this option. First, by closing the taxiway segments, an exit taxiway from the runway is closed, forcing pilots to remain on the runway longer. Second, pilots will have to traverse the terminal apron for a longer distance which could lead to increased congestion on the terminal apron.

Option 2

The next option considered is to close Taxiway D and extend Taxiway A to the Runway 36 threshold. The hold line on Taxiway A would remain in its current position. The hold line would properly indicate an approaching runway rather than an approaching taxiway.

The disadvantages of this option are that the exit from the runway is removed, forcing pilots to remain on the runway for a longer distance. The Taxiway D access to the terminal apron would be lost, thus forcing pilots to traverse the terminal area apron for a longer distance. In addition, extending Taxiway A to the Runway 36 threshold would be costly.

Option 3

The next option is to close the southern 250 feet of Taxiway A, thus eliminating the Hot Spot. This solution to the Hot Spot would necessitate additional layout alterations in order to meet taxiway layout standards.

Taxiway D would still extend from the terminal area apron directly to Runway 4-22 and Runway 18-36. A direct run from an apron to a runway is nonstandard as the potential for a runway incursion is increased. Taxiway design standards indicate that the taxiway geometry should be such that pilots are forced to make a turn onto a taxiway, thus reinforcing pilot situational awareness. In this option, an island of unusable pavement is marked or removed so that pilots must make the desired turn onto the taxiway.

Option 4

The next option is to close the intersection of Taxiways A and D and construct a short connecting taxiway (parallel to the runway). The connecting taxiway should be at least 240 feet, centerline to centerline, from the runway. This taxi-way connector would be approximately 850 square yards of pavement.

Option 4a

Another option that is similar to Option 4 considers applying less restrictive design standards to Runway 4-22. In this scenario, Runway 4-22 would be designated for use by small aircraft exclusively (those under 12,500 pounds). With this designation, the RSA is 120 feet wide rather than 150 feet wide. The OFZ goes from 400 feet wide to 250 feet wide and the OFA goes from 500 feet wide to 250 feet wide.

As can be seen on the exhibit, the connection to the runway is closed but Taxiways A and D are joined. A small portion of pavement may need to be constructed to allow for proper turning radius.

INSTRUMENT APPROACHES

Instrument approach procedures, as previously described in the Inventory chapter, are critical to extending the usefulness of an airport in times of poor weather. Instrument approaches are particularly important for airports serving business jet operations.

Runway 13 provides an instrument landing system (ILS) which provides visibility minimums of ½-mile and cloud ceilings of 200 feet, often referred to as CAT-I minimums. There are three elements that make up the ILS: the localizer antenna to provide lateral positioning information, the glide slope antenna to provide horizontal positioning information, and the approach lighting system to provide alignment and visual information. All three of these systems are ground-based and are located at the airport.

The FAA is advancing NextGen air navigation systems which are based on the constellation of global positioning system (GPS) satellites. New instrument approaches, such as LPV (Lateral Performance with Vertical Guidance) approaches, are providing near CAT-I minimums. In fact, Runway 13 currently provides an LPV approach with ½-mile visibility minimums and 200-foot cloud height ceilings. To obtain an LPV approach with CAT-I minimums, an approach lighting system is required but not the localizer or glide slope antennas.

The ILS system could be lost if there is a need to relocate the ground-based equipment. The FAA is not typically installing or relocating ILS equipment since CAT-I GPS approaches are feasible. According to the *NextGen Implementation Plan* – March 2012, the FAA is considering an incremental program to phase out CAT-I ILS installations by 2025. Any extension of Runway 13 would necessitate the relocation of the glide slope antenna and the approach lighting system. The cost to relocate this equipment is nearly the same as the cost to purchase and install new equipment; therefore, the airport could lose the ILS if an extension is planned to the north and they fail to meet eligibility criteria. Presumably a CAT-I GPS (LPV) instrument approach could replace the ILS provided the MALSR can be relocated.

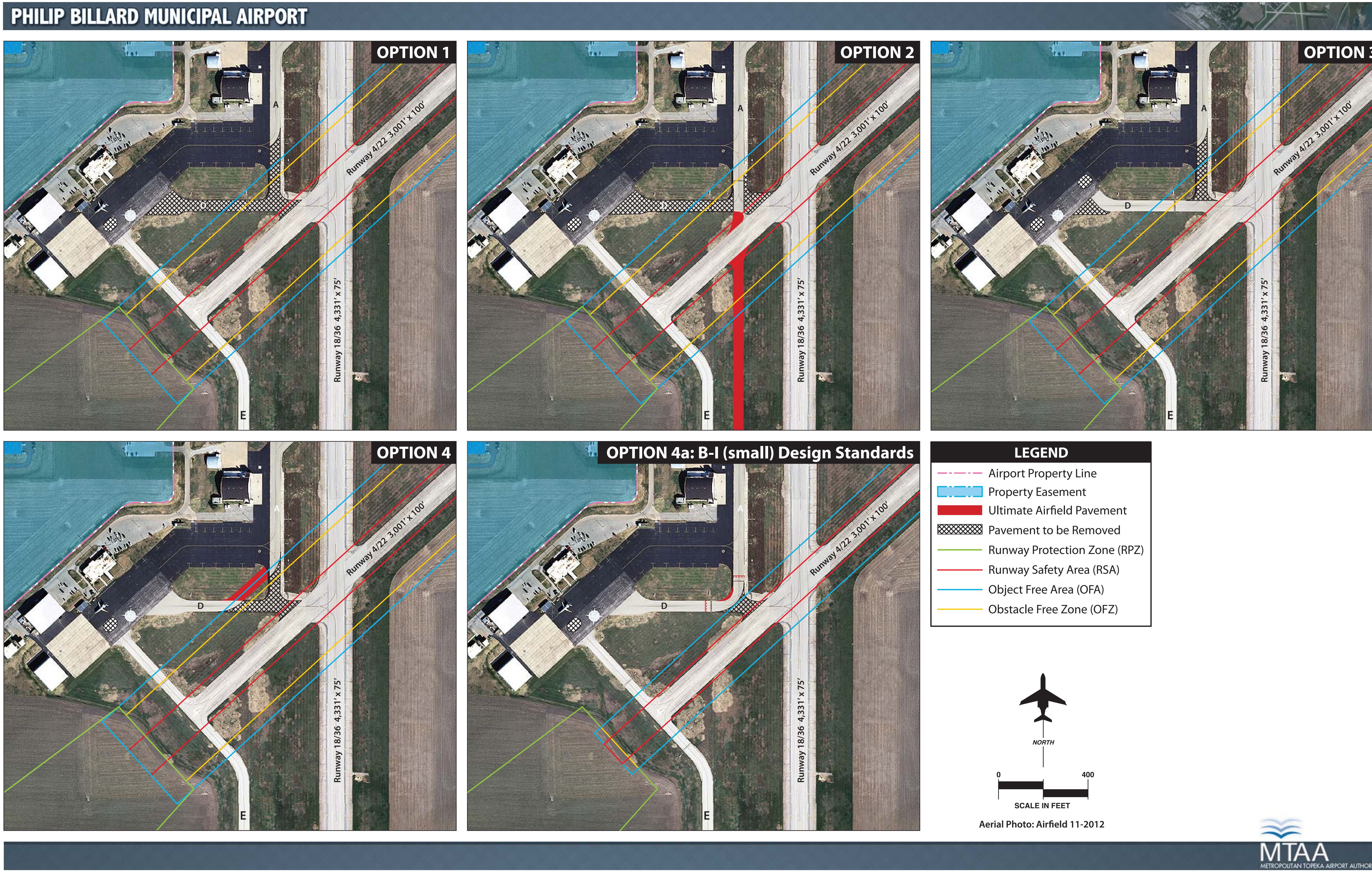

Exhibit 4F
RUNWAY 4/22 REMAINS OPEN - HOT SPOT MITIGATION OPTIONS

All other runways have instrument approach capability with 1-mile visibility minimums. Consideration was given to obtaining visibility minimums as low as ¾-mile, which does not require an approach lighting system (although one is recommended). Instrument approaches with ¾-mile visibility minimums necessitate a larger RPZ. Implementation of the larger RPZ (by means of improved visibility minimums) will require the RPZ to meet design standards by being clear of incompatibilities.

As discussed previously, the larger ¾-mile RPZ will introduce additional incompatibilities for Runway 31 (Oakland Expressway) and Runway 36 (Seward Avenue and homes). Therefore, improved instrument approaches are not considered for these runway ends. The current 1-mile visibility minimums are adequate for Runway 4-22 and thus ¾-mile visibility minimums are not considered for Runway 4-22.

Consideration is given to providing a ¾-mile instrument approach to Runway 18. Such an instrument approach would require a larger RPZ that would extend beyond airport property. Approximately seven acres of agricultural land would need to be acquired. With a ¾-mile instrument approach, the primary surface surrounding the runway would expand from 250 feet from the centerline to 500 feet. This would place numerous hangars within the primary surface. For this reason, the existing 1-mile instrument approaches serving Runway 18-36 are planned to be maintained.

RUNWAY PROTECTION ZONES

The disposition of each of the RPZs should be considered individually. For runways with a displaced landing threshold, separate approach and departure RPZs must be considered. The FAA recommends that the airport have ownership of the RPZ lands where feasible. If outright ownership is not feasible, then easements are also acceptable. Easements in the RPZ should allow the airport to positively limit the heights of structures. A third option for protection of the RPZs that extend beyond airport property is implementation of strict land use zoning that, at a minimum, prohibits residential development or other development that could serve as a congregating point for people, and restricts structure heights.

As discussed previously, the RPZ serving Runway 13 currently has incompatibilities. All or a portion of three residences are within the RPZ. Several public streets are also within the RPZ. Under current guidance from the FAA, the houses should be removed from the RPZ. The public roads would likely be acceptable since they are low volume and have existed since before the RPZ standards were published.

Planning for a possible extension of Runway 13 would necessarily shift the location of the RPZ. The three existing residential penetrations would be removed from the RPZ; however, an existing house would be introduced to the RPZ. This property would likely have to be acquired prior to FAA approval of an extension of the runway. Some portions of the public streets would have to be permanently closed as well to accommodate the extended RSA and OFA associated with the potential runway extension.

The RPZ associated with Runways 31 and 36 currently cross public roads. While this condition is typically grandfathered as acceptable, any change to the RPZ may require full compliance. Since improved visibility minimums would increase the size of the RPZ, no changes are planned to the instrument approaches to these runway ends.

The RPZs serving Runway 4-22 meet design standards and are planned to be maintained until such a time that they are no longer needed (e.g., closure of the runway).

NAVIGATION AIDS

Certain approach aids provide information to pilots to indicate if they are on the correct glide path to the runway for landing. Visual approach aids are typically provided for instrument-capable runway ends that do not already have an approach lighting system. A visual approach slope indicator (VASI) light system is available for both ends of Runway 18-36 and Runway 31.

The more advanced precision approach path indicator (PAPI) system is commonly installed at runways with business jet activity or as replacements for older VASI systems. As the VASIs become outdated, they should be replaced with PAPI systems. Visual approach aids are not planned to Runway 4-22.

TAXIWAYS

The taxiway system at Philip Billard Municipal Airport generally provides for the efficient movement of aircraft to and from the runways. FAA AC 150/5300-13A, *Airport Design*, instituted new design standards for taxiways, some of which impact planning for Philip Billard Municipal Airport.

The following are the taxiway geometry concerns at Philip Billard Municipal Airport as previously identified in Chapter Three – Facility Requirements:

1. Hot Spot at intersection of Taxiway A, D, and Runways 4-22 and 18-36. Several options to mitigate the Hot Spot have been presented.
2. Taxiway C, west of Runway 18-36, is at an angle to the runway. As this taxiway is not designed for high-speed exits, it should be planned at a 90-degree angle.
3. Taxiway D provides direct access to Runway 4-22 from the main terminal area apron. Resolution of the Hot Spot should also resolve this issue.
4. Taxiway E provides direct access from the terminal area apron to the Runway 4 threshold. If Runway 4-22 is closed, then this issue is resolved. If Runway 4-22 is to remain open, then an island of unusable pavement should be installed to force pilots to physically turn the aircraft before, and then enter the taxiway.
5. Taxiway A enters Runway 13-31 at an angle and it terminates at this location. Extension of Taxiway A to the Runway 18 threshold is considered to resolve this issue.
6. There is not currently a taxiway entrance to the Runway 18 threshold. Extension of Taxiway A and Runway 18 will resolve this issue.

RUNWAY LINE-OF-SIGHT

The purpose of line-of-sight requirements facilitates coordination among aircraft, and between aircraft and vehicles that are operating on active runways. This allows departing and arriving aircraft to verify the location and actions of other aircraft and vehicles on the ground that could create a conflict. Line-of-sight requirements pertain to individual runways and to visibility between intersecting runways.

Individual Runways

For runways without a full parallel taxiway any point five feet above the runway surface must be mutually visible to any other point five feet above the runway centerline. For runways with a full parallel taxiway, any point five feet above the runway centerline must be mutually visible to any other point five feet above the runway centerline that is located at a distance that is less than one half of the runway length. All individual runways at Philip Billard Municipal Airport meet this requirement.

Intersecting Runways

For intersecting runways any point five feet above the runway centerline and in the runway visibility zone must be mutually visible with any other point five feet above the centerline of the crossing runway and inside the runway visibility zone. There are no obstructions within the runway visibility zone at Philip Billard Municipal Airport.

BUILDING RESTRICTION LINE

The building restriction line (BRL) identifies suitable building area locations on the airport. The BRL encompasses the RPZs, the OFA, the runway visibility zone, NAVAID critical areas, areas required for terminal instrument procedures, and other areas necessary for meeting airport line-of-sight criteria.

Two primary factors contribute to the determination of the BRL: type of runway (utility or other-than-utility) and the capability of the instrument approaches. Runway 13-31 is an "other-than-utility" runway with a precision instrument approach. Runways 18-36 and 4-22 are "other-than-utility" runway with non-precision instrument approaches.

The BRL is the product of F.A.R. Part 77 transitional surface clearance requirements. These requirements stipulate that no object be located in the primary surface, defined as being no closer than 250 feet from a non-precision instrument runway centerline (visibility minimums not lower than 1-mile) and not closer than 500 feet to a runway served by an instrument approach with visibility minimums lower than 1-mile). From the primary surface, the transitional surface extends outward at a slope of one vertical foot to every seven horizontal feet. Traditionally, the BRL is set at a point where the transitional surface is 35 feet above runway elevation. For Runway 13-31, the 35-foot BRL is set at 745 feet from the runway centerline. For the two crosswind runways, the 35-foot BRL is set at 495 feet from the runway centerline.

There are several hangars along the Taxiway A flight line that is within the 35-foot BRL. Since the BRL rises at an angle from the primary surface at a 7:1 ratio, only the stone hangar is a penetration to the BRL (and the transitional surface) and it penetrates by approximately 20 feet. When the FAA reviews the ALP for this master plan, they will make a determination if any of these structures are first an obstruction to the transitional surface (stone hangar) and then if they are a hazard to air navigation. Since these hangars were in place at the time of the previous ALP approval, it is unlikely that the hangars are a hazard to air navigation.

Exhibit 4G presents the line-of-sight and BRL boundary.

LANDSIDE PLANNING CONSIDERATIONS

Generally, landside issues relate to those airport facilities necessary, or desired, for the safe and efficient parking and storage of aircraft, movement of passengers and pilots to and from aircraft, airport land use, and overall revenue support functions. In addition, elements such as fueling capability, availability of services, and emergency response are also considered in the landside functions.

Landside planning issues, summarized on **Exhibit 4B**, will focus on facility locating strategies following a strategy of separating activity levels. To maximize airport efficiency, it is important to locate facilities intended to serve similar functions close together. For example, it makes sense to plan T-hangar structures in a designated area rather than haphazardly building them as needed on the next available spot at the airport. It is also important to plan for facilities that airport users desire and to group those facilities together, whether they are T-hangars, box hangars, or larger conventional hangars.

The orderly development of the airport terminal area (those areas parallel to the runway and along the flight line) can be the most critical, and probably the most difficult development to control on the airport. A development approach of "taking the path of least resistance" can have a significant effect on the long term viability of an airport. Allowing development without regard to a functional plan can result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of valuable space along the flight line.

Activity in the terminal area should be divided into three categories at an airport. The high-activity area should be planned and developed as the area providing aviation services on the airport. An example of a high-activity area is the aircraft parking apron, which provides outside storage and circulation of aircraft. Large conventional hangars housing fixed base operators (FBOs), other airport businesses, or those used for bulk aircraft storage would be considered high-activity uses. A conventional hangar structure in the high-activity area should be a minimum of 6,400 square feet (80 feet by 80 feet). If space is available, it is more common to plan these hangars for up to 200 feet by 200 feet. The best location for high-activity areas is along the flight line near midfield, for ease of access to all areas of the airfield.

The medium-activity category defines the next level of airport use and primarily includes corporate aircraft operators that may desire their own box or conventional hangar storage on the airport. A hangar in the medium-activity use area should be at least 50 feet by 50 feet, or a minimum of 2,500 square feet. The best location for medium-activity use is off the immediate flight line, but still with ready access to the runway/taxiway system. Typically, these areas will be adjacent to the high-activity areas. Parking and utilities, such as water and sewer, should also be provided in this area.

The low-activity use category defines the area for storage of smaller single and twin-engine aircraft. Low-activity users

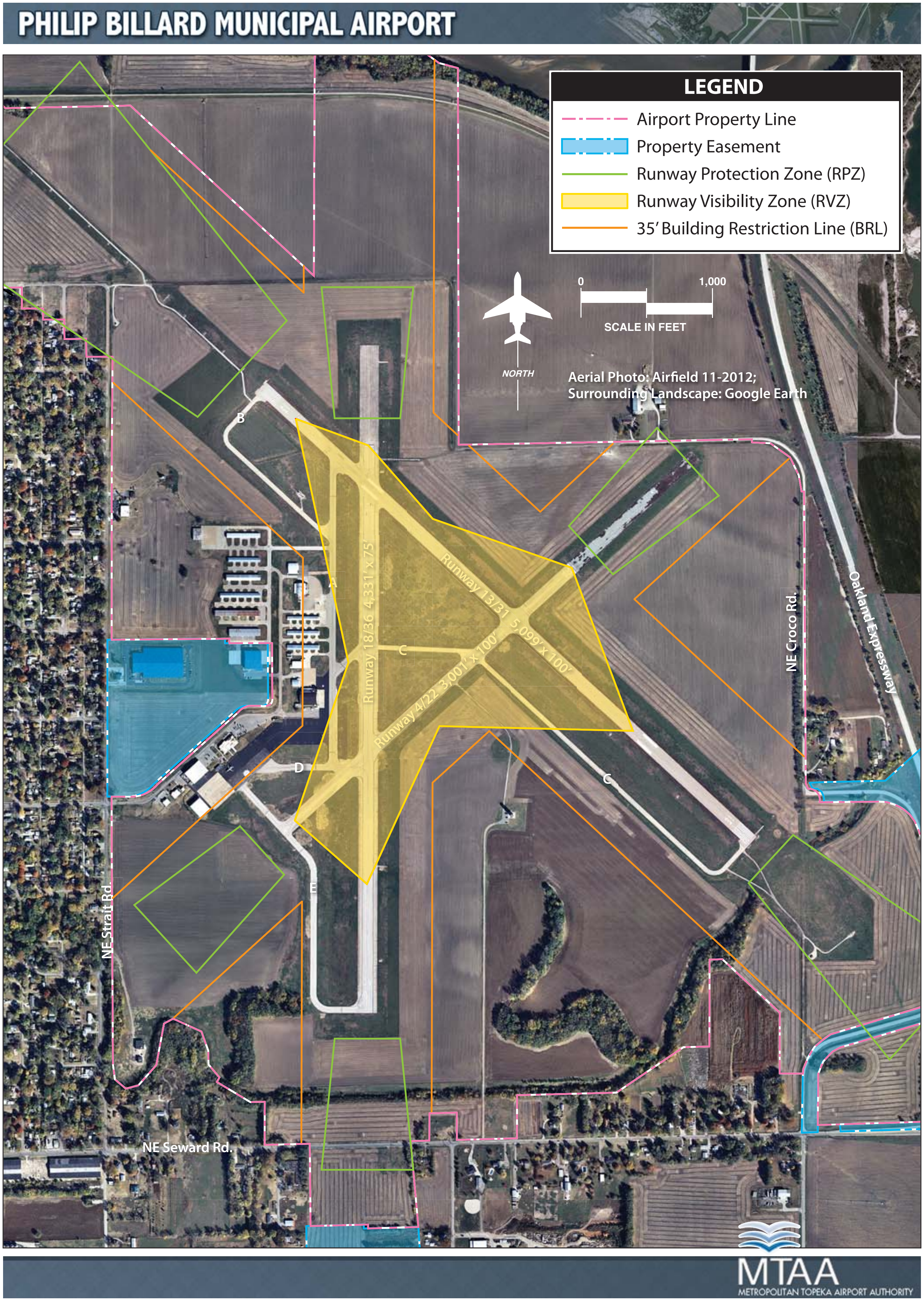

Exhibit 4G
AIRFIELD VISIBILITY ZONES

are personal or small business aircraft owners who prefer individual space in T-hangars or small box hangars. Low-activity areas should be located in less conspicuous areas or to the ends of the flight line. This use category will require electricity, but may not require water or sewer utilities.

In addition to the functional compatibility of the terminal area, the proposed development concept should provide a first-class appearance for Philip Billard Municipal Airport. Consideration to aesthetics should be given high priority in all public areas, as many times the airport can serve as the first impression a visitor may have of the community.

Generally, the existing development at the airport has followed the strategy of separating activity levels. The south terminal area and main apron serve the terminal building and several larger conventional hangars. Future development in this area should be restricted to larger hangars intended to support aviation-related businesses.

Along the flight line, to the north of the terminal area and west of Taxiway A, are some appropriately located conventional and box hangars. However, several T-hangar structures and storage buildings are also located in this area. This layout is not optimal as these lower activity facilities do not maximize the highly desirable flight line development area. Nonetheless, these facilities provide a revenue mechanism for the airport in the form of hangar leases and should be maintained for their useful life. Once a decision is made to replace these facilities, only high-activity uses should be considered.

Ideally, terminal area facilities at general aviation airports should follow a linear configuration parallel to the primary runway. The linear configuration allows for maximizing available space, while providing ease of access to terminal facilities from the airfield. At Philip Billard Municipal Airport, the hangars are situated at an angle to the runway, thus facilitating maximum developable space.

Planning for future hangar development should take into consideration typical local weather conditions, especially potential winter snowfall. Winter weather patterns typically bring snow from the north, which can build up at the north-facing hangar doors. Future planning, especially of T-hangars, may consider locating these hangars such that they are positioned in a north to south manner, with east- and west-facing doors.

Each landside alternative will address development issues, such as the separation of activity levels and efficiency of layout. Each of the landside alternatives will plan for adequate facilities to meet the forecast needs as defined in the previous chapter of this plan.

TAXILANES

All taxilanes should provide for a clear taxilane object free area (TOFA). The dimensions of the TOFA for aircraft in airplane design group (ADG) I is 39.5 feet from the centerline. The TOFA for ADG II aircraft is 57.5 feet from centerline. The taxilane that provides access to the Kansas Highway Patrol hangar does not currently provide this clearance for either ADG.

The primary concern is the pavement in front of the one of the T-hangar structures (identified as building #23 on Exhibit 1L). In the recent past, there have been vehicles parked on this pavement which is inside the TOFA; this creates a danger when aircraft pass on the taxilane. This pavement should be marked as unusable and no objects should be positioned on this pavement. **Exhibit 4H** shows the area of concern.

The access taxilane to the T-hangar area and the KHP hangar is a potential choke point for the movement of aircraft, especially those accessing Runway 13. The current layout forces pilots to make several turns which increase the potential for an aircraft to veer off the edge of the taxiway pavement. To alleviate this situation, two options for more direct access to Taxiway B from the north hangar area are presented on **Exhibit 4H**.

Option 1: The first option is to extend the north hangar area taxilane directly to Taxiway B. The taxilane extension to Taxiway B curves slightly to accommodate a right-angle connection, thus increasing pilot peripheral views. This option would require an additional ILS hold line on the taxilane extension in order for pilots to hold short of the ILS critical area.

Option 2: The second option for extension of the taxilane to Taxiway B is to angle the new taxilane segment at 30 degrees (which is within design standards), in order to avoid the ILS critical area completely. The taxilane extension also would curve slightly to permit a right-angle entrance to Taxiway B. This second option is the preferred approach to extending the taxilane to Taxiway B.

VEHICULAR ACCESS AND PARKING

A planning consideration for any airport master plan is the segregation of vehicles and aircraft operational areas. This is both a safety and security consideration for the airport. Aircraft safety is reduced and accident potential increased when vehicles and aircraft share the same pavement surfaces. Vehicles contribute to the accumulation of debris on aircraft operational surfaces, which increases the potential for foreign object debris (FOD) damage, especially for turbine-powered aircraft. The potential for runway incursions is increased, as vehicles may inadvertently access active runway or taxiway areas if they become disoriented once on the aircraft operational area (AOA). Airfield security may be compromised as there is loss of control over the vehicles as they enter the AOA. The greatest concern is for public vehicles, such as delivery vehicles and visitors, which may not fully understand the operational characteristics of aircraft and the markings in place to control vehicle access. The best solution is to provide dedicated vehicle access roads to each landside facility that is separated from the aircraft operational areas with security fencing.

The segregation of vehicle and aircraft operational areas is supported by FAA guidance established in June 2002 and amended in March 2008. FAA AC 150/5210-20, *Ground Vehicle Operations on Airports*, states, "The control of vehicular activity on the airside of an airport is of the highest importance." The AC further states, "An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport."

At Philip Billard Municipal Airport, access to the south terminal area is relatively secure as there is perimeter fencing and parking lots are accessible from the landside. The ground access to the area north of the terminal area (north of the stone hangar) is more accessible to vehicle traffic. In fact, there are several locations where vehicles can easily access the runway and taxiway system and taxilanes.

PHILIP BILLARD MUNICIPAL AIRPORT

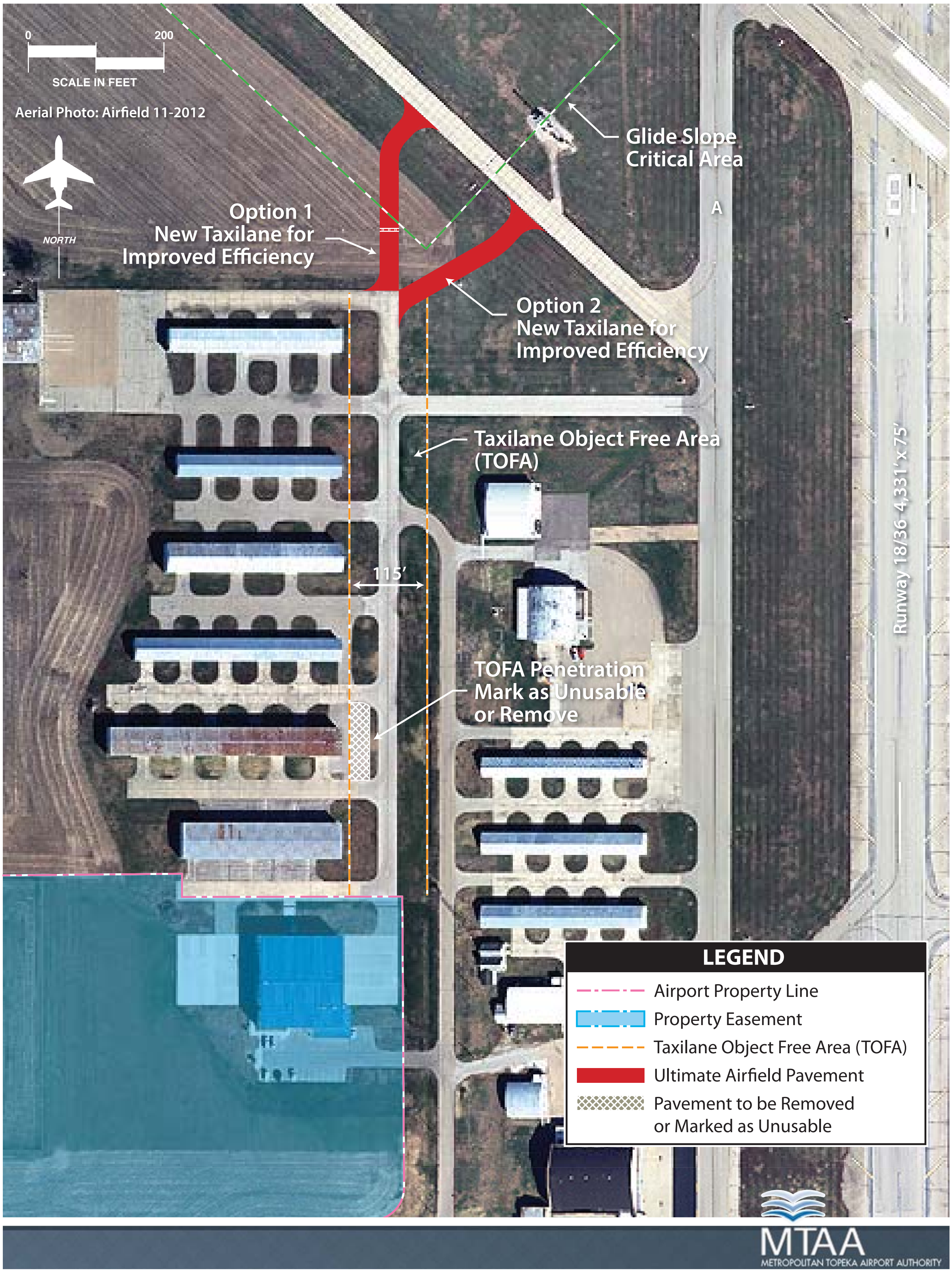

Exhibit 4H
TAXILANE OBJECT FREE AREA MITIGATION

While it is preferable to completely separate vehicles from the AOA, including taxilanes, this is not always feasible, especially at general aviation airports. It is common for airport tenants to access their hangar by traversing the AOA. Therefore, a balance must be achieved that permits airport tenants to access their hangars, while reducing the potential for the public to inadvertently access the AOA.

The landside alternatives for Philip Billard Municipal Airport have been developed to reduce the need for vehicles to cross apron or taxiway areas. Dedicated vehicle parking areas, which are outside the airport fence line, are considered for all potential hangars.

TERMINAL BUILDING

The airport terminal building was originally constructed in 1953. It is showing its age and some areas are not usable. The exterior wall of one of the offices is nearly falling down. Terminal buildings serve not only the needs of pilots but also as an important entrance to the community. They are the first impression that many visitors will have of a community. Many of those visitors will be making an economic contribution to the community.

At a minimum, the terminal building should be maintained and improved in order to meet the needs of general aviation users. A more aggressive approach would be to plan for a new and modern terminal building. Several options for locating a replacement terminal building are shown on **Exhibit 4J**.

A replacement terminal building should be located on the main apron at the airport. It should be able to accommodate high-activity. The potential buildings shown are approximately 10,000 square feet. At this size the facility could continue to accommodate a sizable leasable space (e.g. restaurant) as well as some leasable office space.

Terminal buildings serve as a central entrance to the community for air travelers. The aesthetics of design should be considered. A welcoming entrance to the city may positively influence economic activity in the city.

AIR TRAFFIC CONTROL TOWER (ATCT)

Philip Billard Municipal Airport has an ATCT that provides terminal area guidance for pilots in the immediate vicinity of the airport. The tower is operated and staffed through the FAA's Contract Tower Program. Under this program, the FAA pays for the maintenance and staffing costs of the tower. The tower is staffed by private contractors who are trained and certified in the same manner as FAA employed controllers.

Due to federal budget cuts, approximately 150 contract towers are scheduled to be closed beginning in April 2013. The tower at Philip Billard Municipal Airport is included in this group and is scheduled to be closed in June, 2013.

The FAA issued guidance for airport sponsors outlining two options they can pursue if their tower is scheduled to be defunded. The airport sponsor may choose to operate the tower as a non-towered airport or they may also choose to continue providing tower services as a non-federal control tower. If the airport sponsor chooses to continue providing tower services, then expenses would shift to the airport sponsor.

The FAA has indicated that they will discuss continued use of buildings and equipment and the availability of reimbursable agreements. The airport can reimburse the FAA to provide other services such as tower maintenance and logistics support. The airport sponsor would have to negotiate directly with the company employing the controllers to staff the tower. In addition, the FAA will not begin removing equipment and terminating local service agreements immediately. In most cases, it will take up to 90 days for the FAA to begin disconnecting and removing equipment at affected towers.

Any towered airport has a variety of items to consider when their tower closes. Airports that are not certified for commercial air service, such as Philip Billard Municipal Airport, should consider, at a minimum, the following:

- Frequencies: Pilots in the vicinity should utilize the common traffic frequency (CTAF) to announce their intentions with regard to landing and taking off.
- Pilot-Activated Lights: Pilots should be aware of the availability of pilot-controlled lighting. At Philip Billard Municipal Airport, the runway edge lights for Runways 13-31 and 18-36, as well as the MALSR, VASIs and REILs, can be activated by pilots.
- Weather Observation: Airfield weather information will remain available via the ASOS at the airport. Visual wind indicators will also still be available.
- Notify Tenants: Airport sponsors should notify tenants of the tower closure and provide any additional information.
- Airfield Controls: Airport sponsors must ensure that any airfield controls located in the tower continue to be accessible or are relocated.
- Airport Diagram: Airports must identify to the FAA who will control the airport diagram.
- Notice to Airmen (NOTAM): The airport sponsor should issue a NOTAM alerting pilots to the changes in tower operating hours. The FAA Airports District Office and the FAA Flight Standards district Office should also be notified.
- Publications: Air Traffic Publications and Aeronautical Charts must be updated to reflect the changes.

Historically, FAA has funded the staffing, operations, and maintenance of towers if the airport meets certain operational thresholds and a benefit/cost analysis. If the airport does not meet the threshold, then FAA may not participate in the continued funding of the tower services. It is unknown if Phillip Billard Municipal Airport currently meets the threshold. If the contract tower program is reinstated, it is unknown if renewed justification will be required.

LANDSIDE LAYOUT ALTERNATIVES

As presented in Chapter Three – Facility Requirements, additional aircraft hangar storage area is recommended to accommodate forecast growth in based aircraft. An additional 19,200 square feet of hangar space is recommended. Based on typical user preference, most of this identified need should be in the form of box hangars.

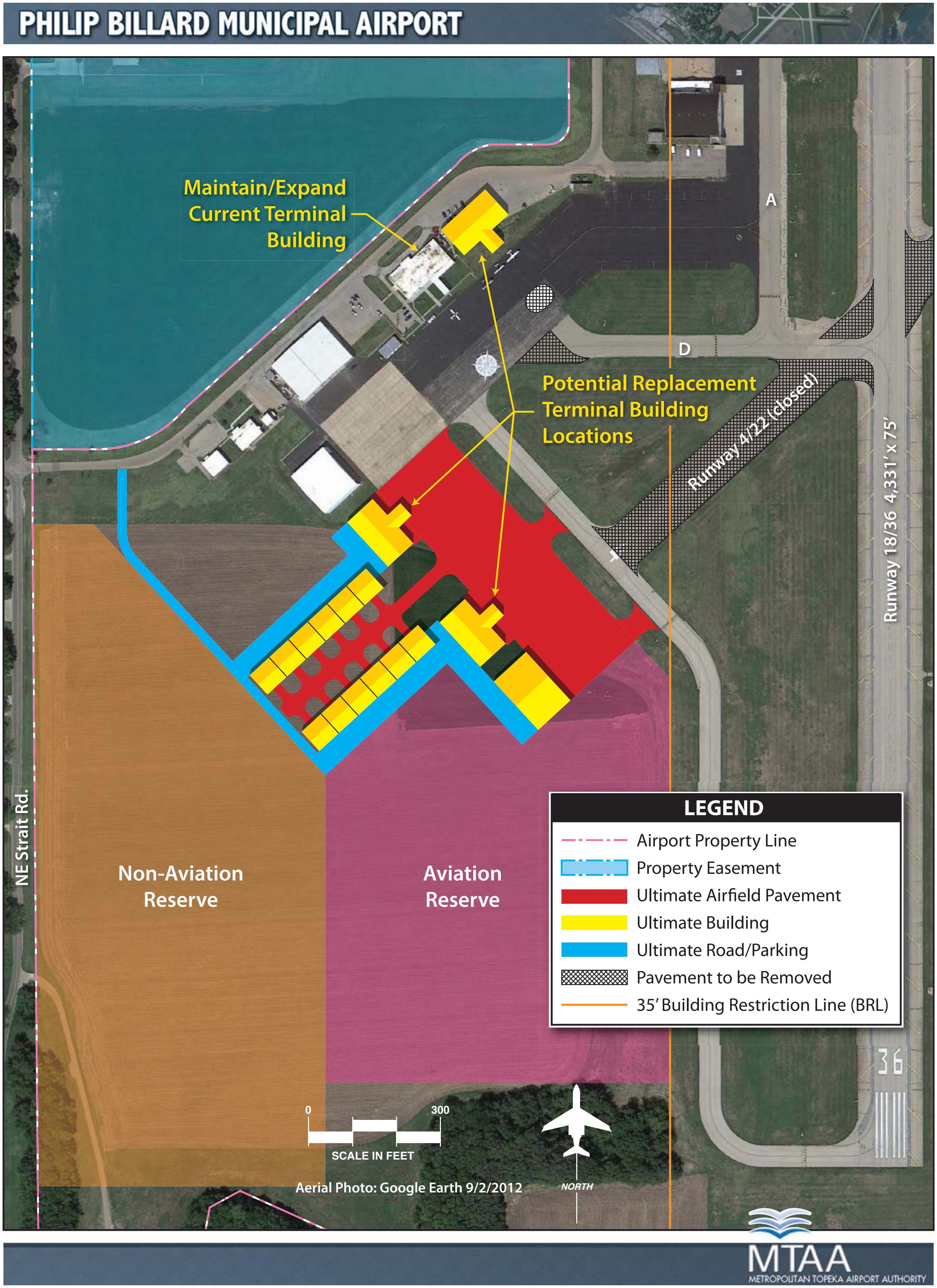

Exhibit 4J
TERMINAL BUILDING OPTIONS

It should be noted that individual preference should be the final arbiter as to what types of hangars are desired. For example, if the airport has a 10-person wait list for a T-hangar space, then it is a good time to plan for more T-hangars. Likewise, if an individual desires to construct a box hangar, then that becomes the priority. The overall hangar space estimates can and should be adjusted by airport management to reflect actual demand at the airport.

The number of potential landside alternatives can be infinite. The following four alternatives are those that best meet design standards, while maximizing the efficiency of aircraft storage and movement. The landside element of the recommended master plan concept, to be presented in the next chapter, may be one of these alternatives or, more likely, is a combination of elements from each of them. Input from the planning advisory committee (PAC) is integral to determining the landside vision for the airport.

The future disposition of the runway/taxiway system will impact the potential landside alternatives. For example, if Runway 4-22 is to be closed, then additional land area becomes available for planning of landside elements. As a result, the landside alternatives will consider scenarios that are dependent upon specific future airside conditions.

DEVELOPMENT AREA

Prior to presentation of the landside alternatives, it is important to identify areas that are reasonably suitable for aviation development. The primary areas available are on the west side of the airport in and around the existing terminal area. This location has readily available utilities and is relatively flat, thus facilitating development. If Runway 4-22 were to be closed in the future, then additional land area to the south of the terminal area would become available for aviation development.

On the east side of the airport, between Runway 22 and Runway 31, there is currently 47 acres of property that could support aviation development. If Runway 4-22 were to close, then an additional 23 acres would be available for a total of 70 acres. This area has direct access to the primary runway and is located at the end of the instrument runway, thus providing direct access for aircraft landing to Runway 13. When planning future development, it is desirable to locate facilities where taxi times can be reduced.

The east side location is ideally suited for access to the surface transportation system with quick access to the Oakland Expressway and the interstate highway system. Locating facilities on the east side would potentially reduce residential vehicle traffic to and from the airport.

Planning east side facilities does present some challenges. First, all utilities would have to be extended to the area (or capacity would have to be increased). Second, this location would potentially increase taxi times for the majority of aircraft as Runway 18-36 supports approximately 70 percent of operations. Third, the cost to develop the east side would include significant infrastructure improvements including road construction. In essence, to develop the east side for aviation activity would be like starting anew. For these reasons, development of the east side of the airport should not be considered until the west side is fully developed. Since the aviation facilities needed, based on the aviation demand forecasts, can be accommodated on the west side, aviation development of the east side is not considered feasible or prudent within the scope of this master plan (20 years).

NORTH TERMINAL AREA DEVELOPMENT OPTIONS

The north terminal area has opportunities for hangar development. A logical area to consider for additional aircraft storage hangar development, as demand dictates, is to the west of the existing T-hangars. Much of the infrastructure needed is readily available including utilities and taxilane stubs. Planning development as an extension of existing facilities will also reduce costs and limit potential environmental impacts. **Exhibit 4K** presents two development options for the north terminal area.

Option 1

Under this option, the area to the west of the T-hangars is considered for additional hangar development. As shown, the taxilanes are extended in order to provide access to new T-hangars and connected box hangars. As shown on the exhibit, approximately 30 new hangar positions are planned.

To the north of the northernmost T-hangar structure is undeveloped land. This area is shown with approximately 16 new hangar positions. The flight-line to Runway 18-36 has existing space for one additional conventional hangar, immediately south of the airport maintenance hangar.

Option 2

This north terminal area development option provides a slightly different layout for the area to the west of the existing T-hangars. In this option, the taxilanes are extended, as in the previous option; however, an end-around taxilane is provided. This taxilane has the benefit of reducing potential congestion on the existing taxilane. The drawback to the end-around taxilane is that dedicated vehicle parking cannot be made available for users of the planned new T-hangars. Since hangar tenants currently drive to their hangars, continuing this practice is acceptable.

As with Option 1, the area to the north of the northernmost T-hangar structure is available for hangar development. On the flight-line, a single hangar is planned as well.

Option 3 – Current ALP Plan

A third option is to maintain the plan on the current ALP as developed in 2002 and shown on **Exhibit 4A**. This option provides for three stand-alone box hangars to the west of the T-hangars. An end-around taxilane is planned, which would improve aircraft movement efficiency to some degree. Locating higher activity box hangars at the ends of lower activity T-hangars should be avoided if possible.

The previous ALP showed that the three T-hangars on the flight-line were planned to be removed and replaced with three larger conventional hangars, which are set back slightly to the 35-foot BRL. This is a reasonable plan if the T-hangars are

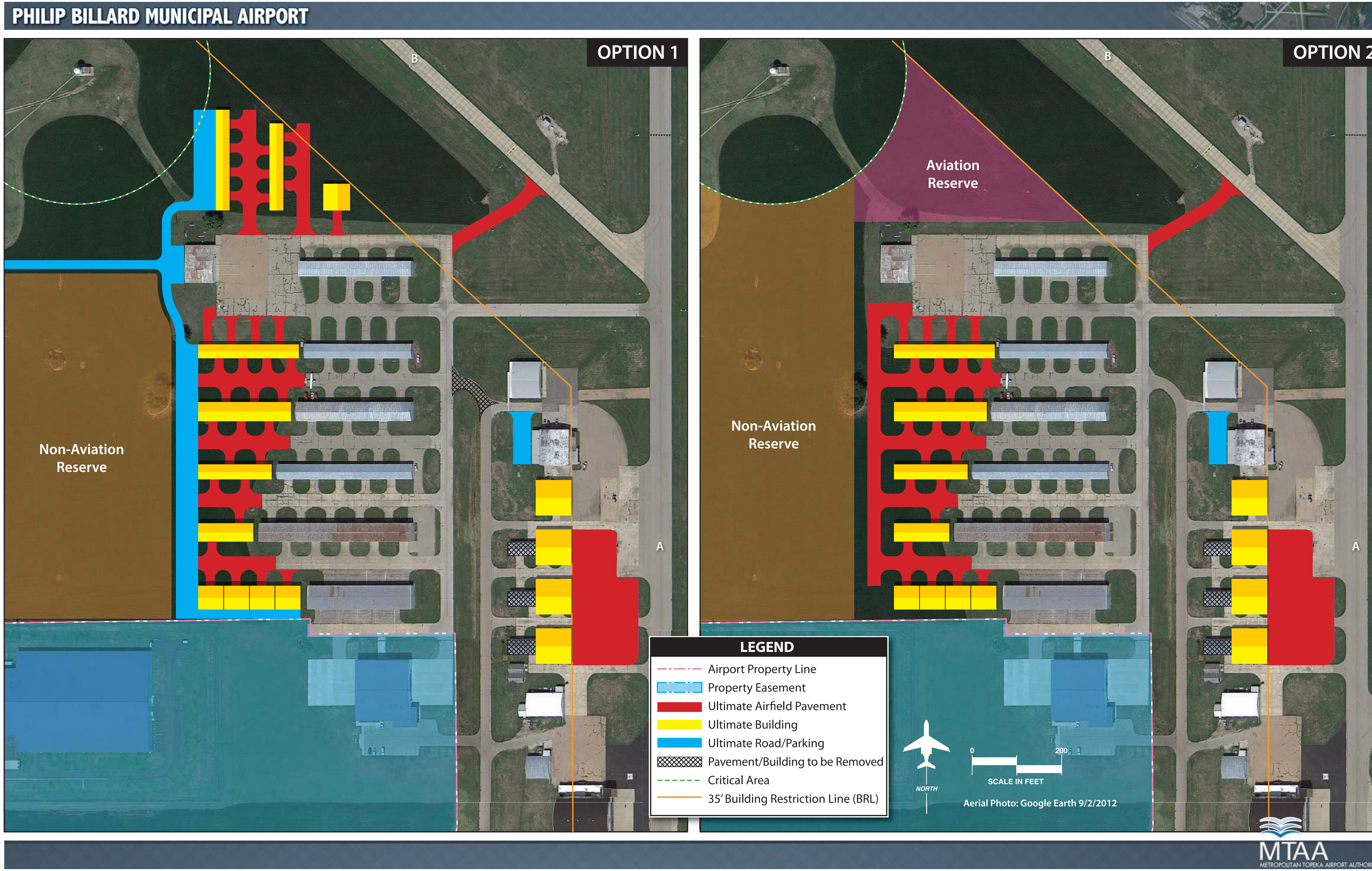

Exhibit 4K
T-HANGAR DEVELOPMENT AREA

anticipated to be in un-leasable condition. Until such time, the flight-line T-hangars should remain in a revenue-producing capacity for the airport. The existing T-hangars are not a penetration to the BRL because they are lower in height. Removing them should only be considered if they are not able to produce revenue and not because of the location of the 35-foot BRL.

SOUTH TERMINAL AREA DEVELOPMENT OPTIONS

The south terminal area is considered those areas south of the stone hangar. The future disposition of Runway 4-22 will determine the area available for development. **Exhibit 4L** presents two options for development if the runway is closed.

Option 1

With the closure of Runway 4-22, the entire area south of the terminal building becomes available for development. Any development planned should locate larger, high-activity conventional hangars closest to Taxiway E. Box hangars and T-hangars should be set back or located further south of the terminal area.

As shown on the exhibit, Option 1 considers apron area fronting Taxiway E with conventional hangars facing the apron. There are numerous conventional hangars shown; however, this far exceeds the forecast need. At a minimum, space for one or two large conventional hangars should be reserved, with the remaining area available for box or T-hangars.

Option 2

The next option for landside development in the south terminal area considers three conventional hangars and an access taxilane. The taxilane would extend from the planned apron area to the southwest. As shown, the taxilane provides access to two connected box hangar structures with 10 aircraft storage units. The remaining area fronting Taxiway E should be reserved for aviation development exclusively.

Option 3 – Current ALP Plan

A third option is to maintain the development plan shown on the current ALP (**Exhibit 4A**). This plan considers three additional conventional hangars facing a new apron area. Farther south, adjacent to Taxiway E, four T-hangar structures are located. This option also maximizes development space and presents an extended range plan.

SOUTH DEVELOPMENT OPTION WITH RUNWAY 4-22 OPEN

If Runway 4-22 is planned to remain open, then the potential developable land to the south becomes limited due to the need to protect operations to and from the runway. The RPZ for Runway 4 must remain clear and structures should be located no closer than the BRL.

Exhibit 4M shows this potential with two larger conventional hangars and a taxilane providing access to two rows of connected box hangars.

LANDSIDE SUMMARY

The landside facility layout should follow basic industry standards, such as locating high-activity hangars on or near the main terminal area apron. Medium-activity box or connected box hangars should then be set back from the flight line and low-activity T-hangars should be the farthest from the flight line. Sustainability in planning should also be considered by such means as maximizing available land area and limiting the need to extend utilities.

Each of the development options follows these basic airport planning principles, primarily by planning future hangar development in the existing airport terminal area. This area is large enough to easily accommodate forecast growth in based aircraft at the airport. Each of the alternatives considers a long term vision that would extend beyond the 20-year scope of the master plan. Only under some unpredictable circumstance, such as the need to accommodate a large influx of based aircraft to the field (e.g., another airport closes), would this full build-out be necessary within 20 years. Nonetheless, it is beneficial to provide a long term vision for the airport for future generations.

As discussed in Chapter Three – Facility Requirements, the airport is forecast to need approximately 19,200 square feet of new hangar space over the next 20 years. Most of this space is needed in the form of box hangars. **Table 4A** presents a summary of the total hangar area proposed for each alternative.

TABLE 4A
Aircraft Storage Unit Summary
Philip Billard Municipal Airport

	T-Hangar	Box Hangar	Conventional Hangar	Total
NORTH TERMINAL AREA - OPTION 1				
Square Feet	40,200	3,600	6,400	50,200
Est. Storage Units	30	1	2	33
NORTH TERMINAL AREA - OPTION 2				
Square Feet	27,300	11,500	6,400	45,200
Est. Storage Units	20	4	2	26
SOUTH TERMINAL AREA - CLOSE RUNWAY 4-22 - Option 1				
Square Feet	0	0	108,000	108,000
Est. Storage Units	0	0	40	40
SOUTH TERMINAL AREA - CLOSE RUNWAY 4-22 - Option 2				
Square Feet	0	43,200	45,000	88,200
Est. Storage Units	0	12	15	27
SOUTH TERMINAL AREA - RUNWAY 4-22 OPEN				
Square Feet	0	36,000	30,000	66,000
Est. Storage Units	0	10	10	20

Source: Coffman Associates estimates.

While the long term vision far exceeds the forecast need, the potential layouts presented allow hangar development to follow a phased approach for each hangar type. For example, if a T-hangar facility becomes the next priority, then it can be

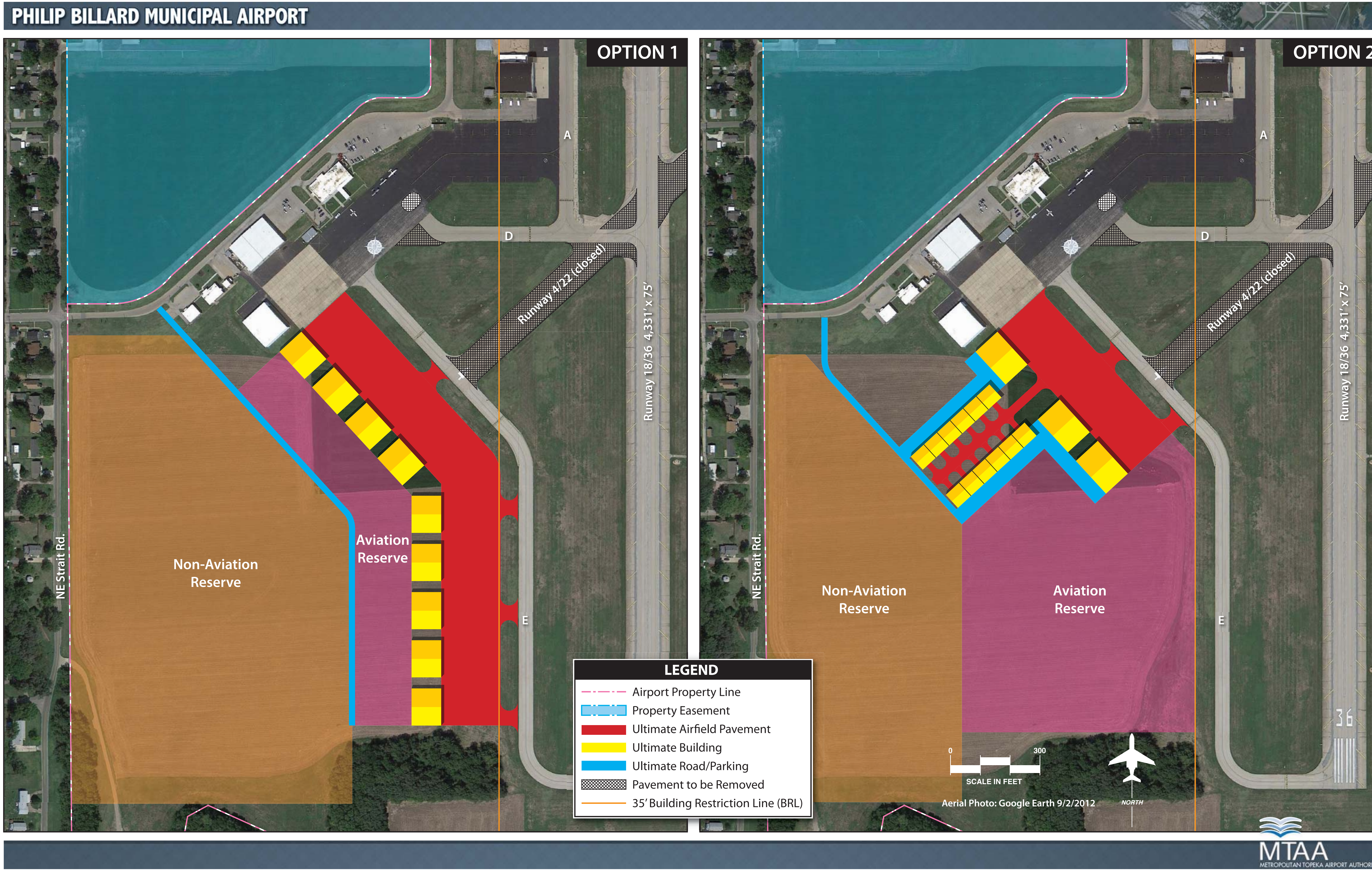

Exhibit 4L
SOUTH TERMINAL AREA WITH RUNWAY 4-22 CLOSED

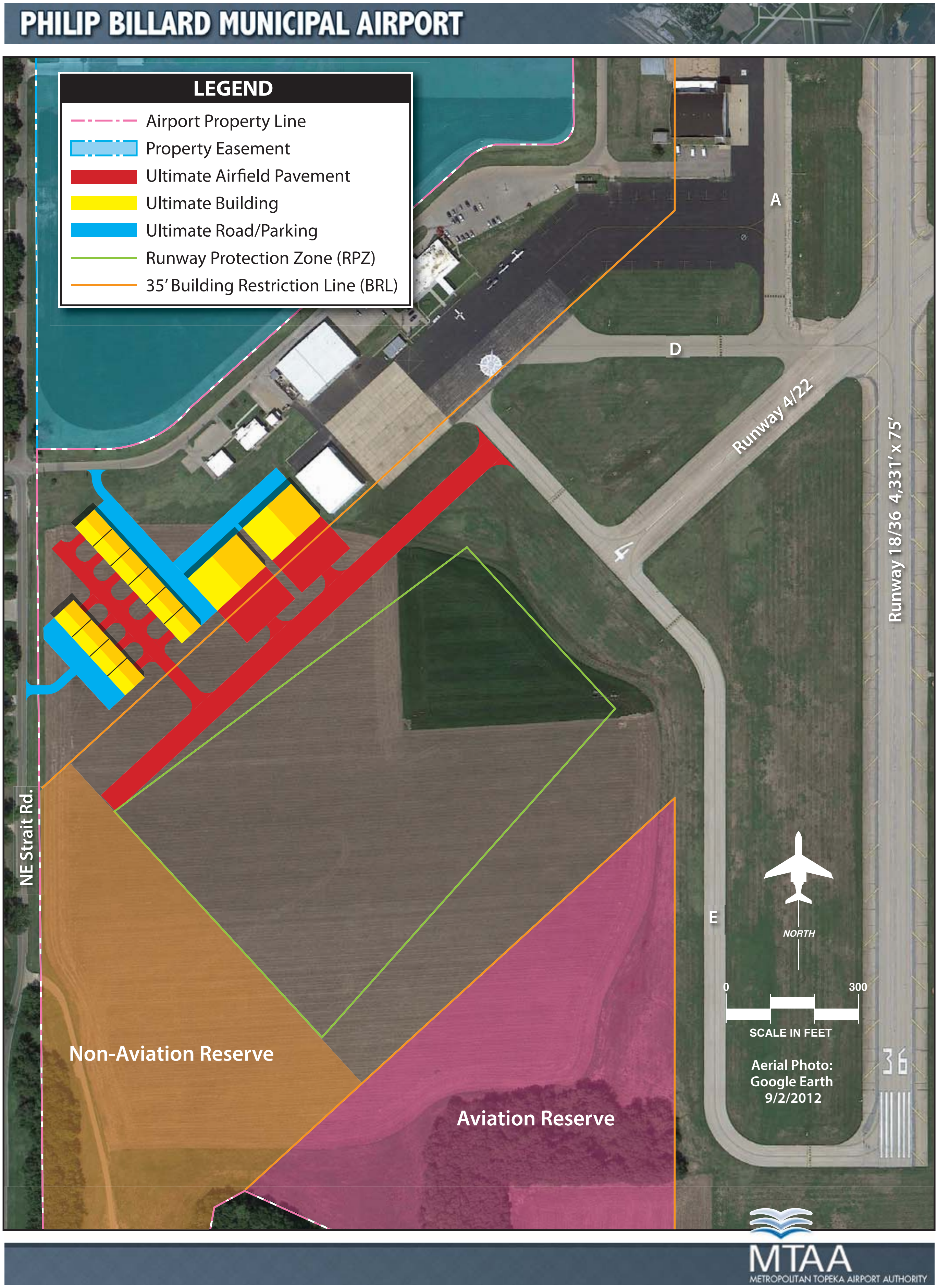

Exhibit 4M
SOUTH DEVELOPMENT OPTION -
RUNWAY 4-22 OPEN

constructed immediately at the designated location with minimal extraneous costs.

ALTERNATIVES SUMMARY

Several development alternatives related to both the airside and the landside have been presented. On the airside, the major considerations are the potential to extend Runway 13-31 an additional 601 feet, bringing the total runway length to 5,700 feet. This is the recommended length for the runway to accommodate 100 percent of business jets at 60 percent useful load. This project should be considered a long term project that will be dependent upon a specific large business jet operating frequently. This specific justification will be needed to move forward with an extension.

Runway 18-36 does not currently provide a threshold taxiway to the Runway 18 end. The alternative presented would extend Runway 18 to the north approximately 469 feet. The purpose of the extension is to allow Taxiway A to be extended to the runway threshold in a standard manner. This design feature is important because additional runway length is not justified; however, simply extending the taxiway to the current runway threshold will create a more confusing and potentially dangerous intersection.

A significant consideration on the airside is the future disposition of Runway 4-22. If the runway is to remain open, then the land area southwest of Runway 4 can only be developed in a limited manner. If the runway is to be closed, then a much larger area becomes available for future aviation development. It should be noted that the future demand forecast for aircraft storage space can be met and is not dependent upon the closure of the runway.

On the landside, there are several clearly identifiable areas where future aviation development should be centered. In the north terminal area, T-hangars and box hangars could be extended to the west and to the north. In the south terminal area, the development options will depend on the status of Runway 4-22. All options for future hangar development far exceed the forecast 20-year need; therefore, meeting forecast hangar needs is not dependent upon the runway closing.

After review by the PAC, a recommended concept will be presented in the next chapter. Elements, such as compliance with FAA standards and on-airport land use, will also be addressed.

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Chapter 5

RECOMMENDED MASTER PLAN CONCEPT

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Chapter Five

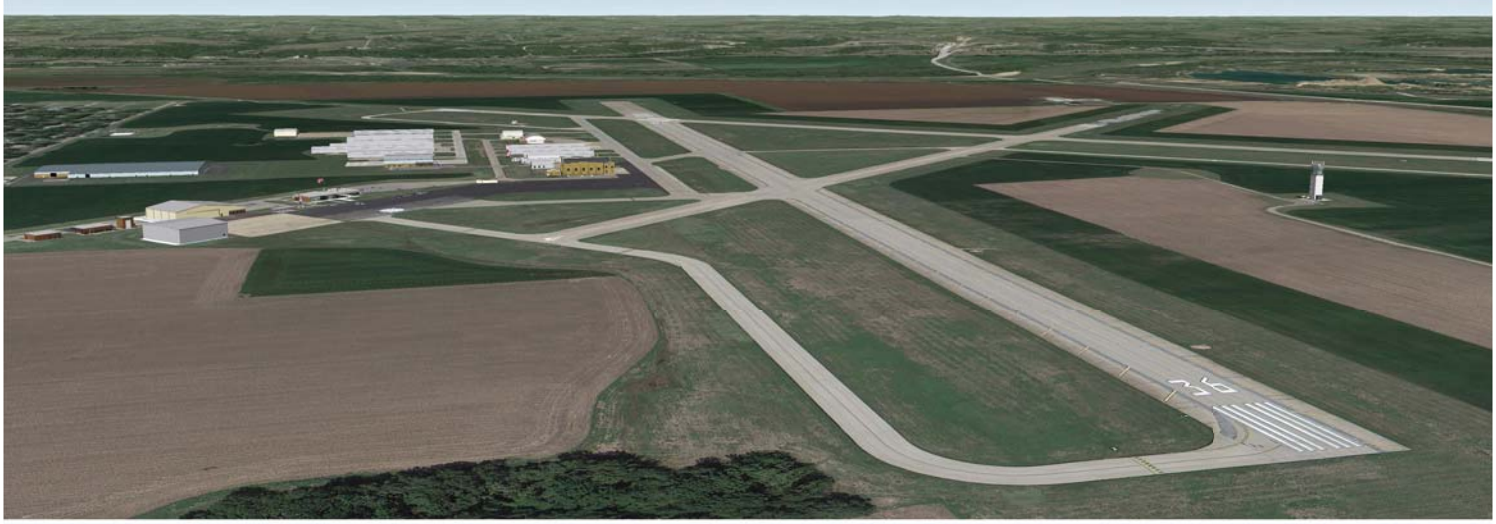
RECOMMENDED MASTER PLAN CONCEPT

The airport master planning process for Philip Billard Municipal Airport (TOP) has evolved through the development of forecasts of future demand, an assessment of future facility needs, and an evaluation of airport development alternatives to meet those future facility needs. The planning process has included the development of three sets of draft working papers which were presented to the Planning Advisory Committee (PAC) and discussed at several coordination meetings.

The PAC is comprised of several constituencies with an investment or interest in Philip Billard Municipal Airport. These groups included representatives from the Federal Aviation Administration (FAA), the Metropolitan Topeka Airport Authority, Shawnee County, Kansas Department of Transportation - Division of Aviation, airport businesses, and local and national aviation associations. This diverse group has provided extremely valuable input into the recommended plan.

In the previous chapter, several development alternatives were analyzed to explore options for the future growth and development of Philip Billard Municipal Airport. The development alternatives have been refined into a single recommended concept for the master plan. This chapter describes, in narrative and graphic form, the recommended direction for the future use and development of Philip Billard Municipal Airport.

The recommended concept provides the ability to meet the increasing demands on the airport by larger corporate aircraft operators while continuing to provide ade-



quate space for smaller piston aircraft operators. The recommended master plan concept, as shown on **Exhibit 5A**, presents the ultimate configuration for the airport which preserves and enhances the role of the airport while meeting FAA design standards. A phased program to implement the recommended development concept will be presented in Chapter Six - Capital Improvement Program. The following sub-sections will describe the recommended master plan concept in detail.

The Philip Billard Municipal Airport is classified by the FAA as a general aviation airport and it is included in the *National Plan of Integrated Airport Systems* (NPIAS). NPIAS airports are considered important to the national aviation infrastructure and, as such, are eligible for development grant funding from the FAA. The FAA has further categorized the airport as a "Local" general aviation facility. The airport is classified as a "Regional Airport "in the Kansas Airport System Plan.

AIRSIDE CONCEPT

The airside plan generally considers those improvements related to the runway and taxiway system. Runway 13-31 is planned to be extended from 5,099 feet to 5,700 feet in the long term. Runway 18-36 is planned to be extended to the north a distance of 769 feet, bringing the total length to 5,100 feet. Runway 4-22 is planned to be closed.

RUNWAY 4-22

During the master planning process, the future disposition of Runway 4-22 was discussed at great length. Chapter Four – Alternatives presented the advantages and disadvantages of both keeping the runway open and potential closure. The recommendation included within this master plan is to plan for closure of Runway 4-22.

Runway 4-22 has been planned for closure for more than a decade. The previous airport layout plan also included planning for closure of the runway. The primary reason for closing Runway 4-22 is that it is redundant and is unnecessary. The combination of Runways 13-31 and 18-36 meets the FAA requirements for wind coverage. As such, the runway is not eligible for FAA maintenance and improvement grants, and costs associated with the runway falls to MTAA.

As of 2013, the runway has deteriorated to such a degree that foreign object debris (FOD) develops rapidly. FOD can be a safety concern as rocks and other debris can damage aircraft. It has become time consuming for the airport maintenance staff to remove FOD and maintain the runway in a safe operating condition.

From a design standpoint, the existence of the runway contributes to the FAA-identified Hot Spot located at the intersection of Runway 4-22 and Taxiways A and D. Closure of the runway will help to mitigate the Hot Spot. The runway protection zone (RPZ) serving the approach to Runway 22 extends beyond airport property and over private property. Closure of the runway will mitigate this non-standard RPZ and enhance landside development possibilities. Currently, the RPZ associated with the approach to Runway 4 eliminates development options adjacent to the existing terminal area.

The primary negative to closing the runway is that pilots who may utilize Runway 4-22 would have to taxi a slightly farther distance to another runway. However, since Runway 4-22 is used infrequently, estimat-

PHILIP BILLARD MUNICIPAL AIRPORT

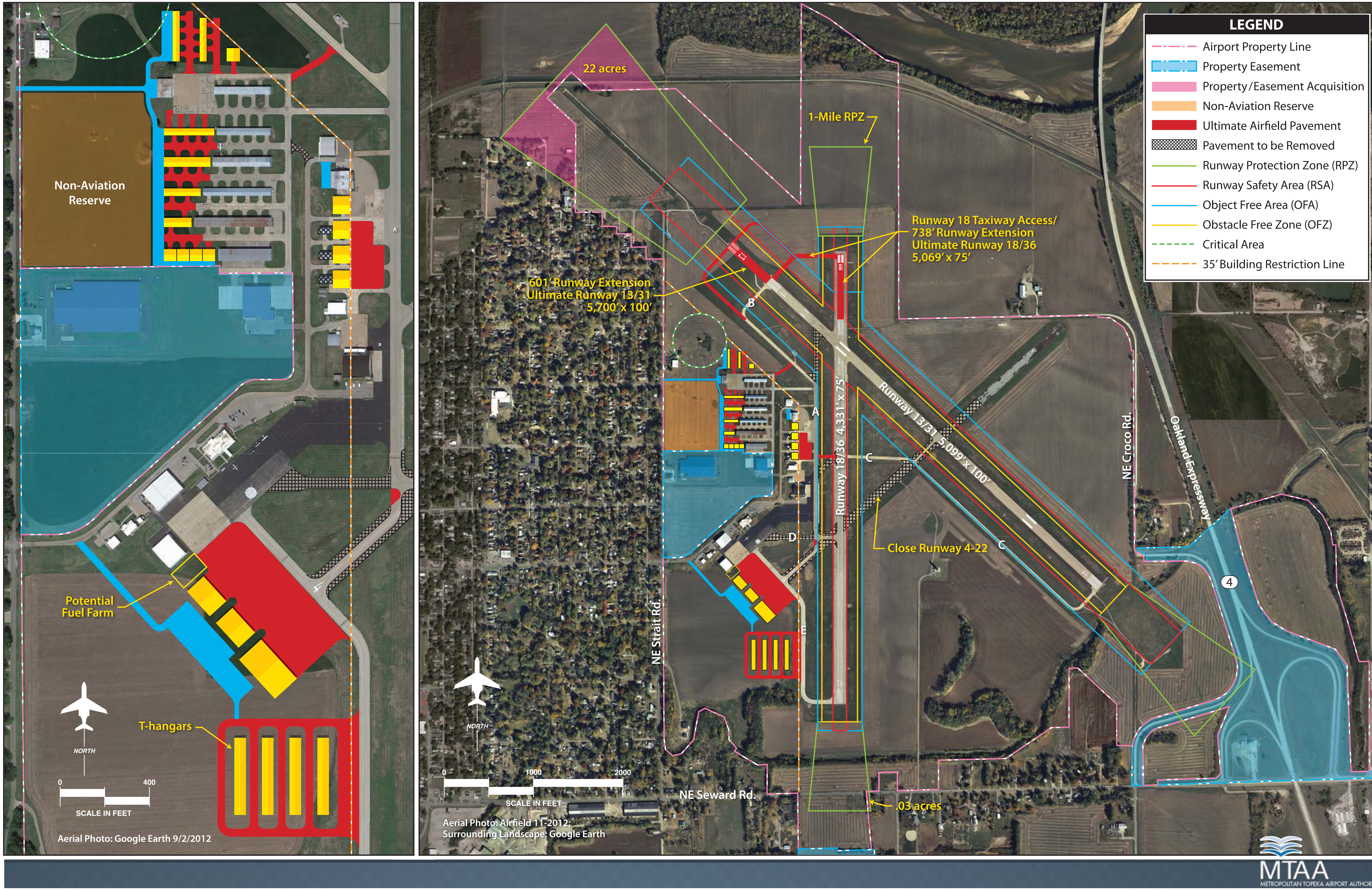


Exhibit 5A
RECOMMENDED MASTER PLAN CONCEPT

ed at less than five percent of the time, the additional taxi time is not considered a significant impact.

There are costs associated with closing a runway; however, these costs are eligible for FAA funding. The initial cost would be associated with appropriate environmental documentation following the guidelines contained in the *National Environmental Policy Act* (NEPA). Once closure is approved, there are several options for implementation which range from simply marking and publishing that the runway is closed to complete removal of the pavement.

DESIGN STANDARDS

The FAA has established design criteria to define the physical dimensions of runways and taxiways, as well as the imaginary surfaces surrounding them which protect the safe operation of aircraft at the airport. These design standards also define the separation criteria for the placement of landside facilities.

As discussed previously, the design criteria primarily center on the airport's critical design aircraft. The critical aircraft is the most demanding aircraft or family of aircraft which currently, or are projected to, conduct 500 or more operations (take-offs and landings) per year at the airport. Factors included in airport design are an aircraft's wingspan, approach speed, tail height and, in some cases, the instrument approach visibility minimums for each runway. The FAA has established the Runway Design Code (RDC) to relate these design aircraft factors to airfield design standards. The most restrictive RDC is also considered the overall Airport Reference Code (ARC).

Analysis conducted in Chapter Three - Facility Requirements concluded that the current critical and future RDC for Runway 13-31 falls in C-II. For Runway 18-36, the RDC is B-II. To the greatest extent feasible, those airfield elements associated with each runway should be planned to meet the respective design standards.

While airfield elements, such as safety areas, must meet design standards associated with the applicable RDC, landside elements can be designed to accommodate specific categories of aircraft. For example, a taxilane into a T-hangar area only needs to meet the object free area (OFA) width standard for smaller single and multi-engine piston aircraft expected to utilize the taxilane, not those standards for the larger business jets representing the overall critical aircraft for the airport.

Table 5A presents the primary design standards to be applied to the airport based on the runway design code for each runway. Those elements in **BOLD** indicate a planned change to the design standard based upon the recommended master plan concept.

TABLE 5A
Current and Future Runway Design Standards
Philip Billard Municipal Airport

	Current/Future	Current/Future
Runway	**Runway 13-31**	**Runway 18-36**
Design Aircraft	C-II-3	B-II-2
Example Aircraft	Cessna Citation X (750)	King Air 200
Runway Design Code	C-II-2400	B-II-5000
Runway Reference Code	C-II-2400	B-II-4000
Visibility Minimums	½-Mile (13)/1-Mile(31)	1 Mile (18,36)
RUNWAY DESIGN		
Runway Length	5,099/**5,700**	4,331/**5,100**
Runway Width	100	75
Runway Shoulder Width	10	10
RUNWAY PROTECTION		
Runway Safety Area (RSA)		
Width	500	150
Length Beyond Departure End	1,000	300
Length Prior to Threshold	600	300
Runway Object Free Area (ROFA)		
Width	800	500
Length Beyond Departure End	1,000	300
Length Prior to Threshold	600	300
Runway Obstacle Free Zone (ROFZ)		
Width	400	400
Length Beyond End	200	200
Precision Obstacle Free Zone (POFZ)		
Width	800	NA
Length	200	NA
Approach Runway Protection Zone (RPZ)		
Length	2,500 (13)/1,700 (31)	1,000 (18,36)
Inner Width	1,000 (13)/500 (31)	500 (18,36)
Outer Width	1,750 (13)/1,010 (31)	700 (18,36)
Departure Runway Protection Zone (RPZ)		
Length	1,700	1,000
Inner Width	500	500
Outer Width	1,010	700
RUNWAY SEPARATION		
Runway Centerline to:		
Holding Position	250	200
Parallel Taxiway	400	240
Aircraft Parking Area	500	250

Note: All dimensions in feet
Source: FAA AC 150/5300-13A, Airport Design

DESIGN AIRCRAFT

As discussed at length in Chapter Three – Facility Requirements, the design aircraft is defined by that category of aircraft which accounts for 500 or more operations annually. The design aircraft is identified by its Aircraft Approach Category (AAC), Airplane

Design Group (ADG) and Taxiway Design Group (TDG). For Runway 13-31, the design aircraft is identified as those aircraft that fall in C-II-3. Small- and medium-sized business jets, such as the Cessna Citation X (model 750), best represent this design aircraft.

For Runway 18-36, the design aircraft is represented by those aircraft that fall in B-II-2. This category is best represented by small business jets and larger turboprop aircraft. An example aircraft would be the Beech King Air 350, a twin engine turboprop aircraft.

Runway Design Code (RDC)

The RDC is an FAA code signifying the design standard to which the runway is to be built. This code includes the AAC, ADG, and the lowest instrument approach visibility planned. An RDC is applied to each runway.

Runway 13-31 is planned to remain in RDC C-II-2400. This code indicates that the runway is planned to have (or maintain, in this case) an instrument approach with ½-mile visibility minimums. The current RDC for Runway 18-36 is B-II-5000. This indicates the runway is designed for those aircraft in B-II and it has an instrument approach with 1-mile visibility minimums. Since lower visibility minimums are not feasible for Runway 18-36 in order to maintain a clear primary surface, 1-mile visibility minimums are planned to be maintained. Therefore, the future RDC for Runway 18-36 remains B-II-5000.

Runway Reference Code (RRC)

The RRC is an FAA code signifying the current operational capabilities of a runway and associated parallel taxiway. The RRC is comprised of the AAC, ADG, and the lowest visibility minimum permissible based on the existing runway/taxiway separation. The RRC is not a design standard; instead, it indicates the potential capabilities of the existing runway and parallel taxiway.

The RRC for Runway 13-31 is C-II-2400. This indicates that the runway can support a design aircraft in C-II and can support an instrument approach with ½-mile visibility minimums based on runway to taxiway separation. The RRC is only an indication that the existing airport geometry can support this classification, not an indication that there are no obstructions or other factors that may restrict the capability of the airport.

The RRC for Runway 18-36 is B-II-4000. This means that the existing runway/taxiway geometry is capable of supporting a design aircraft in B-II and an instrument approach with visibility minimums as low as ¾-miles. To support an instrument approach with ¾-mile visibility minimums, the parallel taxiway must be at least 240 feet from the runway centerline. At 275 feet, Taxiway A meets this minimum requirement.

RUNWAY 13-31 LENGTH

FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design* is utilized in Chapter Three – Facility Requirements to arrive at the minimum runway length necessary for Philip Billard Municipal Airport. The FAA provides several categories of runway length calculations based primarily on documented activity by a group of similar aircraft. At Philip Billard Municipal Airport, business jets exceed the threshold of 500 annual operations.

To accommodate 75 percent of business jets at 60 percent useful load, a runway length of 5,500 feet is recommended. To accommodate the remaining 25 percent of business jets at 60 percent useful load, a runway length of 5,700 feet is recommended.

In addition to these calculations, the operating manuals of several business jets known to operate at the airport were consulted. The runway length needs of several business jets are of particular interest in relation to runway length. A Lear 45, which falls in the 0 to 75 percent category (ARC D-I), is based at the airport. The existing runway length may restrict the useful load for this aircraft. The Cessna Citation X (model 750) is a C-II business jet that falls in the 75 to 100 percent category. This aircraft needs up to 6,400 feet of runway length for takeoff on hot days when fully loaded.

As a result of these runway length calculations, Runway 13-31 is planned for an extension of up to 601 feet, bringing the total runway length to 5,700 feet. Specific justification would need to document 500 annual operations by an aircraft, such as the Lear 45 or Cessna Citation X, which needs the additional length. The forecasts of aviation demand presented in Chapter Two – Forecasts indicated that the justification threshold may not be crossed within the 20-year scope of this master plan. Nonetheless, if activity by these types of business jets were to sufficiently increase, then the planned extension of Runway 13-31 may have a higher priority.

Consideration was given to which end of the runway could best support the extension (or if the 601-foot extension could be split between the two ends). It was determined that the Runway 13 end could best support the extension primarily because it would be more practicable to clear the approach RPZ (and thus meet design standard) for Runway 13 than for Runway 31. To plan an extension to the south would shift the Runway 31 RPZ over the Oakland Expressway interchange at Seward Road. Since public roads within the RPZ are incompatible and it is not practicable to relocate the interchange, extending the runway in this direction is not considered further.

RUNWAY 18-36 LENGTH

The FAA recommended length for a crosswind runway is based primarily on activity at the airport and on overall airport wind coverage. Runway 18-36 should, at a minimum be capable of accommodating all small general aviation aircraft (A/B-I, under 12,500 pounds). Utilizing FAA runway length tables, a runway length of 4,300 feet is recommended for Runway 18-36. At 4,331 feet in length, Runway 18-36 currently meets the minimum recommended length; therefore, extension of the runway is not justified based up on capacity needs.

The most challenging aspect of Runway 18-36 is not its current length, but the fact that there is not direct taxiway access to the Runway 18 threshold. Because of this, pilots are forced to back-taxi on the runway to the threshold or depart from the taxiway intersection. Neither of these options is supported by design or operating standards.

The back-taxi maneuver places aircraft on the runway for a longer period of time, and it places them on Runway 13 at the location of the touchdown zone. Departing at the intersection reduces the available runway length, thus reducing the length of time that pilots have available to depart or to abort. Recent design guidelines from the FAA emphasize providing direct taxiway access to the runway thresholds, and these taxiways should be at a 90-degree angle to enhance pilot peripheral views.

To provide taxiway access to the Runway 18 threshold, the runway is planned to be extended by 769 feet, bringing the total length to 5,100 feet. The alternatives analysis recommended an extension of 738 feet; however, the FAA recommended planning the runway to a length of 5,100 feet in order to make the reported length a uniform round number which allows edge light installation to meet design standards.

The planned extension is intended to mitigate a significant safety concern at the airport; it is not to increase the capacity of the runway. In fact, an alternate option would be to shorten the runway; however, the runway would have to be shortened to 3,600 feet, which is less than the minimum recommended length of 4,300 feet.

RUNWAY STRENGTH

Runway 13-31 is strength rated at 50,000 pounds for single wheel loads (S), 72,000 pounds for dual wheel loads (D), and 110,000 pounds for dual tandem wheel loading (DT). This strength fully meets the requirements of the critical aircraft family of business jets in ARC C-II. The existing pavement strength is planned to be maintained. Routine maintenance and overlay of Runway 13-31 will likely have the effect of increasing the strength of the pavement over time.

Runway 18-36 is strength rated at 60,000 pounds S, 80,000 pounds D, and 96,000 pounds DT. This is adequate to meet the needs of the intended users and is planned to be maintained through routine maintenance.

RUNWAY SAFETY AREAS

The Facility Requirements chapter discussed the requirements for the runway safety area (RSA), object free area (OFA), and obstacle free zone (OFZ). Of particular concern is the RSA, which must meet FAA design standard to the greatest extent possible. The RSA is an area surrounding the runway that must be cleared of all penetrating obstructions, graded, drained, and capable of supporting an aircraft veer-off or emergency vehicles.

The RSA for Runway 13-31 is 500 feet wide and extends 1,000 feet off each runway end. Only those navigational aids with frangible bases, such as runway edge lights and approach lights necessary for the safe operations of aircraft, are allowable within the RSA. The OFA must also be clear of penetrating obstructions, but it does not have to be capable of supporting an aircraft or emergency vehicle, like the RSA. The OFA for Runway 13-31 is 800 feet wide and extends 1,000 feet beyond the runway end. Ownership of the RSA by the airport is required.

The RSA, OFA, and OFZ for both runways currently meet design standard. If either Runway 13-31 or 18-36 is extended, then the standards for these critical safety areas will need to be maintained around and beyond the extended runways.

For Runway 13-31, the planned extension will place a small corner of the RSA on NE Strait Road, and the OFA would extend slightly further. This portion of NE Strait Road would have to be closed and the airport fence line would have to be relocated outside the OFA in this area. There are no potential obstructions to the safety areas if Runway 18-36 is extended to the north.

The OFZ is 400 feet wide and extends 200 feet beyond the runway ends for both runways. Generally, the OFZ falls within the RSA. Like the RSA, the OFZ precludes penetrating obstructions except for frangible navigational aids necessary for safe operation of aircraft at the airport. The OFZ design standards are currently met at the airport, which is a condition that must be maintained if the runways are extended.

RUNWAY PROTECTION ZONES

The RPZ is a trapezoidal area beginning 200 feet beyond the runway ends. The function of the RPZ is to protect people and property on the ground. Typically, this is achieved through airport ownership of the RPZs, although proper land use control measures, such as easements, are acceptable. The RPZs should be cleared of any incompatible objects or activities. Prohibited land uses include residences and places of public assembly such as churches, schools, hospitals, office buildings, and shopping centers.

The FAA recommends that the airport sponsor own in fee simple the RPZ property. When fee simple ownership is not currently feasible, positive land use measures should be implemented in order to protect the airport from encroachment by incompatible land uses or obstructions.

In September of 2012, the FAA published *Interim Guidance on Land Uses within a Runway Protection Zone*. The guidance addresses action necessary for new or modified RPZs. Any action that would introduce new land use incompatibilities into the RPZ will have to be specifically reviewed and approved by the FAA. Airport sponsors should follow existing guidance for meeting RPZ design standards for existing incompatibilities.

The current compatibility status of the RPZs for each runway end was presented in Chapter Three – Facility Requirements. **Table 5B** presents information related to the current and future compatibility status of RPZs based on the recommended concept.

TABLE 5B
RPZ Status and Mitigation Recommendation
Philip Billard Municipal Airport

Approach RPZ	Current Status	Current Recommendation	Future Status	Future Recommendation
Runway 13	Portions of three (3) structures within RPZ	Acquire and remove buildings	The three (3) structures are removed from the RPZ and one (1) new structure is introduced to RPZ	Acquire and remove new structure
	Public Roads in RPZ	None	Public Roads in RPZ	Close roads
	Private property in RPZ	Acquire easement or in fee	Private property in RPZ	Acquire property
Runway 31	Public Roads in RPZ	None	No change planned	No change planned
Runway 36	Public Road in RPZ	None	No change planned	No change planned

Source: Coffman Associates analysis

Currently, the RPZ serving the approach to Runway 13 has several incompatibilities, including residential housing and other structures and public roads. There are three structures, two of which are residential housing, which are on the edge of the RPZ. These properties are recommended for acquisition in order to meet the RPZ design standards. If the runway is extended in the future, then the RPZ will shift accordingly and the three structures will no longer be in the RPZ; however, an additional home would be introduced to the RPZ. As part of the runway extension project, this house would have to be acquired.

There are several public roads within the Runway 13 RPZ currently. This situation is essentially grandfathered. The extension of Runway 13-31 would lessen the RPZ impact to public roads; however, the RSA and OFA would now extend over a portion of these roads. At this point, the roads would have to be closed. The position of the Runway 13 RPZ was previously shown on Exhibit 4C.

Currently there are approximately 5.7 acres of private property within the outer edges of the RPZ. This property is recommended for acquisition or an avigation easement.

The outer edges of the approach RPZ serving Runway 31 extends over Croco Road and a small portion of the Oakland Expressway exit ramp. No change is planned to the size or location of this RPZ; therefore, no action is necessary regarding these roads.

The approach RPZ serving Runway 36 extends across Seward Road. A small sliver of this RPZ (approximately .03 acres) extends beyond airport property on the east side of the RPZ. Analysis of aerial photography indicates that this portion of the RPZ may extend over a house. It is recommended that the airport acquire this land and the house, if detailed ground surveys show that the house is within the RPZ.

The RPZ serving Runway 18 is currently on airport property entirely. Consideration was given to improving the instrument approach so that visibility minimums may decrease from 1-mile to ¾-miles. With a lower visibility minimum the primary surface surrounding the runway increases in size to encompass numerous hangars. As a result, 1-mile visibility minimums are to be maintained.

INSTRUMENT APPROACHES

The recommended concept maintains the existing non-precision instrument approaches with 1-mile visibility minimums to Runways 31 and 36. The precision instrument approach to Runway 13 with ½-mile visibility minimums is also maintained; however, if the runway is extended, then the precision approach will need to be redeveloped and published.

Runway 18 is planned to maintain an instrument approach with 1-mile visibility minimums.

RUNWAY/TAXIWAY SEPARATION

There are two factors that primarily influence the FAA standards for runway/taxiway separation. The first is the type and frequency of aircraft operations as described by the applicable RDC, and the second is the capability of the instrument approaches available at the airport. The current RDC is C-II for Runway 13-31 and B-II for Runway 18-36. Runway 13 has a CAT-I ILS precision instrument approach with ½-mile visibility minimums. Runway 31 has a non-precision instrument approach with 1-mile visibility minimums. Both ends of Runway 18-36 have a non-precision instrument approach procedure with 1-mile visibility minimums.

Those portions of Taxiway A that are parallel to Runway 18-36 are 275 feet from Runway 18-36, centerline to centerline. The applicable separation design standard is a minimum of 240 feet now and in the future, which considers a ¾-mile visibility minimum. The taxiway hold lines should be 200 feet from the runway centerline.

Taxiway B is parallel to the northwest portion of Runway 13-31 and is separated by 500 feet from the runway. This distance exceeds the FAA design standard of 400 feet for a runway with a precision instrument approach. No change is needed or planned to this taxiway.

Taxiway C is parallel to the southern half of Runway 13-31 and is separated from the runway by 400 feet. This separation distance meets standard and is planned to be maintained.

Taxiway E is parallel to the southern portion of Runway 18-36 and is separated from the runway by 400 feet. This separation distance meets standard and is planned to be maintained.

TAXIWAYS

An extensive discussion of the taxiway design standards has been presented previously in Chapter Three – Facility Requirements. Several taxiway elements as they exist today do not conform to the latest design standards. Each of these has been addressed in the master plan concept.

Taxiway C

The portion of Taxiway C located to the west of Runway 18-36 does not meet standard because it is not at a right angle to the runway. Taxiways should be at a 90-degree angle to the runway in order to provide pilots with a full peripheral view of the runway, unless the taxiway is specifically designed as a high speed exit, which this is not. To solve the 90-degree issue, this portion of Taxiway C is planned to be reconstructed at a 90-degree angle.

Taxiway C is also a runway crossing that is located in the "high-energy" area of the runway. Runway crossings should be located in the first or last third of the runway because the middle third is where pilots will have reduced ability to avoid potential collisions due to the higher rate of speed in this location.

An additional analysis has been undertaken to determine alternatives to having a taxiway crossing in the high-energy portion of the runway. This analysis is presented on **Exhibit 5B**.

The exhibit shows the high-energy portion of Runway 18-36 as based on the recommended concept. The primary function of Taxiway C is to provide access to and from the Runway 31 threshold. Three additional options for providing this access were considered.

Option 1

The first option considers the construction of a partial eastside parallel taxiway to Runway 18-36. This taxiway would extend from the Runway 36 threshold to an intersection with former Runway 4-22. A portion of Runway 4-22 would then be converted to taxiway to connect with Taxiway C. In total, this taxiway would be approximately 3,200 feet long and encompass approximately 12,400 square yards of pavement. A sub-option considers a crossing taxiway at the south end of the runway that would shorten the distance pilots would have to taxi. This option would result in approximately 2,400 linear feet of new taxiway or approximately 9,300 square yards of pavement.

This option is not considered practicable for two primary reasons: the cost and the benefit. The cost would be in excess of $1.2-$1.6 million to construct, light, and mark the taxiway. The benefit is considered limited since pilots can already access

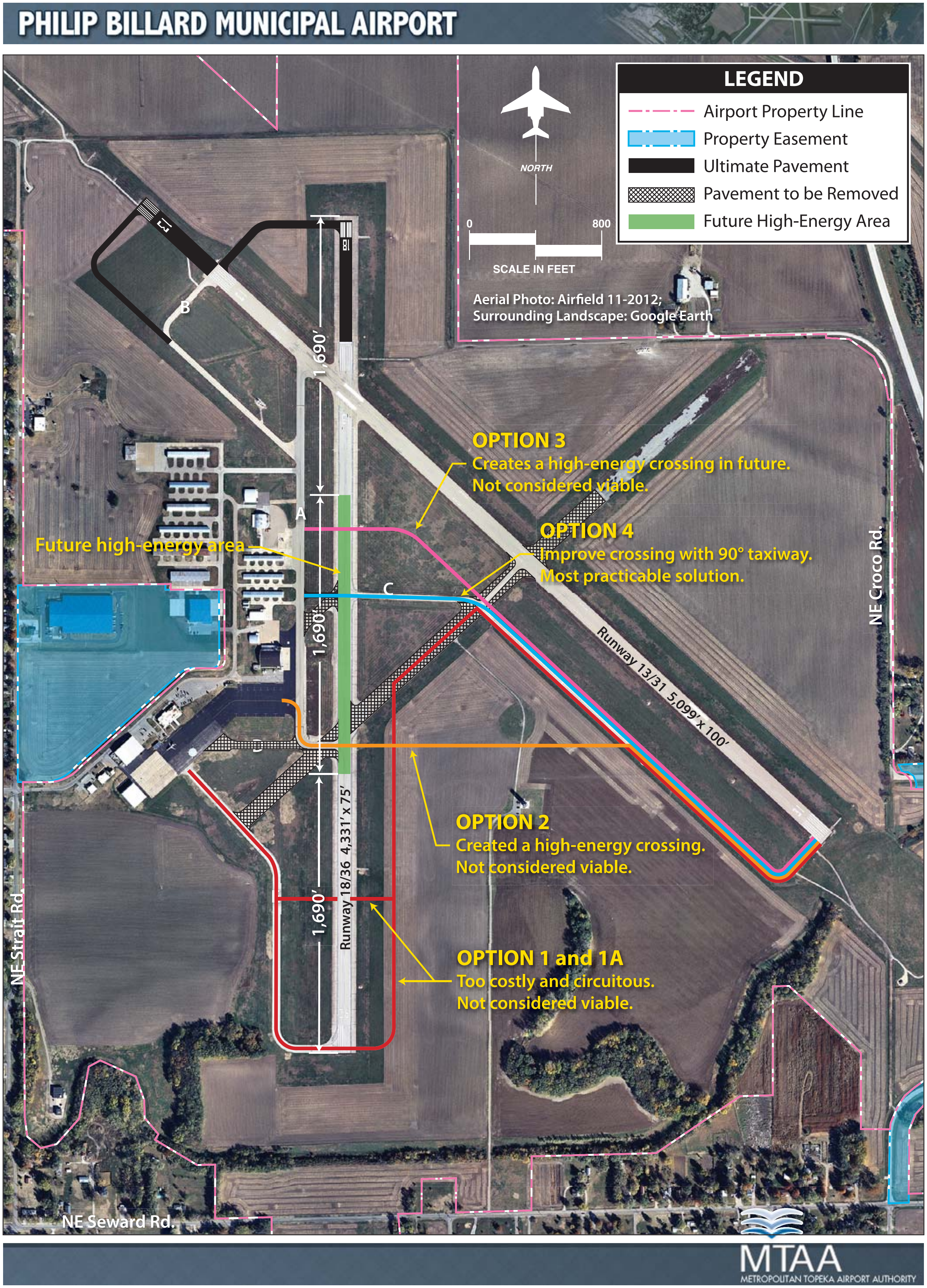


Exhibit 5B
RUNWAY CROSSING OPTIONS

the Runway 13 threshold by simply using Taxiway C.

Option 2

Option 2 considers constructing a taxiway that extends from Taxiway A to Taxiway C, just to the north of the ATCT. This taxiway would be approximately 1,600 feet long and encompass approximately 6,200 square feet of pavement. This taxiway is estimated to cost approximately $800,000.

Option 2 is not considered feasible because it does not resolve the problem as there is still a taxiway crossing the runway at the high-energy portion of the runway.

Option 3

The third option is to shift the crossing taxiway to the north as far as possible. As can be seen from the exhibit, this crossing location would also be located within the high-energy portion of the runway. This taxiway would be approximately 1,000 feet long, encompass 3,900 square yards of pavement and cost approximately $500,000 to construct.

This option is not considered feasible either. It does not solve the high-energy runway crossing issues and it costs much more than the alternative, which is to simply continue to utilize Taxiway C.

Option 4

Option 4 is the practicable and recommended solution to the issue of having a runway crossing located within the high-energy portion of the runway. In this option, Taxiway C is maintained and it continues to be utilized in its current capacity. At Philip Billard Municipal Airport, the most practicable solution is to maintain the non-standard runway crossing because the benefit to be realized from any of the other three alternatives is limited.

Other Taxiway Issues

As discussed in Chapter Four – Alternatives, optimal airfield design would provide a 90-degree threshold taxiway to Runway 18. The recommended method to providing this access is to extend a taxiway from the Runway 13 threshold over to the new Runway 18 threshold. Once this access is available, then the northern portion of Taxiway A between Runway 13-31 and the intersection with Taxiway B becomes useless. This portion of Taxiway A is then planned to be removed so that pilots don't inadvertently end up on the runway.

Taxiway B provides access to the existing Runway 13 threshold. This taxiway will need to be extended if and when the runway is extended. Taxiway D is to be closed and removed as part of the project to mitigate the hot spot. No changes are planned to Taxiway E.

TAXILANES

The taxilane providing access to the north hangar development area was the subject of analysis in the previous chapter of this master plan. In that analysis, it was noted that a taxilane intended to serve aircraft in ADG II should have a 115-foot object free area. There are pavement surfaces within this area where cars and trucks have parked in the past. These areas should be marked as non-parking areas.

The second issue with regard to this taxilane is the access it provides to the runway and taxiway system. Currently, to access Runway 13 from the T-hangar development area, pilots must go east to Taxiway A and then make a sharp 150 degree turn to access Taxiway B. This maneuver is challenging because pilots have to turn onto Taxiway B without being able to fully see Taxiway B.

A more direct route is planned which would intersect with Taxiway B at a 90-degree angle. This new taxilane would be situated to be outside the glideslope antenna critical area. The planned taxilane is designed at a 30-degree angle from the existing taxilane, which meets recommended design standards.

HOT SPOT MITIGATION

The intersection of Taxiways A and D with Runway 4-22 is an FAA identified hot spot on the airfield. In the previous chapter, a total of seven alternatives were considered to mitigate the issue. Four of the options were designed around the assumption that Runway 4-22 would remain open. Now that it has been determined that Runway 4-22 is planned to be closed, the remaining three options are considered. After extensive review and discussion with the planning advisory committee and the public at a public information workshop, Option 3 on Exhibit 4E has been selected as the preferred option.

Option 3 plans to continue Taxiway A to the intersection with former Runway 4-22. Taxiway A would then continue, utilizing a portion of Runway 4-22 to the intersection with Taxiway E. The portion of Taxiway D, extending from the current hot spot to the terminal area apron, would be closed. The portion of Taxiway D east of Taxiway A would remain open to provide a runway entrance/exit point. A small portion of Taxiway A pavement would have to be constructed in order to connect properly with former Runway 4-22.

This option meets several preferences for the airport and its users. The exit from Runway 18-26 at Taxiway D is highly utilized. It is preferred to maintain this entrance/exit. Closing the west portion of Taxiway D is preferred to carving out a "green" island on the terminal area apron (Option 2). Utilizing portions of former Runway 4-22 is desired as it will keep construction costs down and it is a sustainable development technique. In addition, the selected option creates a nearly full parallel taxiway to Runway 18-36. Pilots taxiing from the north hangar area to the Runway 36 threshold no longer would have to traverse the terminal area apron.

VISUAL NAVIGATION AIDS

The visual navigational aids serving Runways 13-31 and 18-36 are adequate and should be maintained for their useful life. In the future, when replacement is necessary, the visual approach slope indicator (VASI) systems serving the approaches to Runways 18, 36, and 31 should be upgraded to precision approach path indicator light system (PAPI) systems. The VASIs are an older technology, having been developed in the 1960s. The FAA is funding the replacement of VASIs with PAPIs at many airports in the country and is supported in this effort by international recommendations (ICAO Annex 14) to replace all VASIs with PAPIs.

Runway 13 is the precision ILS runway, and it has an approach lighting system. This should be maintained. Prior to extending the runway, a determination should be made regarding the relocation and recalibration of the ILS systems. In some cases, ILS systems are not being relocated, but instead replaced by GPS instrument approaches. If possible, the ILS system should be preserved.

Runway end identification lights (REIL) are strobe lights set to the side of the runway which provide rapid identification of the landing threshold. REILs are normally provided for instrument capable runways when an approach lighting system is not available. The Runway 18 end is currently outfitted with REILs. Runways 31 and 36 should be planned for REIL installation when justified.

PROPERTY ACQUISITION

Planning for growth of the airport includes the consideration of strategic property acquisition of adjacent lands in order to allow for facility expansion or for the protection of the function and role of the airport. The FAA supports and provides reimbursement for necessary property acquisition. The reimbursements are provided when the land is necessary for airport development or protection. The FAA supports and funds immediate land acquisition needs, but does not support "land-banking" of property that may or may not be needed in the future.

All recommended property acquisition is related to FAA recommendations that the airport own the entirety of the RPZs where feasible. Therefore, those RPZs that extend beyond current airport property (or are planned to) are recommended for fee simple acquisition.

The approach RPZ serving Runway 13 extends beyond airport property currently encompassing portions of two homes and one business/warehouse facility. These should be acquired if feasible; however, the RPZ is planned to shift off of these structures in the future with the long term planned extension of the runway. Therefore, the airport should consult with the FAA regarding the priority of acquiring these three properties since they may no longer be in the RPZ in the future. The outer edges of the Runway 13 RPZ currently extend off airport property. These areas are recommended for acquisition.

A very small portion (0.03 acres) of the Runway 36 RPZ extends over private property. The RPZ may include a portion of a residential home. The airport should plan to acquire this property if it becomes a priority for the FAA.

AIRSIDE CONCLUSION

Design standards for Philip Billard Municipal Airport are determined by the frequency of activity by the critical aircraft group and the sophistication of the instrument approaches. A design aircraft is determined for each runway with the most restrictive runway design code (RDC) also serving as the overall airport reference code (ARC). The current and future critical aircraft for Runway 13-31 falls in RDC C-II-2400. The current and future RDC for Runway 18-36 falls in RDC B-II-5000.

Runway 4-22 is planned to be closed. The previous airport layout plan also recommended closure of this runway since it was redundant. Analysis in this master plan confirms this conclusion, but more recent design standards and an FAA focus on airfield hot spots indicates that this runway should be closed in the near term. The closure of this runway will help to solve the hot spot issue at the airport.

Two portions of Runway 4-22 are planned to be converted to taxiways. First, the portion extending from the intersection with Runway 13-31 and Taxiway C is planned to be preserved as a taxiway to continue to provide an exit from the runway. The southwest portion between the intersection with Runway 18-36 and the former Runway 4 threshold is also planned to be converted to a taxiway. This portion will provide needed access to the Runway 36 threshold from the north hangar areas, eliminating the need for pilots to taxi through the terminal apron area.

Closure of Runway 4-22 also opens up the southwest portion of the airport for future development. This is advantageous because this area is closest to existing utilities and is relatively flat, thus reducing development costs. This area encompasses approximately 47 acres.

Runway 18-36 is planned to be extended to the north a distance of 769 feet, for a total runway length of 5,100 feet. This extension is planned for the purpose of improving safety on the airfield. Currently, pilots must taxi on Runway 13-31 and back-taxi on Runway 18-36 to access the Runway 18 threshold. The extension of the runway will allow for direct taxiway access to the Runway 18 threshold, and it will allow that taxiway to enter the runway at a 90-degree angle, meeting design standards.

Runway 13-31 is planned to be extended to the northwest a distance of 601 feet, bringing the total runway length to 5,700 feet. This extension is designed to accommodate a somewhat larger type of business jet should activity exceed the 500 annual operations threshold. Trends at the airport indicate that this justification may not happen until the long term planning period. Therefore, this is not a high priority project until justification exists.

The northern portion of Taxiway A, which currently terminates at Runway 13-31, is planned to be closed, thus reducing potential for inadvertent runway incursions. The new taxiway planned to serve the Runway 18 threshold will replace the purpose of this portion of Taxiway A.

The portion of Taxiway C, west of Runway 18-36, is non-standard in that it is not at a 90-degree angle to the runway. This portion is planned to be reconstructed to meet standard.

The last planned airside project is the construction of a new taxilane from the north hangar development directly to Taxiway B, which increases the safety and efficiency of aircraft movements to and from the Runway 13 threshold.

LANDSIDE CONCEPT

The primary goal of landside facility planning is to provide adequate aircraft storage space to meet forecast needs, while also maximizing operational efficiencies and land uses. Also important is identifying the overall land use classification of airport property in order to preserve the aviation purpose of the airport well into the future. Achieving these goals yields a development scheme which segregates aircraft activity levels while maximizing the airport's revenue potential. **Exhibit 5A** presents a large scale view of the planned landside development for the airport.

There are an unlimited number of potential facility layout concepts that could be considered. Several potential layouts were presented in the previous chapter. The future layout depicted is a compilation of the alternatives presented, as well as the previous plan.

The plan presented maximizes potential aviation development space which is in close proximity to existing facilities. It also follows the design philosophy of co-locating facilities which would be intended for similar levels of activity. This philosophy considers reserving flight line property for high activity conventional hangars. Medium activity box hangars are also grouped together and somewhat removed from the flight line. Low activity T-hangars are also co-located and are set the farthest from the runway.

At Philip Billard Municipal Airport, while existing hangars are grouped together, some hangar types are not in an ideal location. For example, there are three T-hangar structures located on the flight line. Ideally, this location would be reserved for higher activity conventional or box hangars. There are two larger conventional hangars that are located back behind the T-hangars, which introduce a co-mingling of aircraft types. For example, the Kansas Highway Patrol hangar is located at the end of a taxilane originally intended to access T-hangars.

Future facility planning provides a strategy to optimize hangar types and locations over time. In addition, an attempt to strike a balance between building on an existing layout and repositioning planning hangars in a more optimal direction has been made. For example, all the T-hangars are oriented from east to west, which can be problematic with winter ice and snow buildup on the north facing hangar doors. As a result, planned new T-hangars have been oriented in a north to south manner to reduce the problem of ice and snow buildup on the hangar doors.

For the most part, new development is planned in close proximity to existing facilities in order to take advantage of existing infrastructure availability and reduce future development costs.

The following goals were high priorities when developing the recommended landside concept:

- Maximize existing development areas.
- Group planned new development by facility type.
- Locate high activity hangars on the flight line.
- Separate public vehicles from the airfield operations area.
- Provide dedicated vehicle parking for new and existing hangars where feasible.

HANGARS

The recommended concept shows the location for certain hangar types. Following the philosophy of separation of activity levels, larger high-activity conventional hangars are located facing the main apron or the parallel taxiway. Lower activity T-hangars and box hangars are farther from the main apron and grouped together. **Table 5C** presents the total hangar area provided in the master plan concept.

As can be seen from the table, the master plan concept provides 214,650 square feet of new aircraft hangar space. The need over the course of the next 20 years is estimated at approximately 20,000 square feet. Therefore, the hangar layout presented represents a vision for the airport that extends beyond the scope of this master plan. The reason for this is to provide airport decision-makers with dedicated areas on the airport that should be reserved for certain hangar types. For example, areas intended for T-hangars should remain reserved for T-hangars even beyond the scope of the master plan.

In the north hangar development area, the areas to the west of the existing T-hangars are planned to be reserved for future T-hangar and box hangar needs. The area to the north of the existing T-hangars is also planned for future T-hangar development. Two T-hangar structures oriented north to south are planned in this location. One stand-alone box hangar is also planned.

TABLE 5C
Planned Hangar Space
Philip Billard Municipal Airport

Facility Type	Existing Hangar Space	Additional Hangar Space Needed	Total Airport Hangar Space Need	New Hangar Space Planned	Total Hangar Space Planned
T-Hangar	89,500	1,500	91,000	115,800	205,300
Box Hangar	15,500	18,500	34,000	41,850	57,350
Conventional Hangar	43,800	0	43,800	57,000	100,800
Total Hangar Space	**148,800**	**20,000**	**168,800**	**214,650**	**363,450**
Maintenance/Office	22,600	0	0	6,600*	29,200

Measurements in square feet.
*Maintenance/office space is estimated at 15% of conventional hangar space.
Source: Coffman Associates analysis

There are three existing T-hangar structures located adjacent to Taxiway A. Ideally, this flight line space would be reserved for high activity box and conventional hangars. The long term plan shows these T-hangars being replaced by conventional hangars. Considering the tight finances of most general aviation airports, the existing T-hangars should be maintained as a revenue source for the airport until it becomes more costly to maintain them than to replace them.

The development plan for the south terminal area is contingent upon the closure of Runway 4-22. Once closed, approximately 47 acres in the southwest corner of the airport adjacent to the existing terminal area, becomes available for development. As shown, three large conventional hangars are planned to be facing an expanded terminal area apron adjacent Taxiway E. Farther to the south is a T-hangar complex with four T-hangar structures.

VEHICULAR ACCESS AND PARKING

A planning consideration for any airport master plan is the segregation of vehicles and aircraft operational areas. This is both a safety and security consideration for the airport. Aircraft safety is reduced and accident potential increased when vehicles and aircraft share the same pavement surfaces. Vehicles contribute to the accumulation of debris on aircraft operational surfaces, which increases the potential for Foreign Object Damage (FOD), especially for turbine-powered aircraft. The potential for runway incursions is also increased, as vehicles may inadvertently access an active runway or taxiway area if they become disoriented once on the aircraft operational area (AOA). Airfield security may be compromised as there is loss of control over the vehicles as they enter the secure AOA. The greatest concern is for public vehicles, such as delivery vehicles and visitors, which may not fully understand the operational characteristics of aircraft and the markings in place to control vehicle access. The best solution is to provide dedicated vehicle access roads to each landside facility that is separated from the aircraft operational areas with security fencing.

The segregation of vehicle and aircraft operational areas is supported by FAA guidance established in June 2002. FAA AC 150/5210-20, *Ground Vehicle Operations on Airports* states, "The control of vehicular activity on the airside of an airport is of the highest importance." The AC further states, "An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport."

The landside alternative for Philip Billard Municipal Airport has been developed to reduce the need for vehicles to cross an apron or taxiway area. Dedicated vehicle parking areas, which would be outside the planned airport perimeter fence, are considered for all potential hangars.

A new entrance road is planned that extends from NE Strait Road to the north hangar area. This road then leads to parking lots to the north and south, providing dedicated vehicle parking for the hangars in this area. This entrance road and the parking lots will reduce the need for vehicles to access aircraft movement areas. In fact, the existing road that accesses the north T-hangar development area (adjacent the Air Explorers hangar, which is the northernmost flight line hangar) could be closed or it could be gated.

In the south terminal area where new facilities are planned, an access road leading to dedicated parking is planned to extend south from the existing airport entrance road. This road ultimately leads to planned T-hangars adjacent to Taxiway E.

AIRCRAFT APRON

Two new aircraft aprons are planned. To the north, where four box hangars are ultimately planned to replace the three T-hangar structures, the apron is planned to be expanded. In the south terminal area, a large apron is planned to front the three conventional hangars planned. This apron would be an extension of the existing south terminal area apron.

FUEL FACILITIES

A location for a replacement fuel farm has been identified in the south terminal area. This location would facilitate an expanded fuel farm and it could also provide a self-serve capability. Development of a fuel farm in this location should only be considered once Runway 4-22 is closed.

A replacement fuel farm is needed as the existing facility has aged. It is also located under the apron in the north terminal area. Underground fuel facilities are more difficult to monitor for leaks and corrosion, and typical replacement is an aboveground facility.

TERMINAL BUILDING

Many organizations with responsibility for business oriented general aviation airports see benefit in providing terminal building facilities. A terminal building can provide many necessary services, such as flight planning, pilot lounge, restrooms and showers, administrative offices, restaurants, and in some cases, community meeting facilities. Terminal buildings are often the first impression of a community a visitor will experience. Currently, these services are available in the existing terminal building; however, the existing facility is more than 50 years old and is in need of significant maintenance or potential replacement.

If the airport authority were to invest in a replacement terminal building, it should be centrally located adjacent to the main terminal apron. The existing location is ideally suited for a terminal building. Several other options were previously presented on Exhibit 4J. A specific site has not been identified for a new terminal building; however, if the airport authority were to move forward with a replacement structure, any of these locations would be acceptable.

LAND USE CONSIDERATIONS

Identifying existing and planned land uses, both on and off the airport, is an important consideration. By understanding the issues related to land use in the airport vicinity, the airport sponsor and those municipal jurisdictions in the vicinity of the airport can take proactive steps to protect the airport from incompatible land uses. There are three basic categories of land use to consider:

1) On-Airport Land Use
2) Off-Airport Land Use Compatibility
3) Height and Hazard Zoning

ON-AIRPORT LAND USE

The objective of on-airport land use planning is to coordinate uses of airport property in a manner that is both functional with the design of the airport and compatible with the airport environs. There are two primary considerations for on-airport land use planning. First is to secure those areas essential to the safe and efficient operation of the airport. Second is to determine compatible land uses for the balance of the property which would be most advantageous to the airport and the community.

The airport property encompasses approximately 874 acres of land and includes the Airfield Operations area, the Aviation Development area, and the Revenue Support area. **Exhibit 5C** presents the on-airport land use map for Philip Billard Municipal Airport.

Airfield Operations (AO)

The Airfield Operations area is that portion of airport property that encompasses the major airside elements such as runways, taxiways, runway safety area, runway object free area, runway obstacle free zone, runway protection zone (on airport property), taxiway safety area, taxiway object free area, navigational aids and their critical areas, and the runway visibility zone. The Airfield Operations area is intended to provide for safe and efficient aircraft taxiing, take-off, and landing.

Aviation Development (AD)

The Aviation Development area is defined as those areas that must be reserved for development that needs access to the Airfield Operations area. In general, current and future aircraft access must be preserved in these areas.

Typical uses permitted in the Aviation Development area includes:

1. Transportation Terminals
    a) Commercial Airlines
    b) Commuter Airlines
    c) Cargo Airlines (freight terminals)
    d) Fixed Base Operators
    e) Specialized Aviation Service Operations
    f) Aircraft Maintenance
    g) Aircraft Equipment Sales/Rentals
    h) Food and Beverage Retail Sales
    i) Retail Fueling Services
    j) Vehicle Parking
2. Warehouses
    a) Aircraft Hangars
3. Vocational Schools
    a) Flight Training

Other uses may include:

1. Revenue Support: Certain non-aviation related uses may be permissible within the Aviation Development area provided they are temporary (five years or less) in nature and can be removed in a timely manner to allow for Aviation Development (i.e., agricultural activities).

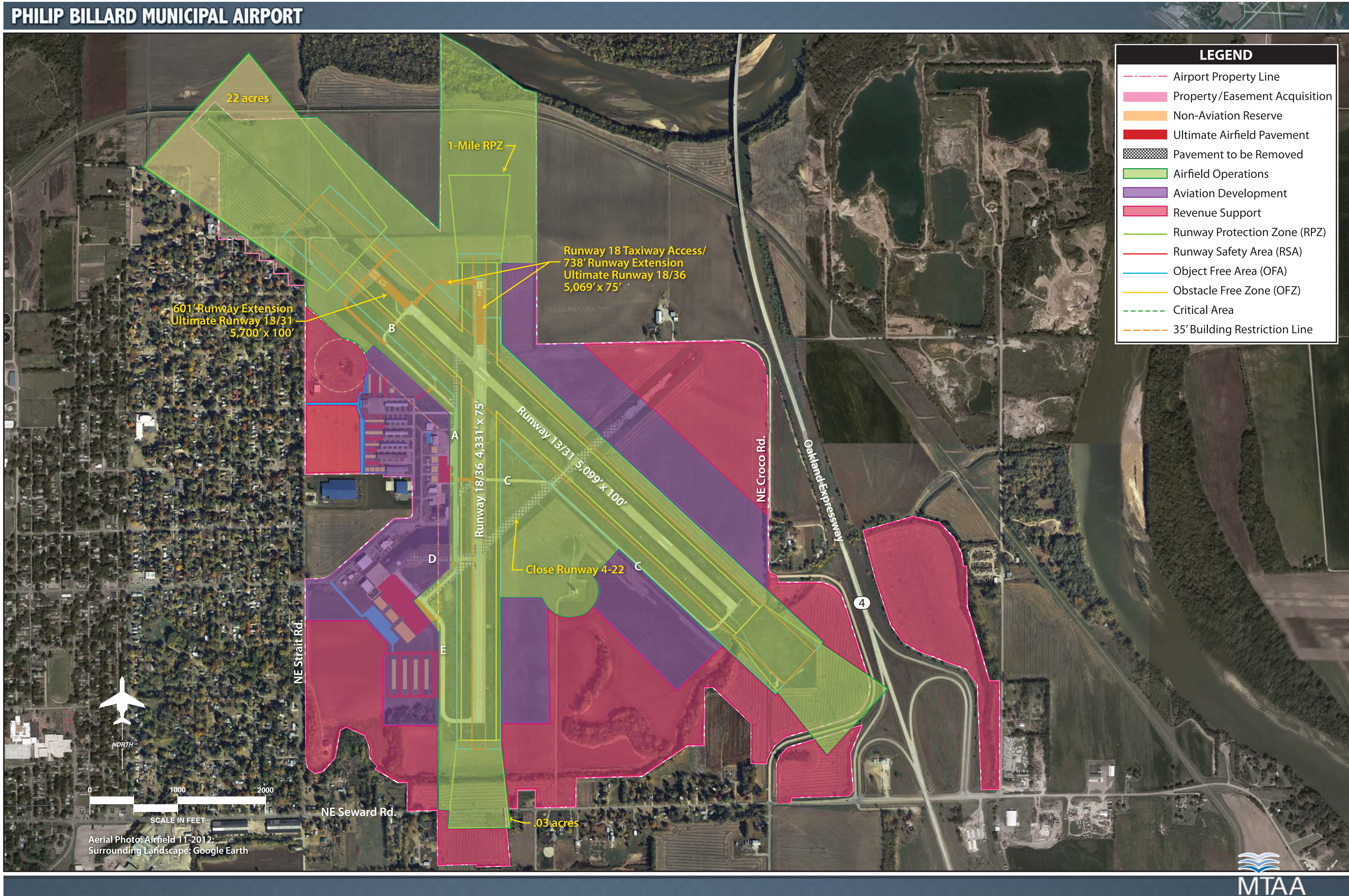


Exhibit 5C
AIRPORT LAND USE PLAN

Revenue Support (RS)

The revenue support classification includes all potential development that is compatible with airport activities and is unlikely to require access to the runway and taxiway system. This classification may include both aviation and non-aviation development.

Typical revenue support land uses include:
1) Airport and airport related facilities.
2) Research facilities, testing laboratories, and facilities for the manufacturing, processing, and/or assembly of products.
3) Warehouses
4) Vocational schools
5) Eating and drinking establishments

ON-AIRPORT LAND USE OBLIGATIONS

The airport has accepted grants for capital improvements from the FAA. As such, the airport sponsor has agreed to certain grant assurances. Grant assurances related to land use assure that airport property will be reserved for aeronautical purposes. If the airport sponsor wishes to sell (release) airport land or lease airport land for a non-aeronautical purpose (land use change), they must petition the FAA for approval. The Airport Layout Plan and the Airport Property Map must then be updated to reflect the sale or land use change of the identified property.

Release of Airport Property

A release of airport property would entail the sale of land that is not needed for aeronautical purposes currently or into the future. The following documentation is required to be submitted to the FAA for consideration of a land release:

1. What is requested?
2. What agreement(s) with the United States are involved?
3. Why the release, modification, reformation, or amendment is requested?
4. What facts and circumstances justify the request?
5. What requirements of state or local law or ordinance should be provided for in the language of an FAA-issued document if the request is consented to or granted?
6. What property or facilities are involved?
7. How the property was acquired or obtained by the airport owner.
8. What is the present condition and what present use is made of any property or facilities involved?
9. What use or disposition will be made of the property or facilities?
10. What is the appraised fair market value of the property or facilities? Appraisals or other evidence required to establish fair market value.
11. What proceeds are expected from the use or disposition of the property and what will be done with any net revenues derived?
12. A comparison of the relative advantage or benefit to the airport from sale or other disposition as opposed to retention for rental income.

Each request should have a scaled drawing attached showing all airport property and airport facilities which are currently obligated for airport purposes by agreements with the United States. Other exhibits supporting or justifying the request, such as maps, photographs, plans and appraisal reports should be attached as appropriate. There are no areas of airport property planned for release from obligation and/or sale.

Land Use Change

A land use change permits land to be leased for non-aeronautical purposes. A land use change does not authorize the sale of airport land. Leasing airport land to produce revenue from non-aeronautical uses allows the land to earn revenue for the airport as well as serve the interests of civil aviation by making the airport as self-sustaining as possible. Airport sponsors may petition for a land use change for the following purposes:

- So that land that is not needed for aeronautical purposes can be leased to earn revenue from non-aviation uses. This is land that is clearly surplus to the airport's aviation needs.

- So that land that cannot be used for aeronautical purposes can be leased to earn revenue from non-aviation uses. This is land that cannot be used by aircraft or where there are barriers or topography that prevents an aviation use.

- So that land that is not presently needed for aeronautical purposes can be rented on a temporary basis to earn revenue from non-aviation uses.

A land use change shall not be approved by the FAA if the land has a present or future airport or aviation purpose, meaning the land has a clear aeronautical use. If land is needed for aeronautical purposes, a land use change is not justified. Ordinarily, land on or in proximity to the flight line and airport operations area is needed for aeronautical purposes and should not be used or planned for non-aviation purposes.

The proceeds derived from the land use change must be used exclusively for the benefit of the airport. The proceeds derived from the land use change may not be used for a non-airport purpose. The proceeds cannot be diverted to the airport sponsor's general fund or for general economic development unrelated to the airport.

Generally, a land use change of airport property will be reviewed on a case-by-case basis at the time that the change is necessary. However, the airport land use drawing, which is included as part of the airport layout plan set, shows those areas likely eligible to be released from obligation.

There are several areas on the airport that will likely never serve an aviation purpose. These areas include property to the west of the north T-hangar development area, the area in the southwest corner of the airport, the area south of the airport traffic control tower, southeast areas of airport property, and a large parcel to the east in the general vicinity of the old Runway 22 threshold.

On-Airport Land Use Summary

Part of the master plan is to identify any property on the airport that could be released or have a land use change. The airport authority does not intend to release any airport property for sale. The airport authority may desire to market certain portions of property to both aeronautical and non-aeronautical businesses. Aeronautical businesses are defined as those that require access to the runway/taxiway system, meaning they have at least one aircraft used for the business. Non-aeronautical businesses would include all other types of businesses and public institutions that are permissible under local zoning which is compatible in close proximity of the airport.

OFF-AIRPORT LAND USE COMPATIBILITY

Land use compatibility is the responsibility of the airport sponsor and must be pursued in order to comply with FAA grant assurances. In effect since 1964, Grant Assurance 21, *Compatible Land Use*, implementing Title 49 United States Code (U.S.C.) § 47107 (a) (10), requires, in part, that the sponsor:

> *"…take appropriate action, to the extent reasonable, including the adoption of zoning laws, 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 all cases, the FAA expects a sponsor to take appropriate actions to the extent reasonably possible to minimize incompatible land uses. FAA Order 5190.6B, *Airport Compliance Manual*, provides guidance on land use compatibility and other airport compliance issues.

The MTAA, City of Topeka, and Shawnee County should work together to develop compatibility standards to prohibit residential and public assembly uses within the runway protection zones and to limit certain uses within noise impact boundaries (typically the 65 DNL – See Appendix C for more detail). For example, residential land uses should be kept as far away from the airport as is practicable.

Grant Assurance 20, *Hazard Removal and Mitigation*, states that the airport sponsor "will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, lighting, or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards."

The FAA provides further guidance in Advisory Circular (AC) 150/5200-33, *Hazardous Wildlife Attractants on or Near Airports*. The distance between the airport movement areas and wildlife attractants should be at least 10,000 feet for airports serving turbine-powered aircraft (such as Philip Billard Municipal Airport) and should include approach and departure airspace to a distance of five miles. Examples of wildlife attractants (particularly for birds) include landfills, waste water treatment facilities, lakes, and wetlands.

HEIGHT AND HAZARD LAND USE ZONING

Both the City of Topeka and Shawnee County have implemented height and hazard zoning for the protection of Philip Billard Municipal Airport. Both of these entities utilized guidance provided by the FAA in the Code of Federal Regulations (CFR) Part 77, *Objects affecting Navigable Airspace* to develop the height and hazard zoning. The guidance is flexible enough to account for planned changes in the future layout of the airport. Nonetheless, it is good practice for the airport sponsor to review the local zoning ordinances to be sure it still applies to the new master plan layout. The Airport Airspace Drawing, which is included as part of the Airport Layout Plan drawing set, may be the basis for an updated height and hazard zoning ordinance, should that be needed.

SUMMARY

The recommended master plan concept has been developed with significant input from the planning advisory committee (PAC). The PAC included representation from the Metropolitan Topeka Airport Authority (MTAA), FAA, Kansas Department of Transportation – Aviation of Division, airport management, airport businesses and airport users. This plan provides the necessary development to accommodate and satisfy the anticipated growth over the next 20 years and beyond.

The airport currently meets design standards for its critical aircraft (that grouping of general aviation aircraft that perform 500 or more annual operations) in ARC C-II. Representative aircraft include medium-sized business jets such as the Cessna Citation X (model 750). The future critical aircraft is planned to remain in the same design category.

On the airside, primary Runway 13-31 is planned to be extended from its current length of 5,099 feet to 5,700 feet. The planned extension is not currently justified by FAA standards and is considered a long term project.

Crosswind Runway 18-36 is planned to be extended from its current length of 4,331 feet to a total length of at least 5,100 feet. The extension is a safety related project whose primary purpose is to provide direct access to the Runway 18 threshold. Currently, pilots must taxi on both runways in order to access the Runway 18 threshold.

Runway 4-22 is planned to be closed because it is redundant and maintenance is not eligible for FAA funding. In addition, closure of the runway goes a long way to solving the airfield hot spot issue at the intersection of the runway and Taxiways A and D. Closure of the runway also opens up property adjacent to the terminal area for aviation-related development.

On the landside, future hangar development is planned to remain within the general hangar development areas. There are no plans to locate hangar facilities on other areas of the airport, although other areas generally surrounding the runways are to be reserved for aeronautical purposes.

Overall, the landside layout provides a vision for airport development that far exceeds the 20-year scope of the master plan. By implementing efficient facility locating strategies and maximizing the existing property, the airport is positioned to accommodate growth well into the future.

Some limited property acquisition is recommended. This includes fee simple ownership of the RPZs that currently extend beyond airport property. In addition, if Runway 13 is extended, some property acquisition will be required and the new RPZs are recommended for acquisition.

Overall, four specific development strategies have emerged from the master planning process:

1) Provide direct taxiway access to the Runway 18 threshold (extend runway to the north).
2) Plan for an extension of Runway 13-31 when it is justified.
3) Close Runway 4-22.
4) Develop an overall on-airport land use plan.

The next chapter of this master plan will consider strategies for funding the recommended improvements and will provide a reasonable schedule for undertaking the projects based on demand over the course of the next 20 years.

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY
TOPEKA REGIONAL AIRPORT & BUSINESS CENTER | BILLARD AIRPORT

Chapter 6

CAPITAL IMPROVEMENT PROGRAM

Chapter Six

CAPITAL IMPROVEMENT PROGRAM

The analyses completed in previous chapters evaluated development needs at the airport over the next 20 years and beyond, based on forecast activity and operational efficiency. Next, basic economic, financial, and management rationale is applied to each development item so that the feasibility of each item contained in the plan can be assessed.

The presentation of the capital improvement program (CIP) has been organized into two sections. First, the airport development schedule and CIP cost estimate is presented in narrative and graphic form. Second, capital improvement funding sources on the federal, state, and local levels are identified and discussed.

AIRPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

Now that the recommended concept has been developed and specific needs and improvements for the airport have been established, the next step is to determine a realistic schedule (implementation timeline) and associated costs for the plan. The recommended improvements are grouped by planning horizon: short term, intermediate term, and long term. The short term planning horizon is further subdivided into yearly increments. **Table 6A** summarizes key activity milestones for the three planning horizons.

Table 6A Planning Horizon Summary Philip Billard Municipal Airport	Base Year (2012)	Short Term	Intermediate Term	Long Term
Based Aircraft	88	92	97	107
ANNUAL OPERATIONS				
General Aviation				
Itinerant	32,588	34,400	36,600	41,200
Local	16,331	18,200	20,400	24,900
Subtotal	48,919	52,600	57,000	66,100
Air Taxi Activity				
Itinerant	1,692	1,900	2,200	3,000
Military Activity				
Itinerant	614	900	900	900
Local	390	600	600	600
TOTAL OPERATIONS	**51,615**	**56,000**	**60,700**	**70,600**
Source: Coffman Associates analysis				

A key aspect of this master plan is the use of demand-based planning milestones. Many projects should be considered based on actual demand levels. As short term horizon activity levels are reached, it will then be time to program for the intermediate term based upon the next activity milestones. Similarly, when the intermediate term milestones are reached, it will be time to program for the long term activity milestones.

Many development items included in the recommended concept will need to follow these demand indicators. For example, the plan includes construction of new aprons and taxilanes. Based aircraft will be the primary indicator for these projects. If based aircraft growth occurs as projected, additional hangars should be constructed to meet the demand. Often, this potential growth is tracked with a hangar waiting list. If growth slows or does not occur as forecast, some projects may be delayed. As a result, capital expenditures will be made on an as-needed basis, which leads to a more responsible use of capital assets.

Construction of hangars is an important consideration for airport operators. In order to accommodate forecast growth, additional hangar space must be made available; otherwise, pilots will look to house their aircraft (and potentially their businesses) at other airports or in other municipalities. Historically, airport operators would construct hangars and serve as the lessor of those hangars. The cost of construction was often considered a regular expense of operating an airport, even if rental fees did not fully cover the cost of construction over a typical 20-year loan amortization schedule.

In more recent times, airport sponsors are looked upon to be more self-sufficient, a financial position encouraged by the FAA. As a result, new hangar construction undertaken by airport sponsors has been limited. The most significant problem is that the market rate for renting a hangar in many areas of the country (including Topeka) is less than the amount necessary to break even on a typical construction loan.

Philip Billard Municipal Airport is no different in this respect. It is known that new hangars, such as T-hangars, are needed for the airport, yet the going rate for a T-hangar is around $200 per month, while a new T-hangar might have to be at $400 per month.

Because of these economic realities, few general aviation airports are constructing hangars on their own, instead relying on private developers. In some cases, private developers can keep construction costs lower, which in turn lowers the monthly fee necessary to amortize a loan. To the greatest extent possible, private development of all hangar types should be supported and promoted by the airport sponsor.

The CIP for this master plan includes construction cost estimates for hangar development. The CIP only considers local sources of funding of hangar construction. Local sources would include MTAA or private developers. Therefore, if MTAA cannot financially construct any of the new hangars planned, then private developers will have a baseline cost estimate from which to determine if they can proceed with construction.

The airport sponsor's responsibility related to new hangars is to provide public access taxilanes, typically in conjunction with FAA development grants. These taxilanes are then able to be utilized by private developers to provide aircraft access to the runway/taxiway system. The CIP presented in this master plan includes construction of several taxilanes.

Some development items do not depend specifically on demand. Safety-related projects, such as the extension of Runway 18, should be programmed in a timely manner regardless of the forecast growth in activity. Other items, such as pavement maintenance, should be addressed in a scheduled manner and are not dependent on reaching aviation demand milestones.

As a master plan is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, some projects may require additional infrastructure improvements (i.e., drainage improvements, extension of utilities, etc.) that may take more than one year to complete.

Once the list of necessary projects was identified and refined, project-specific cost estimates were developed. The cost estimates include design, engineering, construction administration, and contingencies that may arise on the project. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficient for planning purposes. Cost estimates for each of the development projects in the CIP are in current (2013) dollars. **Exhibit 6A** presents the proposed CIP for Philip Billard Municipal Airport. **Exhibit 6B** presents the CIP overlaid onto the airport aerial photograph and broken out into planning horizons.

The FAA utilizes a national priority ranking system to help objectively evaluate potential airport projects. Projects are weighted toward safety, infrastructure preservation, standards, and capacity enhancement. The FAA will participate in the highest priority projects before considering lower priority projects, even if a lower priority project is considered a more urgent need by the local sponsor. Nonetheless, the project should remain a priority for the airport and funding support should continue to be requested in subsequent years.

The following sections will describe in greater detail the projects identified for the airport over the next 20 years. The short term (0-5 years) projects are presented in yearly increments. The intermediate (years 6-10) and long term (years 10-20) are grouped by local priority.

SHORT TERM IMPROVEMENTS

The projects identified for the short term planning period have been prioritized based on airport need and potential to be funded. If any of these projects cannot be funded in the timeframe indicated, the airport sponsor should consider the project for the following year.

The major objective of the short term CIP is to redesign existing airfield geometry that does not meet design standards. These areas may be confusing to pilots and can lead to safety concerns. The major areas of concern are the hot spot at the intersection of Runway 4-22 and Taxiway A and D and the lack of taxiway access to the Runway 18 threshold.

2014 Projects

The first project identified is for the airport to undertake a Wildlife Hazard Assessment (WHA) study. This is a year-long assessment of the airport property in regard to wildlife attractants. The results of the study can lead to the development of a Wildlife Management Plan which presents implementable solutions to restricting wildlife at the airport. Typically, the various solutions are eligible for FAA funding.

There have been two reported wildlife/aircraft encounters at Philip Billard Municipal Airport since 2000. One was a bird strike that caused $8,000 in damage to the aircraft and the other was a siting of a deer on the airfield. These cases provide the justification for the WHA study.

The next project is to perform the necessary environmental documentation related to closing Runway 4-22. The airport must consult with the FAA to determine the level of study required. This project may require as much as an Environmental Assessment and as little as a Categorical Exclusion.

2015 Projects

Once proper environmental documentation has been provided and approved, the closure of Runway 4-22 is planned. The portion of the runway from the existing Runway 4 threshold to the intersection with Taxiway A is planned to be converted to a taxiway. That portion of the runway from the intersection with Runway 13-31 to Taxiway C is also planned to be preserved for use as an exit taxiway from Runway 13-31.

In association with the closure of the runway is the closure of Taxiway D as it extends from the terminal apron to Taxiway A. Taxiway D should be closed in this location so that there is not direct access from the apron to the runway. In addition, a small area of new pavement is planned at the south end of Taxiway A in order to provide continued Taxiway A access south to the intersection with Taxiway E.

The closure of Runway 4-22 and the associated taxiway project will solve the existing hot spot issue. Pilots will no longer

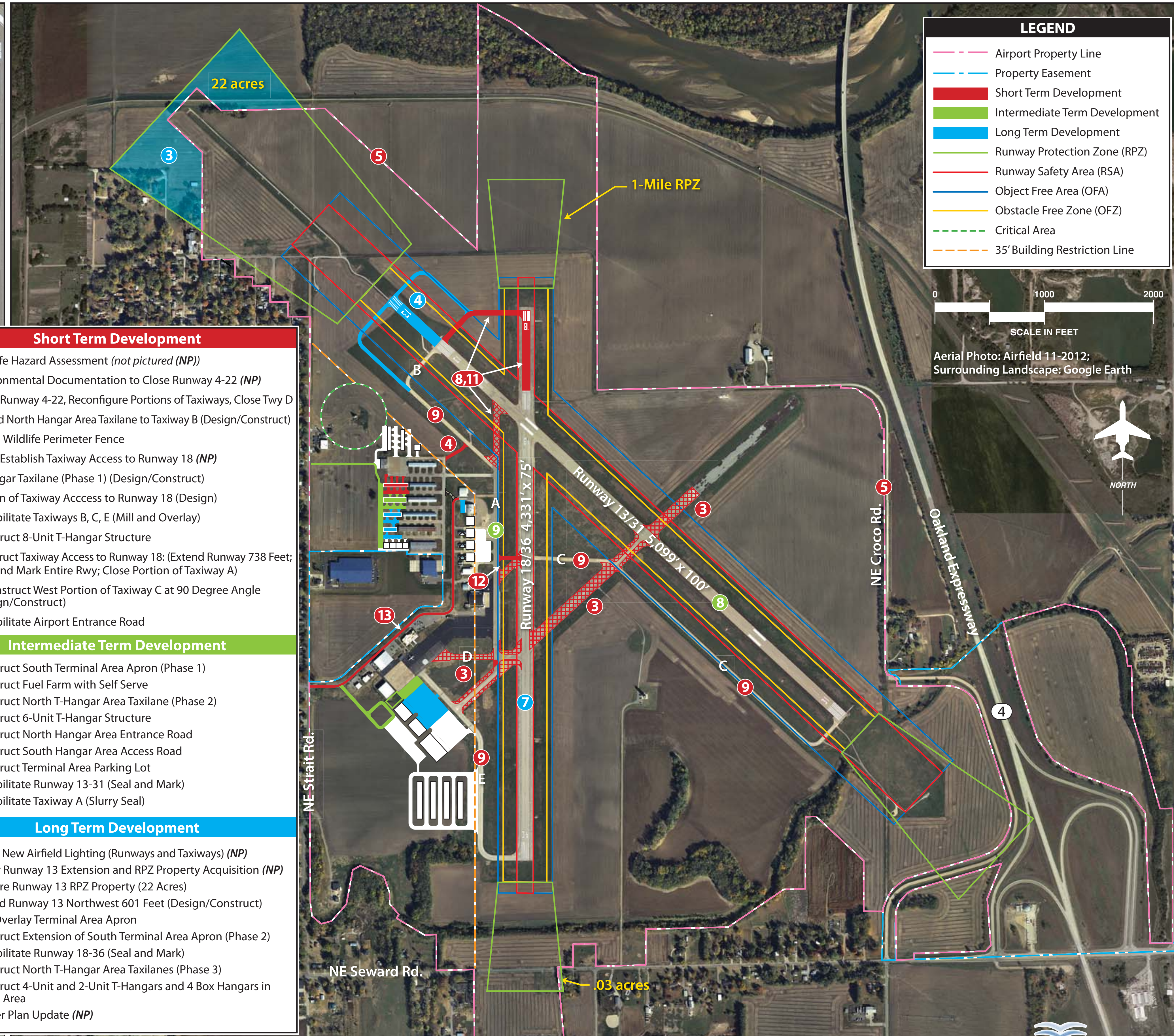
PHILIP BILLARD MUNICIPAL AIRPORT

	Project Description	Project Cost	FAA Eligible	Total Local
SHORT TERM PROGRAM (1-5 YEARS)				
2014	1 Wildlife Hazard Assessment	$70,000	$63,000	$7,000
	2 Environmental Documentation to Close Runway 4-22	$80,000	$72,000	$8,000
	TOTAL	**$150,000**	**$135,000**	**$15,000**
2015	3 Close Runway 4-22, Reconfigure Portions to Taxiways, Close Twy D	$1,579,000	$1,421,100	$157,900
	4 Extend North Hangar Area Taxilane to Taxiway B (Design/Construct)	$128,000	$115,200	$12,800
	TOTAL	**$1,707,000**	**$1,536,300**	**$170,700**
2016	5 Install Wildlife Perimeter Fence	$1,378,000	$1,240,200	$137,800
	6 EA to Establish Taxiway Access to Runway 18	$200,000	$180,000	$20,000
	7 T-hangar Taxilane (Phase 1) (Design/Construct)	$203,000	$182,700	$20,300
	TOTAL	**$1,781,000**	**$1,602,900**	**$178,100**
2017	8 Design of Taxiway Access to Runway 18 (Design)	$196,000	$176,400	$19,600
	9 Rehabilitate Taxiways B, C, E (Mill and Overlay)	$656,000	$590,400	$65,600
	10 Construct 8-Unit T-Hangar Structure	$400,000	$0	$400,000
	TOTAL	**$1,255,000**	**$769,500**	**$485,200**
2018	11 Construct Taxiway Access to Runway 18: (Extend Runway 769 Feet; Seal and Mark Entire Rwy; Close Portion of Taxiway A)	$2,124,000	$1,911,600	$212,400
	12 Reconstruct West Portion of Taxiway C at 90 Degree Angle (Design/Construct)	$301,000	$270,900	$30,100
	TOTAL	**$2,425,000**	**$2,182,500**	**$242,500**
2019	13 Rehabilitate Airport Entrance Road (20% FAA Eligible)	$114,000	$22,800	$91,200
	TOTAL	**$114,000**	**$22,800**	**$91,200**
	TOTAL SHORT TERM PROGRAM	**$7,432,000**	**$6,249,000**	**$1,183,000**
INTERMEDIATE TERM PROGRAM (6-10 YEARS)				
	1 Construct South Terminal Area Apron (Phase 1)	$1,180,000	$1,062,000	$118,000
	2 Construct Fuel Farm With Self Serve	$406,000	$0	$406,000
	3 Construct North T-hangar Area Taxilane (Phase 2)	$240,000	$216,000	$24,000
	4 Construct 6-Unit T-Hangar Structure	$450,000	$0	$450,000
	5 Construct North Hangar Area Entrance Road and Parking Lot	$418,000	$0	$418,000
	6 Construct South Hangar Area Access Road	$187,000	$0	$187,000
	7 Construct Terminal Area Parking Lot	$223,000	$0	$223,000
	8 Rehabilitate Runway 13-31 (Seal and Mark)	$424,000	$381,600	$42,400
	9 Rehabilitate Taxiway A (Slurry Seal)	$94,000	$84,600	$9,400
	TOTAL INTERMEDIATE TERM PROGRAM	**$3,622,000**	**$1,744,200**	**$1,877,800**
LONG TERM PROGRAM (11-20 YEARS)				
	1 Install New Airfield Lighting (Runways and Taxiways)	$3,694,000	$3,324,600	$369,400
	2 EA for Runway 13 Extension and RPZ Property Acquisition	$200,000	$180,000	$20,000
	3 Acquire Runway 13 RPZ Property (22 acres)	$110,000	$99,000	$11,000
	4 Extend Runway 13 Northwest 601 Feet (Design/Construct)	$2,308,000	$2,077,200	$230,800
	5 Mill/Overlay Terminal Area Apron	$384,000	$345,600	$38,400
	6 Construct Extension of South Terminal Area Apron (Phase 2)	$987,000	$888,300	$98,700
	7 Rehabilitate Runway 18-36 (Seal and Mark)	$817,000	$735,300	$81,700
	8 Construct North T-hangar Area Taxilanes (Phase 3)	$291,000	$261,900	$29,100
	9 Construct 4-Unit and 2-Unit T-Hangars and 4 Box Hangars in North Area	$580,000	$0	$580,000
	10 Master Plan Update	$250,000	$225,000	$25,000
	TOTAL LONG TERM PROGRAM	**$9,621,000**	**$8,136,900**	**$1,484,100**
	TOTAL PROGRAM COSTS	**$20,675,000**	**$16,130,100**	**$4,544,900**

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Exhibit 6A
CAPITAL IMPROVEMENT PROGRAM

PHILIP BILLARD MUNICIPAL AIRPORT



Short Term Development

2014
1. Wildlife Hazard Assessment *(not pictured (NP))*
2. Environmental Documentation to Close Runway 4-22 ***(NP)***

2015
3. Close Runway 4-22, Reconfigure Portions of Taxiways, Close Twy D
4. Extend North Hangar Area Taxilane to Taxiway B (Design/Construct)

2016
5. Install Wildlife Perimeter Fence
6. EA to Establish Taxiway Access to Runway 18 ***(NP)***
7. T-hangar Taxilane (Phase 1) (Design/Construct)

2017
8. Design of Taxiway Acccess to Runway 18 (Design)
9. Rehabilitate Taxiways B, C, E (Mill and Overlay)
10. Construct 8-Unit T-Hangar Structure

2018
11. Construct Taxiway Access to Runway 18: (Extend Runway 738 Feet; Seal and Mark Entire Rwy; Close Portion of Taxiway A)
12. Reconstruct West Portion of Taxiway C at 90 Degree Angle (Design/Construct)

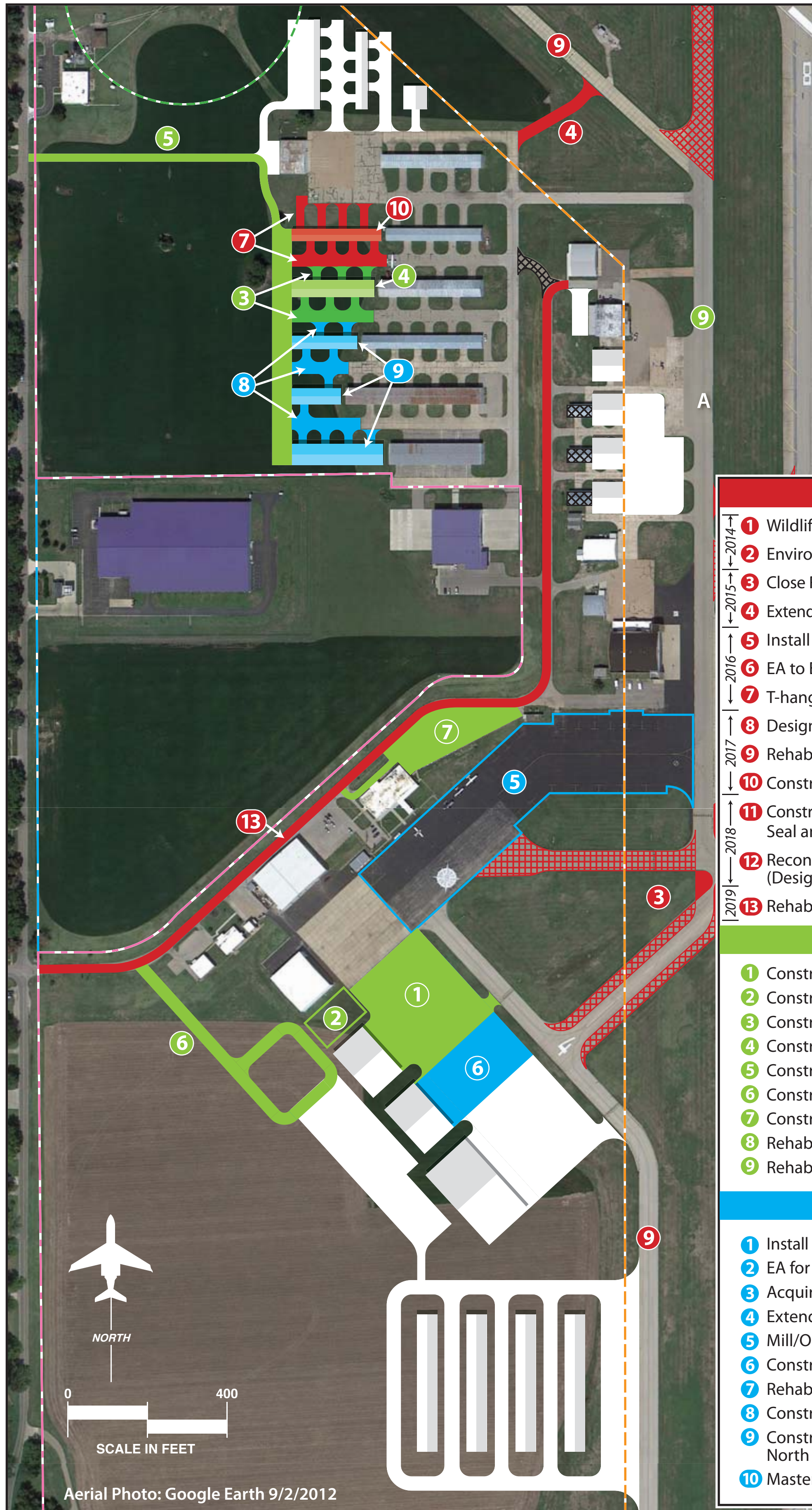
2019
13. Rehabilitate Airport Entrance Road

Intermediate Term Development

1. Construct South Terminal Area Apron (Phase 1)
2. Construct Fuel Farm with Self Serve
3. Construct North T-Hangar Area Taxilane (Phase 2)
4. Construct 6-Unit T-Hangar Structure
5. Construct North Hangar Area Entrance Road
6. Construct South Hangar Area Access Road
7. Construct Terminal Area Parking Lot
8. Rehabilitate Runway 13-31 (Seal and Mark)
9. Rehabilitate Taxiway A (Slurry Seal)

Long Term Development

1. Install New Airfield Lighting (Runways and Taxiways) ***(NP)***
2. EA for Runway 13 Extension and RPZ Property Acquisition ***(NP)***
3. Acquire Runway 13 RPZ Property (22 Acres)
4. Extend Runway 13 Northwest 601 Feet (Design/Construct)
5. Mill/Overlay Terminal Area Apron
6. Construct Extension of South Terminal Area Apron (Phase 2)
7. Rehabilitate Runway 18-36 (Seal and Mark)
8. Construct North T-Hangar Area Taxilanes (Phase 3)
9. Construct 4-Unit and 2-Unit T-Hangars and 4 Box Hangars in North Area
10. Master Plan Update ***(NP)***



Aerial Photo: Google Earth 9/2/2012

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Exhibit 6B
PROJECT PHASING

have the potential to inadvertently end up in the runway obstacle free zone (OFZ) or in the runway environment. Taxiway A will now provide near full parallel capability as it will extend to the intersection with Taxiway E. Taxiway D will no longer provide direct access from the terminal apron to the runway.

The second project considered for the 2015 time frame is the design and construction of the north hangar area taxilane to connect directly with Taxiway B. This connection will reduce the number of turns a pilot would have to make when accessing the Runway 13 threshold from the north hangar development area. This taxilane extension will increase pilot peripheral views thus increasing safety.

2016 Projects

If the results of the WHA show a need for a wildlife fence, then a project is considered for this purpose. Much of the airport north, east and south have inadequate fencing to deter wildlife from encroaching on the runway system. This project considers six-foot high chain link fencing topped with 3-strand barbed wire.

The next project is an Environmental Assessment related to construction of 90-degree taxiway access to the Runway 18 threshold. This EA includes a detailed description and justification for the extension as a safety project. By extending the runway to the north and providing a threshold taxiway entrance, pilots will no longer have to utilize Runway 13-31 and then back-taxi on Runway 18 for departure.

The last project in the 2016 timeframe is the design and construction of two taxilanes which are planned to support additional T-hangars in the north hangar development area. Additional hangars are needed at the airport; however, cost is a concern that will need to be addressed at the time.

2017 Projects

In the fiscal year following the EA for taxiway threshold access to Runway 18, the engineering design of this project is planned. The design phase should include the planned 769-foot extension, the safety areas, the new threshold taxiway, and the closure and removal of the north portion of Taxiway A.

Taxiways B, C, and E are in need of significant maintenance and rehabilitation. This project anticipates a two-inch mill and asphalt overlay.

The next project is the construction of an 8-unit T-hangar structure. Once again, while hangars are needed to support projected growth in based aircraft at the airport, the timing of such construction will rely heavily on financial considerations, especially since revenue generating hangars are not typically eligible for FAA grant funding.

2018 Projects

In 2018, the safety project related providing taxiway access to the Runway 18 threshold is planned for construction. As part of this project, the entire runway is planned for a seal coat and new markings applied. This project also includes construction of a 90-degree threshold taxiway that extends from the Runway 13 threshold. The north portion of Taxiway A is also planned to be removed.

The second project considered in 2018 is the reconstruction of the portion of Taxiway C between Runway 18-36 and Taxiway A. This taxiway is planned to be constructed to provide a right-angled entrance/exit from the runway.

2019 Projects

The main airport entrance road is showing signs of significant deterioration. A project is planned in 2019 to rehabilitate the entrance road. Due to FAA requirements that entrance roads serve the general public and not private businesses, only a portion, estimated at 20 percent, is eligible for FAA grant funding. It should be noted that airport entrance roads typically scope low on the national priority ranking system so FAA funding may be limited to annual non-primary entitlement (NPE) funding.

Short Term Summary

The short term CIP addresses three priorities for the airport. The first is to remedy the hot spot located at the intersection of Runway 4-22, Taxiway A, and Taxiway D. The method of remedy is to first close Runway 4-22 and Taxiway D, and then reconfigure Taxiway A. Portions of Runway 4-22 would then be converted for taxiway use. This is a safety-related project that is a high priority.

The next high priority project is also a safety-related project. In order to provide direct taxiway access to the Runway 18 threshold, the runway is planned to be extended by 769 feet to the north. This project will eliminate the need for pilots to use Runway 13-31 to taxi to Runway 18-36 and to then back-taxi on Runway 18 to the threshold.

The third priority is the construction of taxilanes and T-hangars to support forecast growth in based aircraft at the airport.

The short term projects total approximately $7.43 million. Approximately $6.25 million is eligible for FAA grant funding. The remaining $1.18 million would be the responsibility of the local airport sponsor.

INTERMEDIATE TERM IMPROVEMENTS

Intermediate term projects generally relate to those planned for years six through 10 of the CIP. Due to the fluid nature of funding availability and the possibility of changing priorities, these projects have been grouped together. While they are generally listed in order of priority, circumstances should be analyzed at the time to determine which projects should be pursued first.

The first project considered is expansion of the terminal area apron to the south. This apron is needed to provide additional aircraft parking space and to provide access to potential hangar construction area.

A replacement fuel farm is needed at the airport. The current fuel farm is underground, under the north terminal area apron. While this facility is monitored for leaks and other hazards, it is simply more difficult to monitor underground tanks. The existing facility is aged and should be replaced.

A new fuel farm is planned to be located to the immediate southeast of the southernmost hangar. This location is capable of having dedicated road access for tanker delivery trucks. It is also capable of providing a self-serve capability. Prior to construction of the replacement above-ground fuel farm, a portion of new apron area will need to be constructed in order to provide aircraft access to the facility.

Revenue-generating fueling facilities, such as a fuel farm, are typically not eligible for federal grant funding. Thus, the cost of constructing the fuel farms typically falls to the local sponsor. KDOT may consider participating in this and other projects that are not eligible for federal funding.

Additional taxilanes and T-hangars are planned in the intermediate planning horizon as well. Construction of these facilities should be based upon demand and financial considerations.

Two new airport access roads are planned in the intermediate term as well. The first is construction of a north entrance road, which is planned to extend from Strait Road to the north hangar development area. This road would lead to dedicated vehicle parking which will potentially reduce vehicle traffic on surfaces used by aircraft, thus increasing safety at the airport.

The second road planned would extend from the airport entrance road south to the planned new fuel farm area. This road would also serve future growth of the south terminal area. The terminal building parking lot is also planned to be resurfaced in this timeframe. There are several maintenance projects planned, including rehabilitation of Runway 13-31 and Taxiway A.

The total estimated cost of intermediate term projects is $3.62 million. Of this total, $1.74 million is eligible for FAA grants. The remaining $1.88 million would be the responsibility of MTAA. Local costs include any financial participation by KDOT.

LONG TERM IMPROVEMENTS

Long term projects are those generally considered for years 10 through 20. The most significant project planned is the extension of Runway 13 by 601 feet to the northwest. This project would bring the total runway length up to 5,700 feet and would fully accommodate most business jets in the U.S. fleet today. This project would include extending taxiways, acquiring RPZ property, closing portions of roads, and relocating navigation aids including the approach lighting system.

The Runway 13 extension project will need environmental clearance and it will need specific justification, which does not exist today. Specific justification would be documented evidence that large business jets (those in the 75 to 100 percent categories of the U.S. fleet) are operating at the airport more than 500 times annually.

Several long term projects are related to continued hangar construction which includes taxilanes. The T-hangars on the north end flight line are planned to be removed and replaced with box or conventional hangars. This type of hangar is more appropriate for this location on the airport. It is only recommended to remove these T-hangars when they are at the end of their useful life. Until then, they should continue to generate revenue for the airport.

A second phase of the planned south area apron is planned. This apron would build off of Phase 1, which provided access to the planned fuel farm. Also planned is construction of a new T-hangar complex at the south end of Taxiway E. As previously stated, hangar and taxilane construction should only be undertaken if there is a demonstrated demand and it is financially feasible.

The FAA recommends that airports update their master plan every seven to ten years. A line item has been reserved for this planning project in the long term planning horizon.

Several maintenance and rehabilitation projects are also considered for the long term. This includes rehabilitation of Runway 18-36 as well as the airport taxiways.

The long term projects total approximately $9.62 million, of which approximately $8.14 million is eligible for FAA funding. Approximately $1.48 million would be the responsibility of the airport sponsor.

CAPITAL IMPROVEMENT SUMMARY

The CIP is intended as a road map of airport improvements to help guide the airport sponsor, the FAA, and the state aviation division on needed projects. The plan as presented will meet the forecast demand over the next 20 years and, in many respects, beyond. The first five years of the CIP are separated into yearly installments, and the intermediate and long term projects are grouped together. It should be noted that the sequence of projects will likely change due to availability of funds or changing priorities. Nonetheless, this is a comprehensive list of capital projects the airport should consider in the next 20 years.

The total 20-year CIP proposes approximately $20.68 million in airport development. Of this total, approximately $16.13 million would be eligible for FAA grant funding. The local funding requirement for the proposed 20-year CIP is $4.55 million.

CAPITAL IMPROVEMENT FUNDING SOURCES

There are generally four sources of funds used to finance airport development: airport cash flow, revenue and general obligation bonds, federal/state/local grants, and passenger facility charges (PFCs), which are reserved for commercial service airports. Access to these sources of financing varies widely among airports, with some large airports maintaining substantial cash reserves and most small commercial service and general aviation airports often requiring subsidies from local and state governments to fund operating expenses and to finance modest improvements.

Financing capital improvements at the airport will not rely solely on the financial resources of the airport or the taxpayers. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. Historically, Philip Billard Municipal Airport has received federal and state grants. While some years more funds could be available, the CIP was developed with project phasing in order to remain realistic and within the range of anticipated grant assistance. The following discussion outlines key sources of funding potentially available for capital improvements at Philip Billard Municipal Airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public-use airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal funding, the *FAA Modernization and Reform Act of 2012*, was enacted on February 17, 2012

The law authorizes the FAA's Airport Improvement Program (AIP) at $3.35 billion for fiscal years 2012 through 2015. Eligible airports, which include those in the *National Plan of Integrated Airport Systems* (NPIAS) such as Philip Billard Municipal Airport, can apply for airport improvement grants. **Table 6B** presents the approximate distribution of the AIP funds. Currently, Philip Billard Municipal Airport is eligible to apply for grants which may be funded through state apportionments, the small airport fund, and/or discretionary categories.

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which FAA provides up to 90 percent of the cost and the airport sponsor invests the remaining 10 percent. In exchange for this level of funding, the airport sponsor is required to meet various Grant Assurances, including maintaining the improvement for its useful life, usually 20 years.

TABLE 6B
Federal AIP Funding Distribution

Funding Category	Percent of Total	Funds*
Apportionment/Entitlement		
Passenger Entitlements	29.19%	$977,865,000
Cargo Entitlements	3.00%	$100,500,000
Alaska Supplemental	0.65%	$21,775,000
State Apportionment for Nonprimary Entitlements	10.35%	$346,725,000
State Apportionment Based on Area and Population	9.65%	$323,275,000
Carryover	10.77%	$360,795,000
Small Airport Fund		
Small Hubs	1.67%	$55,945,000
Nonhubs	6.68%	$223,780,000
Nonprimary (GA and Reliever)	3.34%	$111,890,000
Discretionary		
Capacity/Safety/Security/Noise	11.36%	$380,560,000
Pure Discretionary	3.79%	$126,965,000
Set Asides		
Noise	8.40%	$281,400,000
Military Airports Program	0.99%	$33,165,000
Reliever	0.16%	$5,360,000
Totals	100.00%	$3,350,000,000

* FAA *Modernization and Reform Act of 2012*
AIP: Airport Improvement Program
Source: FAA Order 5100.38C, Airport Improvement Program Handbook

The source for AIP funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances, in part, the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

Apportionment (Entitlement) Funds

Federal AIP funds are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial service airports based upon minimum enplanement levels of at least 10,000 passengers annually. If the airport exceeds the enplanement threshold, then it would receive a minimum of $1 million. Other entitlement funds are distributed to cargo service airports, states and insular areas (state apportionment), and Alaska airports.

General aviation airports included in the NPIAS can receive up to $150,000 each year in Non-Primary Entitlement (NPE) funds. These funds can be carried over and combined for up to four years, thereby allowing for completion of a more expensive project. In the past, Philip Billard Municipal Airport has received NPE funding.

The FAA also receives a state apportionment based on a federal formula that takes into account area and population. The FAA then distributes these funds for projects at various airports throughout the state.

Small Airport Fund

If a large or medium hub commercial service airport chooses to institute a PFC, which is a fee of up to $4.50 on each airline ticket, for funding of capital improvement projects, then their apportionment is reduced. A portion of the reduced apportionment goes to the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, and general aviation airports.

Discretionary Funds

The remaining AIP funds are distributed by the FAA based on the priority of the project for which they have requested federal assistance through discretionary apportionments. A national priority ranking system is used to evaluate and rank each airport project. Those projects with the highest priority from airports across the country are given preference in funding. High priority projects include those related to meeting design standards, capacity improvements, and other safety enhancements.

Under the AIP program, examples of eligible development projects include the airfield, public aprons, and access roads. Additional buildings and structures may be eligible if the function of the structure is to serve airport operations in a non-revenue generating capacity, such as maintenance facilities. Some revenue-enhancing structures, such as T-hangars, may be eligible if all airfield improvements have been made; however, the priority ranking of these facilities is very low.

Whereas entitlement monies are guaranteed on an annual basis, discretionary funds are not assured. If the combination of entitlement, discretionary, and airport sponsor match does not provide enough capital for planned development, projects may be delayed.

Set-Aside Funds

Portions of AIP funds are set-asides designed to achieve specific funding minimums for noise compatibility planning and implementation, select former military airfields (Military Airport Program), and select reliever airports. Philip Billard Municipal Airport does not qualify for set-aside funding.

FAA Facilities and Equipment (F&E) Program

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA Airport Traffic Control Towers (ATCTs), enroute navigational aids, on-airport navigational aids, and approach lighting systems.

While F&E still installs and maintains some navigational aids, on-airport facilities at general aviation airports have not been a priority. Therefore, airports often request funding assistance for navigational aids through AIP and then maintain the equipment on their own. At Philip Billard Municipal Airport, all navigation aids are owned and maintained by the FAA.

KANSAS AIRPORT IMPROVEMENT PROGRAM

The State of Kansas recognizes the valuable contribution to the state's transportation economy that airports make. Therefore, the Kansas Department of Transportation – Aviation Division administers the Kansas Airport Improvement Program (KAIP). The program provides approximately $3 million annually through fiscal year 2013, which will increase to $5 million annually beginning in fiscal year 2014.

All public-use airports are eligible to apply for KAIP funding. There are several criteria for project consideration:

1. Scope of eligible project:
   a) Projects addressing safety and preservation concerns
   b) Projects focused on development needs identified in the Kansas Airport System Plan (KASP)
   c) All projects deemed by the sponsor to be critical to the airport's ability to support the community
2. Projects should be capable of completion in one year
3. State funding cannot be used to leverage federal assistance projects

All KAIP funding requests are reviewed by the Project Evaluation Team whose members are designated by the Secretary of Transportation and consist of members with aviation, construction, and maintenance knowledge. All grant requests are evaluated objectively through a priority rating system. The factors used in evaluating projects are:

a. Safety
b. System Preservation

c. KASP Recommendation
d. Geographic remoteness
e. Discretionary
   i) willingness of sponsor to exceed minimum match requirements
   ii) previous project experience
   iii) other considerations

A financial match is required of the airport sponsors. The sponsor participation levels are as follows:

1. Design and Planning projects are funded 95 percent state and 5 percent sponsor match.

2. Privately owned, public-use airport projects will be funded 90 percent state and 10 percent sponsor match.

3. For publicly owned airports, the state/sponsor match is determined by the population of the associated city. Cities with less than 3,000 people will participate at 90 percent state and 10 percent sponsor match. Cities with between 3,000 and 10,000 people will participate at 75 percent state and 25 percent sponsor match. Cities larger than 10,000 people will participate at a 50 percent state and 50 percent sponsor match.

In addition, the airport sponsor must agree to keep the airport open to the public for a minimum of ten years. The maximum level of state participation is $800,000, unless the project is a new runway, which is eligible for up to $1.6 million or a full-depth replacement runway, which is eligible for up to $1.2 million.

LOCAL MTAA FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. The goal of the airport is to generate enough revenue to cover all operating and capital expenditures. As with many general aviation airports, this is not always possible and other financing methods will be needed.

In 1978, the MTAA, formed under KSA 27-237 through 27-330, was instituted as an autonomous agency responsible for the administration of Topeka Regional Airport (formerly Forbes Field Airport), Philip Billard Municipal Airport, and the Topeka Air Industrial Park (TAIP), located at Topeka Regional Airport. The area administered by MTAA covers in excess of 4,000 acres, with the TAIP encompassing approximately 450 acres.

The MTAA is a legally chartered institution with the status of a public corporation. As owner and manager of the airport (and Topeka Regional Airport), the MTAA has relative independence from state and local governments, but also has the responsibility to manage its own budget. MTAA's financial independence rests largely on its ability to issue its own debt, in the form of general revenue bonds, as well as a limited authority to impose taxes upon airport patrons and users in order to fund capital projects at the airport(s). The MTAA receives its operational and capital funding from certain state and local tax programs, including a Shawnee County property tax mil levy, as well as from self-generated income such as land leases, hangar leases, landing fees, fuel flowage fees, etc. In addition to taxes and bonds, the airport collects various user fees, such as rental and fuel flowage fees, which allow the MTAA to operate as a financially self-sustaining public enterprise.

Other sources of development are available, including leasehold financing which refers to a developer or tenant financing improvements under a long term ground lease. The obvious advantage of such an arrangement is that it relieves the MTAA of all responsibility for raising the capital funds for improvements. However, the private development of facilities on a ground lease, particularly on property owned by a quasi-governmental agency, produces a unique set of concerns.

In particular, it may be more difficult to obtain private financing as only the improvements and the right to continue the lease can be claimed in the event of a default. Ground leases normally provide for the reversion of improvements to the airport at the end of the lease term, which reduces their potential value to a lender taking possession. Also, companies that want to own their property as a matter of financial policy may not locate where land is only available for lease.

General MTAA Revenue and Expenses

The balance of project costs, after consideration has been given to grants, must be funded through local resources. From a financial management perspective, the MTAA manages three facilities (Topeka Regional Airport, Philip Billard Municipal Airport, and the Topeka Air Industrial Park) under one accounting function; therefore, it is not possible to consider the financial status of Philip Billard Municipal Airport independently from the other entities. **Table 6C** presents the scheduled revenue and expenses for MTAA for the previous seven years.

TABLE 6C
Revenue and Expenses
Metropolitan Topeka Airport Authority

Fiscal Year	Schedule of Revenues	Schedules of Expenses	Total Revenue Less General Expenses
2012	$3,870,741	$3,452,646	$418,095
2011	$4,033,944	$3,255,989	$777,955
2010	$4,071,668	$3,264,336	$807,332
2009	$4,122,220	$3,352,384	$769,836
2008	$4,126,476	$3,323,926	$802,550
2007	$3,534,600	$3,336,897	$197,703
2006	$3,403,375	$3,264,294	$139,081

Source: MTAA financial records

The operations of the MTAA generate revenues, which are secured by federal grant assurances to be utilized at the MTAA properties. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or for additions or improvements to airport facilities.

All general aviation airports should establish standard basis rates for various leases. All lease rates should be set to adjust to a standard index such as the Consumer Price Index to assure that fair and equitable rates continue to be charged into the future. The condition and location of hangar space should also be considered when establishing the lease rates. Standard basis rates should be established for city-owned hangars, terminal building office space, and ground leases. Fuel flowage fees and aircraft tie-down fees should also be uniform.

Financial Summary

The above financial discussion is intended to show that the operation of Philip Billard Municipal Airport meets various requirements and goals set forth by the FAA.

Grant Assurance #24 – Fee and Rental Structure: Requires the airport sponsor to set fee, lease rates, and other charges that are directed at making the airport as self-sustaining as possible. Airport sponsors must impose fair market value charges for noncommercial uses of airport property, but aeronautical user charges may be less than fair market value. As demonstrated, the fee and rental structure for airport property and facilities is fair and equitable.

Grant Assurance #25 – Airport Revenues: Restricts the use of airport revenue generated by the airport and local taxes on aviation fuel to be expended for the capital or operating costs of the airport, the local airport system, or other facilities owned or operated by the airport sponsor, which directly and substantially relate to the actual air transportation of passengers or property or noise mitigation efforts. Under the *Single Audit Act of 1984*, the airport must conduct an annual audit and assure the government that airport funds have been properly used. In general, revenue generated by the airport may not be diverted to functions unrelated to the operation and maintenance of the airport. Examples of revenue diversion include:

a) General economic development;

b) Marketing and promotional activities unrelated to the airport;

c) Payments in lieu of taxes or other assessments that exceed the value of services;

d) Payments to compensate sponsoring governmental bodies for lost tax revenues exceeding stated tax rates; and

e) Direct or indirect payments of airport revenue beyond that which is required to pay for services and facilities provided to the airport.

The MTAA meets all requirements for financial auditing.

SUMMARY

The best means to begin implementation of the recommendations in this master plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. Rather, the airport should implement measures that allow them to track various demand indicators, such as based aircraft and operations, as well as those times when the main apron is full. Operations, particularly by business jets, will be important when providing justification for several projects in the future. The issues upon which this master plan is based will remain valid for a number of years. The primary goal is for the airport to best serve the air transportation needs of the region, while continuing to be economically self-sufficient.

The actual need for facilities is most appropriately established by airport activity levels rather than a specified date. For example, projections have been made as to when additional hangars may be needed at the airport. In reality, however, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, aviation demand will dictate when facility improvements need to be delayed or accelerated.

The real value of a usable master plan is in keeping the issues and objectives in the minds of the managers and decision-makers so that they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this master plan will impact the period that the plan remains valid. The format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness.

In summary, the planning process requires the airport management to consistently monitor the progress of the airport in terms of aircraft operations and based aircraft. Analysis of aircraft demand is critical to the timing and need for new airport facilities. The information obtained from continually monitoring airport activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.

Appendix A

GLOSSARY OF TERMS

A

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of nonregulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

AIR CARRIER: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

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

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

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

AIRPLANE DESIGN GROUP (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- Group I: Up to but not including 49 feet.
- Group II: 49 feet up to but not including 79 feet.
- Group III: 79 feet up to but not including 118 feet.
- Group IV: 118 feet up to but not including 171 feet.
- Group V: 171 feet up to but not including 214 feet.
- Group VI: 214 feet or greater.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT IMPROVEMENT PROGRAM: A program authorized by the Airport and Airway

Improvement Act of 1982 that provides funding for airport planning and development.

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT LAYOUT PLAN (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

AIRPORT LAYOUT PLAN DRAWING SET: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility which provides en route air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight.

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

ANNUAL INSTRUMENT APPROACH (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

AUTOMATIC WEATHER OBSERVATION STATION (AWOS): Equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

BEARING: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: A barrier used to divert or dissipate jet blast or propeller wash.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

C

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

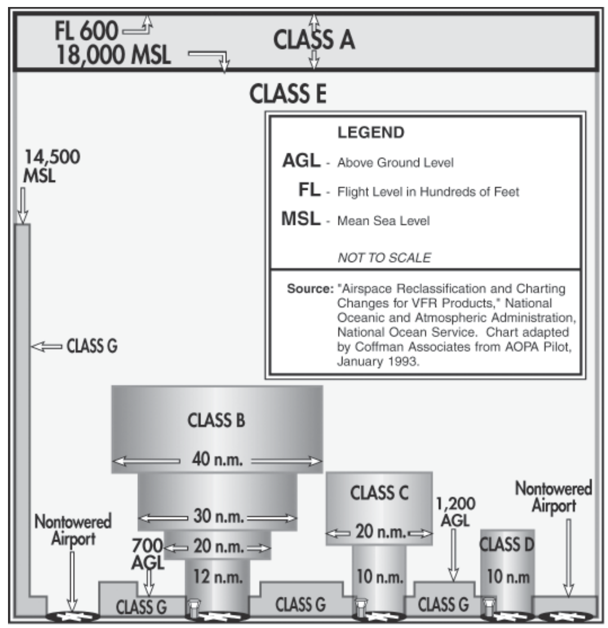
CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 50 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.



CLASS A AIRSPACE: See Controlled Airspace.

CLASS B AIRSPACE: See Controlled Airspace.

CLASS C AIRSPACE: See Controlled Airspace.

CLASS D AIRSPACE: See Controlled Airspace.

CLASS E AIRSPACE: See Controlled Airspace.

CLASS G AIRSPACE: See Controlled Airspace.

CLEAR ZONE: See Runway Protection Zone.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

COMPASS LOCATOR (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

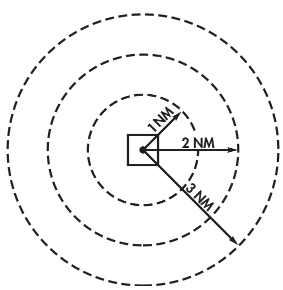
CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

CONTROLLED AIRSPACE: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- **CLASS A**: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

- **CLASS B**: Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.



- **CLASS C**: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- **CLASS D**: Generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure . Unless otherwise authorized, all persons must establish two-way radio communication.

- **CLASS E**: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- **CLASS G**: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

CONTROLLED FIRING AREA: See special-use airspace.

CROSSWIND: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- **TAKEOFF RUNWAY AVAILABLE (TORA)**: The runway length declared available and suitable for the ground run of an airplane taking off.
- **TAKEOFF DISTANCE AVAILABLE (TODA)**: The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)**: The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **LANDING DISTANCE AVAILABLE (LDA)**: The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.

DNL: The 24-hour average sound level, in Aweighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects are legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FEDERAL INSPECTION SERVICES: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FINAL APPROACH AND TAKEOFF AREA (FATO). A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

FINAL APPROACH FIX: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FLIGHT LEVEL: A designation for altitude within controlled airspace.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

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

G

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GENERAL AVIATION AIRPORT: An airport that provides air service to only general aviation.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM (GPS): A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

H

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

HIGH-SPEED EXIT TAXIWAY: A long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

HORIZONTAL SURFACE: An imaginary obstruction- limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

I

INITIAL APPROACH FIX: The designated point at which the initial approach segment begins for an instrument approach to a runway.

INSTRUMENT APPROACH PROCEDURE: 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.

INSTRUMENT FLIGHT RULES (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

K

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

LOCAL TRAFFIC: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): A facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for en route navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest clas- sification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

NAVAID: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.)

NAVIGATIONAL AID: A facility used as, available for use as, or designed for use as an aid to air navigation.

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

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

OBSTACLE FREE ZONE (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

ONE-ENGINE INOPERABLE SURFACE: A surface emanating from the runway end at a slope ratio of 62.5:1. Air carrier airports are required to maintain a technical drawing of this surface depicting any object penetrations by January 1, 2010.

OPERATION: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

OUTER MARKER (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

PRECISION APPROACH: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I)**: A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.

- **CATEGORY II (CAT II)**: A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.

- **CATEGORY III (CAT III)**: A precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

PRECISION OBJECT FREE AREA (POFA): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

REMOTE COMMUNICATIONS OUTLET (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): See remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used en route and for approaches to an airport.

RUNWAY: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

RUNWAY DESIGN CODE: A code signifiying the design standards to which the runway is to be built.

RUNWAY END IDENTIFICATION LIGHTING (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: The average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY REFERENCE CODE: A code signifying the current operational capabilities of a runway and associated taxiway.

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of- site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

RUNWAY VISUAL RANGE (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

SEGMENTED CIRCLE: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SMALL AIRPLANE: An airplane that has a maximum certified takeoff weight of up to 12,500 pounds.

SPECIAL-USE AIRSPACE: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA**: Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.

- **CONTROLLED FIRING AREA**: Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.

- **MILITARY OPERATIONS AREA (MOA)**: Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.

- **PROHIBITED AREA**: Designated airspace within which the flight of aircraft is prohibited.

- **RESTRICTED AREA**: Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.

- **WARNING AREA**: Airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD INSTRUMENT DEPARTURE PROCEDURES: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or en route airspace.

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

STRAIGHT-IN LANDING/APPROACH: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

TACTICAL AIR NAVIGATION (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA): See declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA): See declared distances.

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

TAXIWAY: A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY DESIGN GROUP: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

TAXIWAY SAFETY AREA (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

TETRAHEDRON: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and go is recorded as two operations: one operation for the landing and one operation for the takeoff.

TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

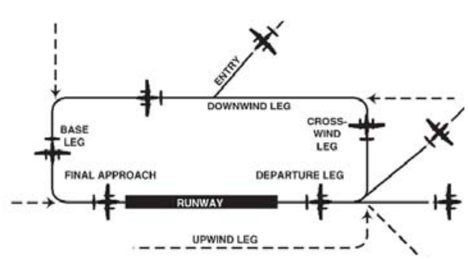
TOUCHDOWN AND LIFT-OFF AREA (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which the helicopter lands or takes off.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100- foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



U

UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

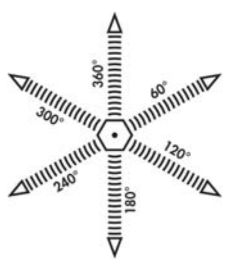
UNIVERSAL COMMUNICATION (UNICOM): A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/OMNIDIRECTIONAL RANGE (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.



VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

W

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100L)

AWOS: automatic weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at ILS outer marker

LORAN: long range navigation

MALS: midium intensity approach lighting system with indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076.1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

PVC: poor visibility and ceiling

RCO: remote communications outlet

RRC: Runway Reference Code

RDC: Runway Design Code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: Taxiway Design Group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

METROPOLITAN TOPEKA AIRPORT AUTHORITY
TOPEKA REGIONAL AIRPORT & BUSINESS CENTER | BILLARD AIRPORT

Appendix B

FORECAST APPROVAL LETTER

U.S. Department
of Transportation
Federal Aviation Administration

Central Region
Iowa, Kansas,
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

March 20, 2013

Eric Johnson
Metropolitan Topeka Airport Authority
Forbes Field
P O Box 19053
Topeka, KS 66619

Dear Mr. Johnson:

Philip Billard Municipal Airport
Topeka, Kansas
AIP No. 3-20-0082-018
Master Plan Update Forecast/Critical Design Aircraft Approval

The submitted Aviation Demand Forecast is **APPROVED**.

The proposed existing Critical Design Aircraft, C-II, and ultimate Critical Design Aircraft, C-II, is **APPROVED**.

Please proceed with developing the remainder of the report and the Airport Layout Plan drawings. If you have any questions regarding this project please call me at (816)329-2637 or email me at jeff.deitering@faa.gov.

Sincerely,

Original Signed By
Jeffrey D. Deitering

Jeffrey D. Deitering, P.E.
Airport Planning Engineer – Kansas

cc: C.Edward Young, KDOT
Patrick Taylor, C.M., Coffman Associates

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY
TOPEKA REGIONAL AIRPORT & BUSINESS CENTER | BILLARD AIRPORT

Appendix C

ENVIRONMENTAL OVERVIEW

Appendix C
ENVIRONMENTAL OVERVIEW

Analysis of the potential environmental impacts of proposed airport development projects, as discussed in Chapter Five and depicted on Exhibit 5A, is an important component of the airport master plan process. The purpose of this appendix is to identify Federal Aviation Administration (FAA)-approved significance thresholds for the various resource categories contained in Order 1050.1E, *Environmental Impacts: Policies and Procedures*, and Order 5050.4B, *National Environmental Policy Act* (NEPA) *Implementation Instructions for Airport Actions.* The overview then evaluates the development program to determine whether future development identified in the airport master plan could individually or collectively affect the quality of the environment.

The construction of any improvements depicted on the recommended development concept plan would require compliance with NEPA to receive federal financial assistance. For projects not "categorically excluded" under FAA Order 1050.1E, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). In instances where significant environmental impacts are expected, an Environmental Impact Statement (EIS) may be required. While this portion of the planning process is not designed to satisfy the NEPA requirements for a categorical exclusion, EA, or EIS, it is intended to supply a preliminary review of environmental issues. This overview identifies which projects under the proposed development plan may require further analysis.

The following table (**Table C1**) summarizes potential environmental concerns associated with build-out of the proposed elements of the master plan. In some cases, these concerns are related to the future construction of specific projects that could be built at the airport;

in other cases, the concerns are related to the overall projected future increase in airport operations (i.e., the aviation forecasts).

TABLE C1
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

FAA Resource Category	Threshold of Significance	Potential Concern
Air Quality, including Greenhouse Gases (GHGs) and Climate	**For air quality:** Potentially significant air quality impacts associated with an FAA project or action would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed. **For GHGs and climate:** There are no federal standards for aviation-related GHG emissions developed at this time.	**For air quality:** Shawnee County, Kansas currently meets federal air quality standards. However, the projected increase in operations and proposed developments over the 20-year planning horizon of the airport master plan would result in additional emissions. The increases would need to be assessed on a project-specific basis as individual development is proposed. **For GHGs and climate:** An increase in GHG emissions would also occur. The increases would need to be assessed on a project-specific basis as individual development is proposed.
Coastal Resources	No specific thresholds have been established; however, if a local Coastal Development Permit (CDP) cannot be issued due to a lack of consistency with the Local Coastal Program (LCP), the FAA typically will not make a federal coastal consistency determination either.	None. No coastal areas are present at Philip Billard Municipal Airport.
Compatible Land Use/Noise	See significance threshold for noise.	None. The only airport actions that would occur off the airport would be the acquisition of property adjacent to the airport. These areas are within the runway protection zones (RPZs) for the approach ends of Runway 18 and the extended Runway 13 on the north side of the airport. The lands identified for acquisition include residences and farmland. The acquisition of residences and farmland is required to conform to the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (URARPAPA). These regulations mandate that certain relocation assistance services be made available to homeowners/tenants of the properties to be acquired. This assistance includes help finding comparable and decent substitute housing for the same cost, moving expenses, and in some cases, loss of income. See also the discussion of noise.

TABLE C1 (Continued)
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

FAA Resource Category	Threshold of Significance	Potential Concern
Construction Impacts	Construction impacts alone are rarely significant pursuant to NEPA. See significance threshold(s) for the resource(s) that construction could affect.	Construction impacts typically relate to the effects on specific impact categories, such as air quality, water quality, or noise during construction. The use of best management practices (BMPs), including those outlined within FAA Advisory Circular 150/5371-10, *Standards for Specifying Construction of Airports, Item P-156, Temporary Air and Water Pollution, Soil Erosion and Siltation Control*, during construction is typically a requirement of construction-related permits such as a National Pollution Discharge Elimination System (NPDES) permit. Use of these measures typically alleviates potential resource impacts. Short term construction-related noise impacts could occur associated with the taxiway improvements and landside developments, including the development of a hotel, and construction of hangar, apron, and access road and parking lot facilities. However, these impacts typically do not arise unless construction is being undertaken during the early morning, evening, or nighttime hours. Construction-related air quality impacts can be expected. Air emissions related to construction activities will be short term in nature and will be included in the air emissions inventory, as required for NEPA documentation efforts. The airport and all applicable contractors will need to obtain and comply with the requirements and procedures of the construction-related NPDES General Permit, including the preparation of a *Notice of Intent* and a *Stormwater Pollution Prevention Plan*, prior to the initiation of product construction activities.
DOT Act: Section 4(f)	When the action's physical use would be more than minimal or its constructive use substantially impairs the Section 4(f) property. In either case, mitigation is not enough to sustain the resource's designated use.	There are no known Section 4(f) properties at the airport. The closest off-airport Section 4(f) properties include: Riverside ATV Park (1 mile northwest), Santa Fe Park (1.5 miles west), and Oakland Billard Park (1.1 miles west). See also the discussion on noise. Source: http://gis.snco.us/publicgis/ps/ Note: Distances measured from the intersection of Runways 18-36 and 13-13.

TABLE C1 (Continued)
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

FAA Resource Category	Threshold of Significance	Potential Concern
Farmland	When the combined score on Form AD-1006 ranges between 200 and 260. Impact severity increases as the total score approaches 260.	Portions of the Runway Protection Zone for Runway 18-36 and Runway 13-31 identified for acquisition are classified as prime farmland by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). If these lands are converted to non-agricultural use as a result of the acquisition, coordination with NRCS will be necessary as part of an environmental assessment.
Fish, Wildlife, and Plants	**For Federally-listed species:** When the U.S. Fish and Wildlife Service or the National Marine Fisheries Service determines a proposed action would likely jeopardize a species' continued existence or destroy or adversely affect a species' critical habitat. **For non-listed species:** Consider scientific literature on, and information from, agencies having expertise in addressing the affected species. Consider information on: project effects on population dynamics; sustainability; reproduction rates; natural and artificial mortality (aircraft strikes); and the minimum population size needed to maintain the affected population.	According to the U.S. Fish and Wildlife Service, there are two endangered species listed for Shawnee County, Kansas: Topeka shiner and interior least tern. The Topeka shiner is a species of fish that occurs in prairie, or former prairie perennial streams with clear water and sandy or rocky bottoms. These conditions are not present within the proposed development areas identified within the Philip Billard Master Plan. The interior least tern typically occupies barren to sparsely vegetated sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines in late April to August. This habitat may be present along the Kansas River, located north of the airport. Coordination with the U.S. Fish and Wildlife Service would be necessary as part of any environmental documentation required for any of the proposed improvements identified within the master plan. Through coordination, the U.S. Fish and Wildlife Service may request field surveys for the interior least tern, as well as species protected under the *Migratory Bird Treaty Act* and the *Bald and Golden Eagle Protection Act*.
Floodplains	When notable adverse impacts on natural and beneficial floodplain values would occur.	Portions of the airport are designated as 100-year floodplains; however, no development is planned within the floodplain and, therefore, no impacts will occur.

TABLE C1 (Continued)
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

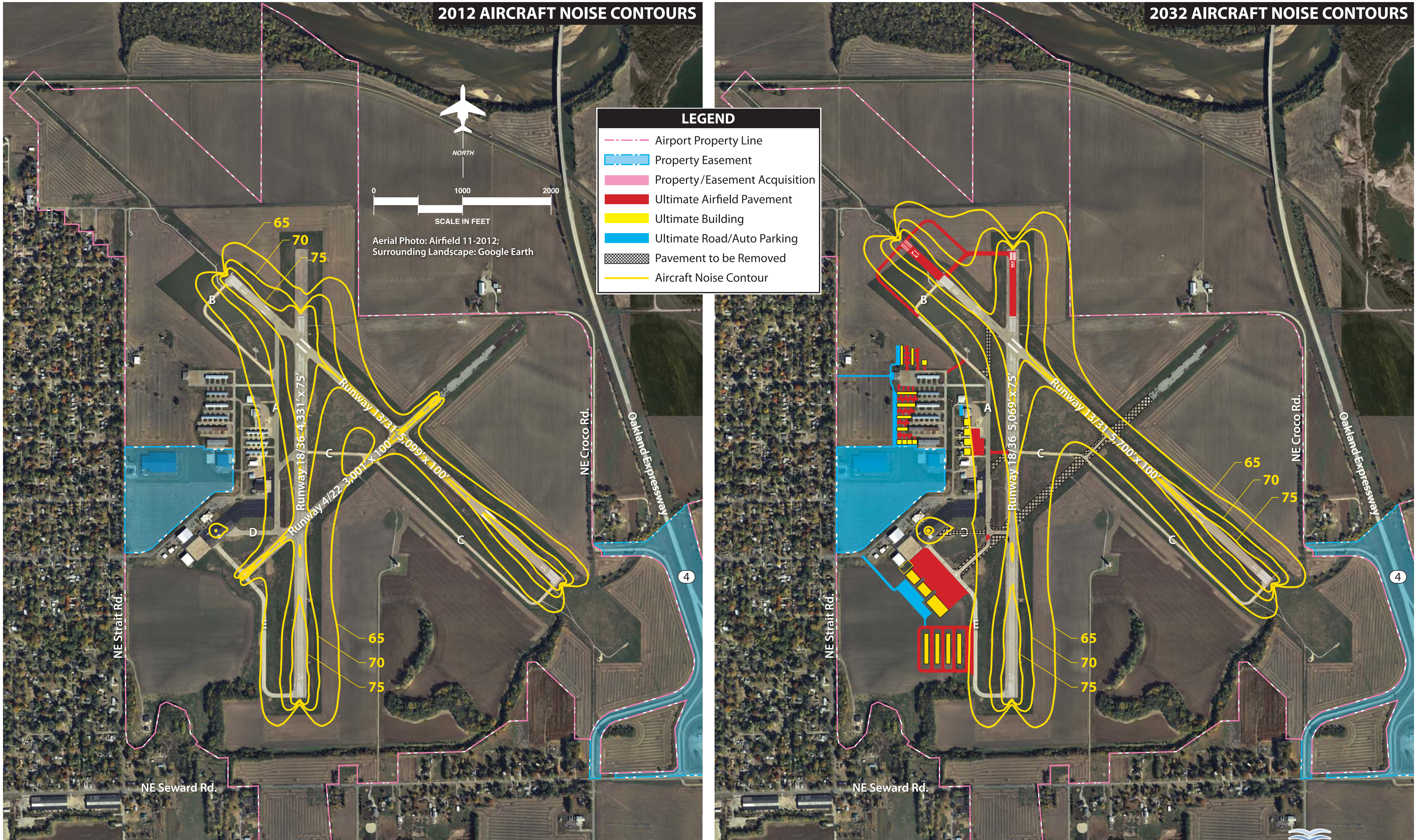
FAA Resource Category	Threshold of Significance	Potential Concern
Hazardous Materials, Pollution Prevention, and Solid Waste	**For hazardous materials:** When an action involves a property on or eligible for the National Priority List (NPL). Uncontaminated properties within an NPL site's boundary do not always trigger this significance threshold. **For pollution prevention:** See significance thresholds for water quality. **For solid waste:** There are no solid waste thresholds of significance established.	**For hazardous materials & pollution prevention:** None. The airport has an active SWPPP that includes measures to manage potential hazardous materials and to protect water quality at the airport. Any expansion of the fuel farms at the airport would be incorporated into the airport's approved spill prevention control and countermeasures (SPCC) plans and operations manuals. There are no Superfund sites within the vicinity of the airport. **For solid waste:** None. Existing and future solid waste is, or would be, collected and disposed of through ongoing City programs and facilities.
Historic, Architectural, Archaeological, and Cultural Resources	When an action adversely affects a protected property and the responsible FAA official determines that information from the State and/or Tribal Historic Preservation Officer addressing alternatives to avoid adverse effects and mitigation warrants further study.	A review of the National Register of Historic Places (NRHP) indicates that no listed sites are located on or within the Airport vicinity. In accordance with Section 106 of the *National Historic Preservation Act*, coordination with the State Historic Preservation Office (SHPO) will be necessary to determine if archaeological field surveys are required to determine the presence of previously unidentified historic properties or archaeological resources on the Airport prior to undertaking planned improvements, including the runway extensions, the fuel farm, and T-hangars.
Light Emissions and Visual Effects	**For light emissions:** When an action's light emissions create annoyance to interfere with normal activities. **For visual effects:** When consultation with Federal, State, or local agencies, tribes, or the public shows these effects contrast with existing environments and the agencies state the effect is objectionable.	None. All new lighting and developed areas associated with the proposed airport master plan would remain on the airfield and other developed portions of the airport. From off-site areas, such as adjacent streets, there will not be noticeable change in the site's appearance.
Natural Resources and Energy	When an action's construction, operation, or maintenance would cause demands that would exceed available or future (project year) natural resource or energy supplies.	None. Planned development projects at the airport are not anticipated to result in a demand for natural resources or energy consumption beyond what is available by service providers.

TABLE C1 (Continued)
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

FAA Resource Category	Threshold of Significance	Potential Concern
Noise	**For most areas:** When an action, compared to the No Action alternative for the same timeframe, would cause noise-sensitive areas located at or above DNL 65 dB to experience a noise increase of at least DNL 1.5 dB. An increase from DNL 63.5 dB to DNL 65 dB is a significant impact. **For national parks, national wildlife refuges and historic sites, including traditional cultural properties:** FAA must give special consideration to these areas. The DNL 65 dB threshold may not adequately address noise effects on visitors to these areas. Consult the jurisdictional agency for more information to determine a significant noise impact.	Noise exposure contours were prepared for the existing (2012) and forecast (2032) conditions. As indicated in **Exhibit C1**, the 2012 65 DNL noise contour remains entirely on airport property. The 2032 noise contours, which include the planned runway extensions to Runway 13-31 and Runway 18-36 and the closure of Runway 4-22, extend off-airport property northeast of the intersection of Runways 13-31 an 18-36. The 2032 65 DNL noise contour does not encompass any noise-sensitive development or properties subject to Section 4(f).
Secondary (Induced) Impacts	Induced impacts will not normally be significant except where there are also significant impacts in other categories, especially noise, land use, or direct social impacts.	None. The proposed actions are not expected to create significant adverse noise, land use, or social impacts. See also discussion under those sections.
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	**For socioeconomic issues:** When an action would cause: • Extensive relocation, but sufficient replacement housing is unavailable; • Extensive relocation of community businesses that would cause severe economic hardship for affected communities; • Disruption of local traffic patterns that substantially reduce the Levels of Service of roads serving the airport and its surrounding communities; • A substantial loss in community tax base. **For environmental justice issues:** When an action would cause disproportionately high and adverse human health or environmental effects on minority and low-income populations, a significant impact may occur.	**For socioeconomic issues:** The proposed development projects would not involve the need to relocate any businesses. The acquisition of residences would be undertaken in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URARPAPA).* The proposed improvements outlined are expected to have only local impacts; the division or disruption of established communities is not anticipated as a result of the proposed project. As specific airport projects are proposed, project-specific traffic studies may be necessary depending on the ingress, egress, and associated vehicular traffic associated with the project. **For environmental justice issues:** None. According to the EPA's online *EJView* tool[1], the tract and blockgroup that includes the Airport do not contain high percentages (above 50 percent) of minority populations or high percentages of residents below the poverty level.

[1] http://epamap14.epa.gov/ejmap/ejmap.aspx accessed July 2, 2013.

PHILIP BILLARD MUNICIPAL AIRPORT



MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Exhibit C1
EXISTING AND FUTURE NOISE CONTOURS

TABLE C1 (Continued)
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

FAA Resource Category	Threshold of Significance	Potential Concern
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks (Continued)	**For children's health & safety risks:** An action causing disproportionate health and safety risks to children may indicate a significant impact.	**For children's health & safety risks:** None. During construction of the projects outlined within the master plan, appropriate measures should be taken to prevent access by unauthorized persons to construction project areas. Additionally, best management practices should be implemented to decrease environmental health risks to children.
Water Quality	When an action would not meet water quality standards. Potential difficulty in obtaining a permit or authorization may indicate a significant impact.	None. Through *Clean Water Act* (CWA), Section 402, National Pollutant Discharge Elimination System (NPDES), permit coverage is required for any point source discharge to surface Waters of the U.S., including stormwater discharges associated with construction activity. Construction activities (clearing, grading, or excavating) that disturb one acre or more require authorization to discharge stormwater under Construction Activities General Permit S-MCST-0312-1. These stipulate the BMPs and minimum control measures required to construct and do business at the airport.
Wetlands , jurisdictional or non-jurisdictional	When an action would: • Adversely affect a wetland's function to protect the quality or quantity of a municipal water supply, including sole source aquifers and a potable water aquifer. • Substantially alter the hydrology needed to sustain the affected wetland's values and functions or those of a wetland to which it is connected. • Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare. The last term includes cultural, recreational, and scientific public resources or property. • Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically-important timber, food, or fiber resources of the affected or surrounding wetlands. • Promote development that causes any of the above impacts. • Be inconsistent with applicable State wetland strategies.	Certain drainages (both natural and human-made) come under the purview of USACE under Section 404 of the CWA; wetlands are also protected. According to USDA's Web Soil Survey, there are no hydric soils, which indicate the potential presence of wetlands, within the proposed development areas. Additionally, according to the U.S. Fish and Wildlife Service, which manages the National Wetlands Inventory[2] (NWI) on behalf of all federal agencies in response to the *Emergency Wetlands Resource Act*, potential wetlands are present on and within the vicinity of Airport property. As indicated on **Exhibit C2,** a 2.21 acre Freshwater Forested/Shrub Wetland is located at the south end of the Airport near the approach end of Runway 36. None of these potential wetland areas will be impacted by projects proposed in the Master Plan; however, field studies and coordination with USACE may be required prior to undertaking future development projects to determine the presence of wetlands or Waters of the U.S.

[2] http://www.fws.gov/wetlands/Data/Mapper.html accessed May 30, 2013.

TABLE C1 (Continued)
Summary of Potential Environmental Concerns
Philip Billard Municipal Airport Master Plan

FAA Resource Category	Threshold of Significance	Potential Concern
Wild and Scenic Rivers	No specific thresholds have been established.	None. The closest designated Wild and Scenic river segments are more than 300 miles from the airport.

FAA, 2006a. FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, March.

FAA, 2006b. FAA Order 5050.4B, *National Environmental Policy Act* (NEPA) *Implementing Instructions for Airport Actions,* April.

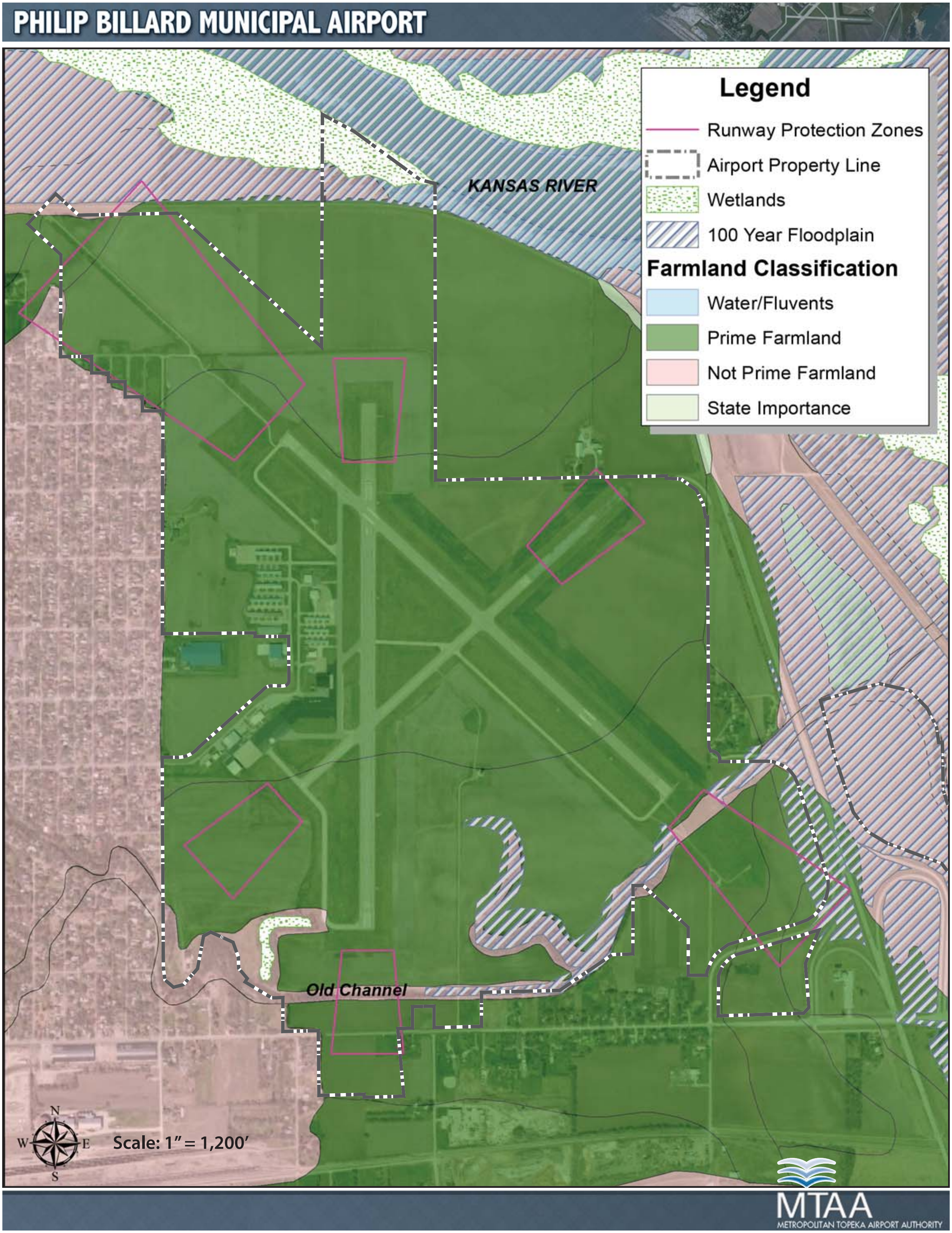


Exhibit C2
ENVIRONMENTAL INVENTORY

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY
TOPEKA REGIONAL AIRPORT & BUSINESS CENTER | BILLARD AIRPORT

Appendix D

LAND USE COMPATIBILITY

Appendix D
LAND USE COMPATIBILITY

The Planning Advisory Service (PAS) Report Number 562, 2010 (*Planners and Planes: Airports and Land-Use Compatibility*) defines airport land use compatibility as: "those uses that can coexist with a nearby airport without either constraining the safe and efficient operation of the airport or exposing people living or working nearby to unacceptable levels of noise or (safety) hazards." Non-compatible land uses are further defined by this PAS report as any land use that adversely affects the livability of surrounding communities, as well as any community characteristic that can adversely affect the viability of an airport.

Non-compatible airport development often results in complaints and demands for restrictions on airport operations. In some cases, if compatibility issues cannot be resolved, the airport's ability to operate efficiently and serve its role in the national aviation system is jeopardized.

Residential development is most sensitive to airport operations and is nearly always an incompatible land use if located close to an airport. Land uses where people congregate, such as schools, churches, theaters, and hospitals, also may be incompatible.

Some uses are incompatible because they actually represent a danger to aircraft using an airport. Examples of these include tall structures, as well as commercial or industrial activities that generate bright lights, smoke, or electronic interference that may affect aircraft radios and navigation equipment. Landfills, which attract birds and other wildlife, can also be dangerous. The most serious hazards are tall structures that extend into the air around airports where aircraft are operating close to the ground.

This airport land use compatibility assessment includes a review of land use compatibility responsibilities; a brief summary of planning and zoning documentation in the vicinity of Philip Billard Airport; and recommendations to maintain airport compatibility in undeveloped areas within the vicinity of the airport.

ROLE OF RESPONSIBLE AGENCIES

Airport land use compatibility involves two overarching concepts: a community's need for safe and efficient air transportation and orderly land use development. These two concepts need to be balanced to achieve a favorable result for both the airport and the residents in the airport's vicinity.

Airport land use compatibility planning can be a complicated matter when considering the various levels of government and documentation involved. Prior to addressing the local issues in the vicinity of Philip Billard Airport, a brief discussion of the specific role of each governmental entity with respect to aviation and land use is necessary. It is important to note that some levels of government are limited in the actions they may take with respect to airport land use compatibility, and care is taken to describe these limitations where appropriate.

FEDERAL

Aviation

The federal government, primarily through the Federal Aviation Administration (FAA), has the authority and responsibility to control aircraft noise sources through the following methods:

- **Implement and Enforce Aircraft Operational Procedures**. These include pilot responsibilities, compliance with Air Traffic Control instructions, flight restrictions, and monitoring careless and reckless operation of aircraft. Where and how aircraft are operated is under the complete jurisdiction of the FAA.

- **Manage the Air Traffic Control System**. The FAA is responsible for the control of navigable airspace and reviews of any proposed alterations in flight procedures for noise abatement on the basis of safety of flight operations, safe and efficient use of navigable airspace, management and control of the national airspace and air traffic control systems, effects on security and national defense, and compliance with applicable laws and regulations.

- **Certification of Aircraft**. The FAA has required the reduction of aircraft noise through certification, modification of engines, or aircraft replacement as defined in Code of Federal Regulations (CFR) Title 14, Part 36.

- **Pilot Licensing.** Individuals licensed as pilots are trained under strict guidelines concentrating on safe and courteous aircraft operating procedures, many of which are designed to lessen the effects of aircraft noise.

Land Use

There are federal laws and regulations related to airport land use compatibility. However, the federal government can only provide guidance for airport land use compatibility as it has no jurisdiction over local planning decisions. In addition, airports that accept federal development grants are required to make every reasonable effort to comply with the laws and regulations. The following is a summary of the federal laws and regulations related to land use compatibility surrounding airports.

Airport and Airway Improvement Act of 1982 - United States Code (USC), Title 49

Upon acceptance of federal funds, this Act obligates the airport owners to operate and maintain the airport and comply with specific assurances, including maintenance of compatible land uses around airports. The implementation of this Act is handled through stipulations outlined in the grant documents signed by airport owners/sponsors when they accept federal funds for a project.

The grant documents are commonly referred to as grant assurances. Pursuant to the provisions of Title 49, U.S.C., subtitle VII, as amended, assurances are required to be submitted as part of a project application by airport sponsors requesting federal funds. Upon acceptance of the grant offer by the airport sponsor, these assurances are incorporated in, and become part of, the grant agreement. There are 39 grant assurances. The following are the primary land use compatibility grant assurances:

- Grant Assurance 20 relates to an airport sponsor's obligation for hazard removal and mitigation to address potential obstructions to the airspace around the airport. Grant Assurance 20 states that the airport sponsor will:

"…take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards."

- Grant Assurance 21 requires, in part, that the sponsor:

"…take appropriate action, to the extent reasonable, including the adoption of zoning laws, 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."

Objects Affecting Navigable Airspace - Code of Federal Regulations (CFR) Title 14, Part 77

This federal regulation establishes standards for determining obstructions in navigable airspace. It sets forth requirements for construction and alteration of structures (i.e., buildings, towers, etc.). It also provides for studies of obstructions to determine their effect on the safe and efficient use of airspace, as well as providing for public hearings regarding these obstructions, along with provisions for the creation of antenna farm areas. It also establishes methods of identifying surfaces that must be free from penetration by obstructions, including buildings, cranes, cell towers, etc., in the vicinity of an airport. This regulation is predominately concerned with airspace-related issues. Implementation and enforcement of the elements contained in this regulation are a cooperative effort between the FAA and the individual state aviation agencies or the airports themselves.

The imaginary surfaces defined in Part 77 include the Primary Surface, Transitional Surface, Approach Surface, Horizontal Surface, and the Conical Surface.

Airport Noise Compatibility Planning - Title 14 CFR Part 150

14 CFR Part 150 establishes procedures and criteria for the evaluation of airport noise-related impacts. Noise, by definition, is sound that is loud, unpleasant, unexpected, or undesired. The best way to minimize the adverse impact of noise is to separate people from that noise. This set of federal regulations establishes the Yearly Day-Night Average Sound Level (DNL) as the metric for measuring noise impacts. DNL represents the average noise received at a given location during the time measured. Residences, schools, and places of public assembly are not compatible with noise levels above 65 DNL. Below the 65 DNL level, land uses are generally considered compatible.

Airport Land Use Compatibility Planning - FAA Advisory Circular (AC) 150/5060-6

This document guides the development of a compatibility plan to ensure the environs surrounding an airport are not developed in a manner that could pose a risk to the airport's operations. This document specifically looks at land use and noise issues.

Airport Master Plans - FAA Advisory Circular (AC) 150/5070-6A

This document guides the development of airport master plans. The guiding principle of the airport planning process is to develop a safe and efficient airport through the use of acceptable standards. While there are many steps in the planning process, none of these steps should be treated in a piecemeal manner. The airside and landside issues must be equally evaluated to create a plan that provides for compatible airport and community development where possible.

A Model Zoning Ordinance to Limit Height of Objects around Airports
FAA Advisory Circular (AC) 150/5190-4A

This advisory circular concerns itself with developing zoning ordinances to control the height of objects. It is based upon the surfaces described in Subpart C of Part 77, Objects Affecting Navigable Airspace. This document provides sample language and model ordinances for use by local airports.

Airport Design – FAA Advisory Circular (AC) 150/5300-13A

This document provides the basic standards and recommendations for airport design. Topics include various runway and taxiway safety areas, the runway protection zones, threshold siting surfaces, runway length, and facility separation standards.

Construction or Establishment of Landfills near Public Airports – FAA Advisory Circular (AC) 150/5200-34A

This document provides guidance on complying with federal statutory requirements regarding the construction or establishment of landfills near public airports.

Hazardous Wildlife Attractants On or Near Airports– FAA Advisory Circular (AC) 150/5200-33B

AC 150/5200-33B provides guidance on land uses that have the potential to attract hazardous wildlife on or near public-use airports.

STATE OF KANSAS

Aviation

With respect to aviation, the Kansas Department of Transportation Aviation Division is responsible for administering the Kansas Airport Improvement Program. Assistance for the development and maintenance of aviation facilities through engineering and aviation experience is provided, as well as systems planning and environmental and community service programs.

Land Use

The State of Kansas grants the authority of land use regulation to local governments. This regulation is accomplished through the use of comprehensive plans and zoning ordinances.

As with the federal government, local planning decisions are at the discretion of the local jurisdiction and the state may not interfere with these decisions.

LOCAL GOVERNMENTS (CITIES AND COUNTIES)

Aviation

Airport proprietors have limited power to control what types of civil aircraft use an airport or to impose curfews or other use restrictions. This power is limited by the rules of 14 CFR Part 161, which state that airport proprietors may not take actions that (1) impose an undue burden on interstate or foreign commerce, (2) unjustly discriminate between different categories of airport users, or (3) involve unilateral action in matters pre-empted by the federal government.

Within the limits of the law and financial feasibility, airport proprietors may mitigate noise or acquire land or partial interests in land, such as air rights, easements, and development rights, to assure the use of property for purposes which are compatible with airport operations.

Land Use

It is important to note the distinction between the primary land use concepts (existing land use, existing zoning, and future land use) used in evaluating development within the airport environs. Existing land use refers to property improvements as they *exist today*. This information is typically gathered from the county assessor's records. Existing zoning identifies the type of land use *permitted on* a given piece of property in accordance with the responsible jurisdiction's ordinances and maps. In the case of Philip Billard Airport, the responsible jurisdiction exerting land use authority within the vicinity of the airport is the City of Topeka.

Zoning is the primary regulatory tool for controlling development within a community. A community's zoning ordinance defines the type, size, and density of land uses allowed in the zones illustrated on the zoning map. Examples of zones include: residential, commercial, industrial, and agricultural. The authority of a municipality to impose land use controls and regulations is found in *Kansas Statute §12-753* in order to adopt zoning ordinances for the protection of the public health, safety and welfare. Cities and counties bear responsibility for the orderly development of areas surrounding the airports within their respective jurisdiction. In addition, cities are authorized to adopt zoning regulations affecting all or any designated portion of the land located outside the city but within three miles thereof. The State of Kansas also permits the adoption of airport zoning ordinances to "prevent the creation or establishment of airport hazards." (K.S.A. Chapter 3, Article 7)

Municipalities also have the authority to adopt overlay zones. Overlay zoning involves the creation of one or more zoning districts that supplement the regulations of the general purpose zoning districts. Within the context of airport compatibility planning, these controls are often used to regulate the height of structures within runway approach areas or to promote compatible development with aircraft noise levels.

Future land use identifies the *projected or future* land use according to the locally adopted comprehensive plan. The comprehensive plan guides future development within the community planning area and provides the basis for zoning designations. In accordance with Kansas Statute §12-747, comprehensive plans are intended to establish long-range development goals for the city and should contain the following provisions:

- *The general location, extent and relationship of the use of land for agriculture, residence, business, industry, recreation, education, public buildings and other community facilities, major utility facilities both public and private and any other use deemed necessary;*
- *population and building intensity standards and restrictions and the application of the same;*
- *public facilities including transportation facilities of all types whether publicly or privately owned which relate to the transportation of persons or goods;*
- *public improvement programming based upon a determination of relative urgency;*
- *the major sources and expenditure of public revenue including long range financial plans for the financing of public facilities and capital improvements, based upon a projection of the economic and fiscal activity of the community, both public and private;*
- *utilization and conservation of natural resources.*

In some cases, the land use allowed in the zoning ordinance or depicted in the comprehensive plan may differ from the existing land use.

Building Codes

Municipal codes can be used to specify the current building standards adopted to regulate the construction of buildings and ensure that they are constructed to safe standards. Building standards may also be used to require sound insulation in new residential, office, and institutional buildings when warranted by existing or potential high aircraft noise levels. The City of Topeka has adopted the International Building Code, 2006, first printing January 2006, as amended. The International Building Code does not include specific provisions for sound insulation to address noise from aircraft operations.

Subdivision Regulations

Subdivision regulations apply in cases where a parcel of land is proposed to be divided into lots or tracts. They are established to ensure the proper arrangement of streets, adequate and convenient public spaces, efficient movement of traffic, adequate and properly located utilities, access for firefighting apparatus, and the orderly and efficient layout and use of land. Subdivision regulations can be used to specify requirements for airport-compatible land development by requiring developers to plat and develop land so as to minimize noise impacts or reduce the noise sensitivity of new development. The regulations can also be used to protect the airport proprietor from litigation for noise impacts at a later date. The most common requirement is the dedication of a noise or avigation easement to the airport proprietor by the land developer as a condition of development approval. Easements typically authorize overflights of property, with noise levels attendant to such operations. They can also require developers to incorporate noise insulation during construction or be used to provide disclosure information about the airport's operations to the property owner. The existing subdivision regulations for the City of Topeka, included in the City's municipal code under Title 18, Division 3, do not include any provisions related to development near airports.

AREA LAND USE

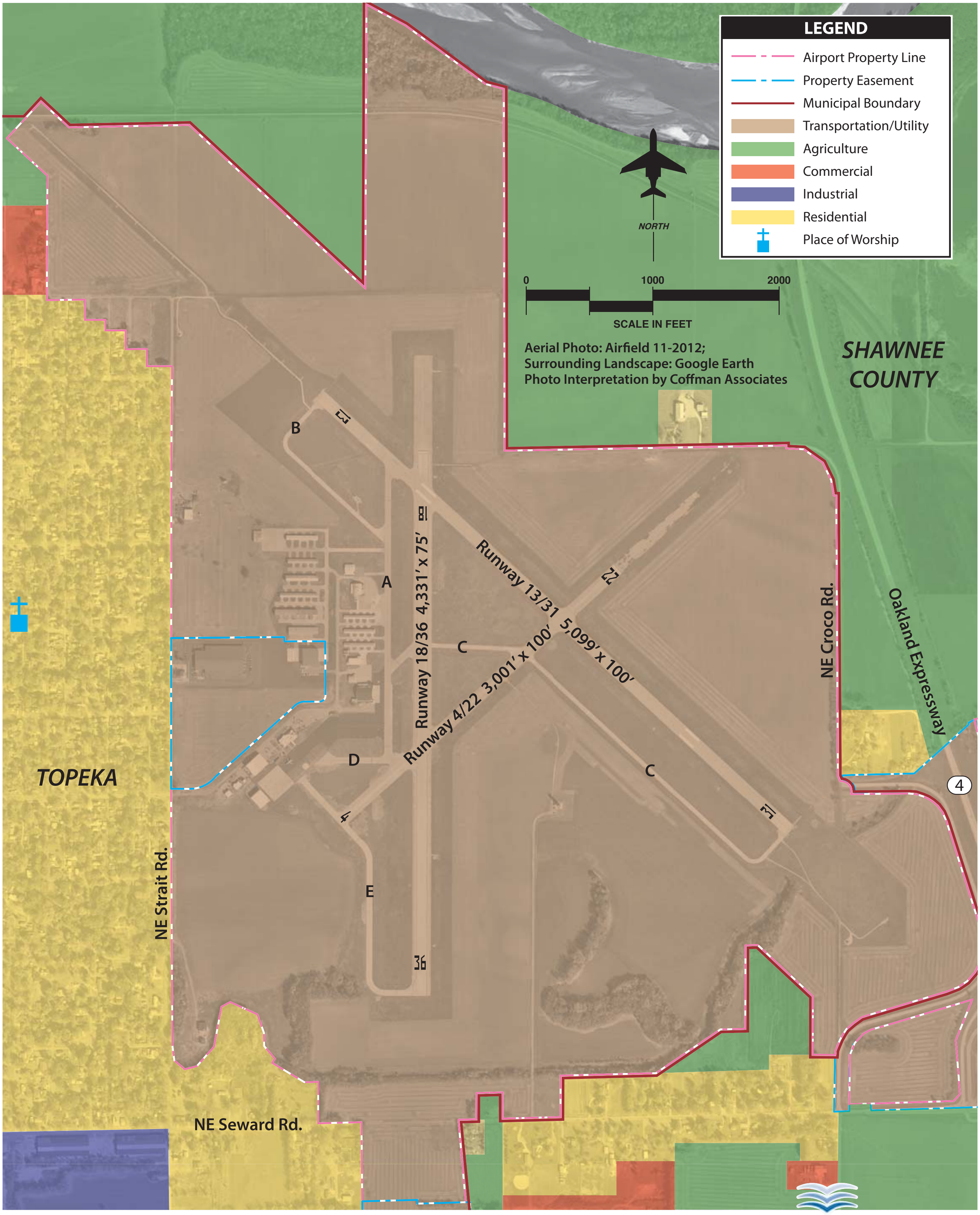
Existing Land Use

As shown on **Exhibit D1**, land adjacent to Philip Billard Airport is developed with agricultural, commercial, industrial, and residential land uses. This information is based on information from the City of Topeka and field investigations. The area west of the airport is known as the Oakland neighborhood and primarily includes detached single-family residences. The area southwest of the airport is referred to as the East End neighborhood and includes a mix of residential and industrial land uses. Both of these neighborhood areas are located within the City of Topeka. Land uses to the south and east of the Runway 18-36 extended runway centerline are located outside the City of Topeka and include residential, commercial, and agricultural. Areas to the east and north are also located outside the City of Topeka and are primarily used for agriculture and related uses. Portions of this land are also undeveloped, used as right-of-way for the Oakland Expressway, or are located along the Kansas River corridor.

Zoning

The City of Topeka zoning designations area depicted on **Exhibit D2**. As shown on the exhibit, the airport property is zoned Single-Family Residential (R1). Land to the west of the airport is zoned Single-Family Residential (R2). South of the airport along Seward Road, land is zoned Heavy Industrial (I2), Commercial (C2), Residential Reserve (RR1) and Office and Industrial (OI2). To the east of the airport, land is zoned Light Industrial (I1) and to the north, much of the land is zoned Residential Reserve (RR1). **Table D1** summarizes the allowable uses for each zoning district and states the maximum height for structures within each zone.

PHILIP BILLARD MUNICIPAL AIRPORT

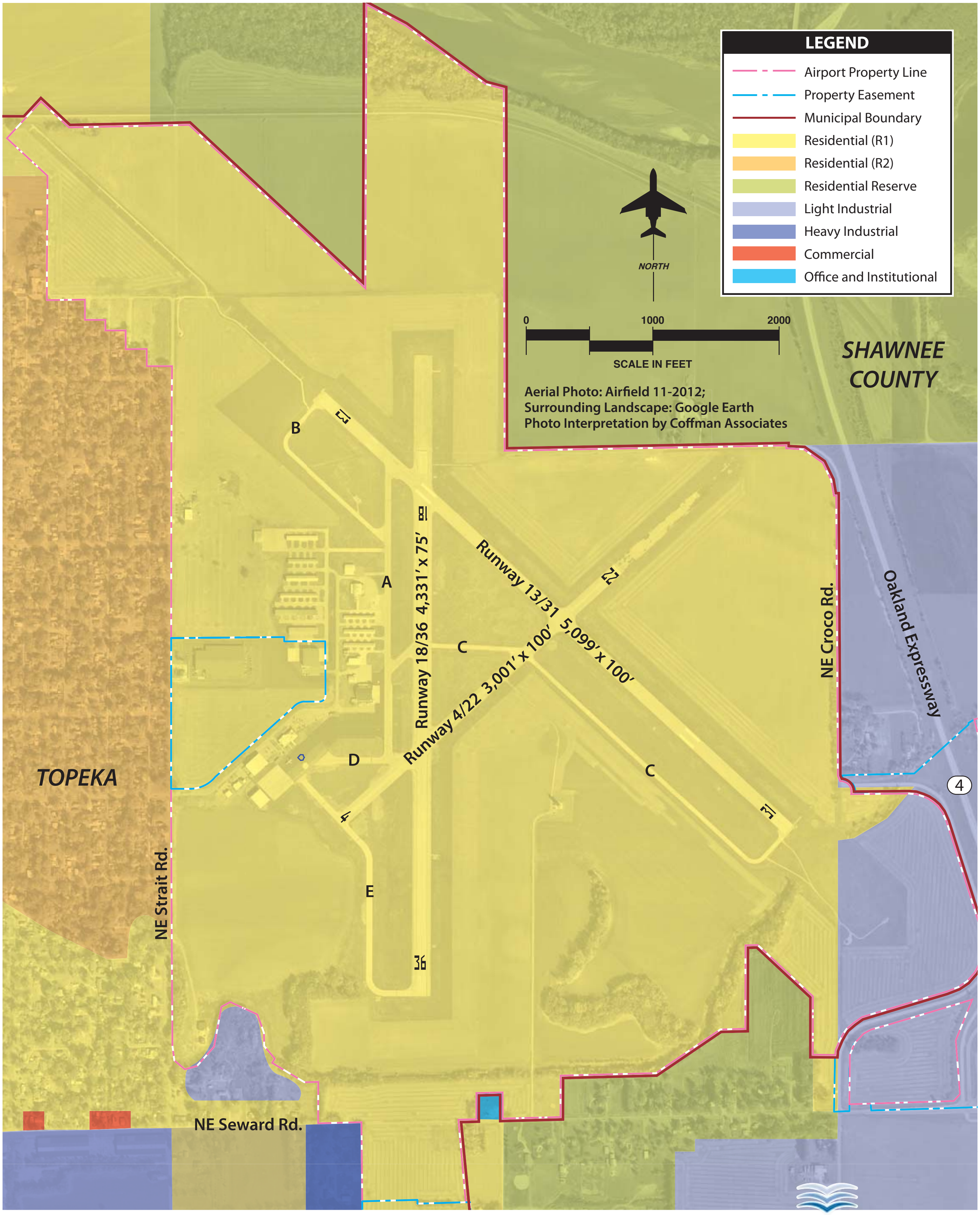


MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Source: Metropolitan Topeka Long Range Transportation Plan, Figure 2-18: Current Land Use

Exhibit D1
EXISTING LAND USE

PHILIP BILLARD MUNICIPAL AIRPORT



MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Source: City of Topeka Zoning Viewer, http://maps.topeka.org/website/NewZoning/viewer.htm, accessed June 2013

Exhibit D2
ZONING

TABLE D1
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
RR-1 (Residential Reserve District) – Maximum Structure Height: 42 ft.		
Agriculture Nursery, greenhouse, orchard Detached single-family dwelling Group home Public park Private park Subdivision maintenance facility Elementary or secondary school Residential care facility Home care	Day care facility Religious assembly Golf course	Cemetery Public use facility Surface parking lot Communication tower Mineral extraction Cultural facility Private airport or heliport Recreation field Supportive retail or food Utilities Community center Open space Bed and breakfast Reception facility Demolition landfill Sanitary landfill Grain storage Fertilizer storage Game hunting preserve Equine riding academy Kennel Short term campground Youth campground Oil or gas well drilling Billboard Group residence Wind energy system Home care Assisted living
R-1 (Single-Family Dwelling District) – Maximum Structure Height: 42 ft.		
Detached single-family dwelling Group home Public park Private park Subdivision maintenance facility Elementary and secondary school Residential care facility Home care	Day care Religious assembly Golf course	Cemetery Public use facility Surface parking lot Communication tower Mineral extraction Cultural facility Private airport or heliport Recreation field Supportive retail or food Utilities Community center Open space Bed and breakfast Conference facility Landfill Group residence Wind energy system Home care Assisted living

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
R-2 (Single-Family Dwelling District) – Maximum Structure Height: 42 ft.		
Detached single-family dwelling Group home Public park Private park Subdivision maintenance facility Elementary and secondary school Residential care facility Medical care facility Home care	Day care Religious assembly Golf course	Public use facility Surface parking lot Cultural facility Community center Open space Recreation field Supportive retail or food Utility Bed and breakfast Reception facility Communication tower Conference facility Landfill Group residence Wind energy system Home care Assisted living
R-3 (Single-Family Dwelling District) – Maximum Structure Height: 42 ft.		
Detached single-family dwelling Group home Public park Private park Subdivision maintenance facility Elementary and secondary school Residential care facility Medical care facility Home care	Day care Religious assembly Golf course	Public use facility Surface parking lot Cultural facility Recreation facility Supportive retail or food Utility Community center Open space Bed and breakfast Reception facility Communication tower Group residence Wind energy system Home care Assisted living
R-4 (Manufactured Home District) – Maximum Structure Height: 42 ft.		
Manufactured home Group home Public park Private park Subdivision maintenance facility Elementary and secondary school Residential care facility Medical care facility	Day care Religious assembly Golf course	Public use Surface parking lot Cultural facility Recreation field Supportive retail or food Utility Community center Open space Communication tower Group residence Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
M-1 (Two-Family Dwelling District) – Maximum Structure Height: 45 ft.		
Detached single-family dwelling Two-family dwelling Public park Private park Subdivision maintenance facility Elementary or secondary school Residential care facility Medical care facility Group home Home care Single-family attached dwelling	Day care Religious assembly Golf course Management and leasing offices	Bed and breakfast Open space Community center Cultural facility Food service incidental to principal use Surface parking lot Utility Public use Reception facility Supportive retail Communication tower Recreation field Group residence Wind energy system Home care Assisted living
M-1a (Limited Multiple-Family Dwelling District) – Maximum Structure Height: 45 ft.		
Detached single-family dwelling Two-family dwelling Three-family dwelling Four-family dwelling Public park Private park Subdivision maintenance facility Elementary or secondary school Residential care facility Medical care facility Group home Home care Single-family attached dwelling	Day care Religious assembly Golf course	Bed and breakfast Open space Community center Cultural facility Food service incidental to principal use Surface parking lot Utility Public use Reception facility Supportive retail Communication tower Recreation field Group residence Wind energy system Home care Assisted living

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
M-2 (Multiple-Family Dwelling District) – Maximum Structure Height: 50 ft.		
Detached single-family dwelling Two-family dwelling Multiple-family dwelling Boarding and lodging house Public park Private park Subdivision maintenance facility Elementary or secondary school Residential care facility Medical care facility Group home Sorority or fraternity house Group residence Residential care facility Home care Assisted living facility Single-family attached dwelling	Bed and breakfast Day care Religious assembly Golf course Surface parking lot	Community center Cultural facility Food service incidental to principal use Surface parking lot Utility Public use facility Reception facility Recreation facility Residential care facility Bed and breakfast Communication tower Open space Correctional placement residence Group residence Wind energy system
M-3 (Multiple-Family Dwelling District) – Maximum Structure Height: 100 ft.		
Same as M-2	Same as M-2	Apartment hotel Bed and breakfast Community center Cultural facility Medical care facility Food service incidental to principal use Surface parking lot Utility Public use facility Reception facility Recreation facility Community living facility Supportive retail Communication tower Open space Correctional placement residence Group residence Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
M-4 (Multiple-Family Dwelling District) – Maximum Structure Height: 160 ft.		
Apartment hotel Multi-family dwelling Boarding and lodging house Public park Private park Subdivision maintenance facility Elementary or secondary school Residential care facility Medical care facility Certain accessory uses Sorority or fraternity house Group residence Residential care facility Home care Assisted living facility	Bed and breakfast Day care facility Religious assembly Golf course Surface parking lot	Bed and breakfast Community center Cultural facility Medical care facility Food service incidental to principal use Utility Public use facility Reception facility Recreation field Retail incidental to principal use Community living facility Communication tower Open space Correctional placement residence Wind energy system
E (Multiple-Family Dwelling District) – Maximum Structure Height: 75 ft.		
Any use permitted in M-3 or O&I-2 Radio broadcasting studio Bank Savings and loan Business or commercial school Office building Insurance office Clinics	None	None
O&I-1 (Office and Institutional District) – Maximum Structure Height: 42 ft.		
Professional or government offices Cultural facility Radio and television broadcasting facility Elementary or secondary school Public park Funeral home	Religious assembly Dwelling unit located above ground floor Day care facility Surface parking lot	Bed and breakfast Artist studio Public use facility Veterinary clinic Retail incidental to principal use Food service incidental to principal use Utility Community center Reception facility Surface parking lot Medical care facility Communication tower Group residence Correctional placement residence Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
O&I-2 (Office and Institutional District) – Maximum Structure Height: 75 ft.		
Professional or government office Cultural facility Funeral home Radio and television broadcasting Elementary or secondary school Public park Community living facility Business or vocational school Private membership club Medical care facility Crisis center	Religious assembly Dwelling unit above ground floor Artist studio Veterinary clinic Day care facility Surface parking lot	Bed and breakfast Hospital Public use facility Crematorium Heliport Broadcasting tower Retail incidental to principal use Food service incidental to principal use Utility Community center Reception facility Surface parking lot Community living facility Communication tower Correctional placement residence Group residence Wind energy system
O&I-3 (Office and Institutional District) – Maximum Structure Height: None, except when in conflict with the airport hazard ordinance.		
Business or vocational school Community center Cultural facility Community living facility Funeral home Hospital Medical care facility Professional or government office Artist studio Printing plant Private membership club Elementary or secondary school Public park Radio and television broadcasting studio Reception facility Research laboratory Crisis center	Day care facility Veterinary clinic Religious assembly Dwelling unit above ground level Surface parking lot	Bed and breakfast Broadcasting tower Food service incidental to principal use Heliport Utility Public use facility Restaurant Retail incidental to principal use Communication tower Surface parking lot Correctional placement residence Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
C-1 (Commercial District): – Maximum Structure Height: 35 ft.		
Antique shop Bed and breakfast Book shop Candy shop Camera shop Delicatessen Floral shop Gift shop Grocery Hardware shop Hobby shop Home decorating shop Liquor sales Lock and key shop Professional or government office Patio/garden shop Barber shop Pharmacy Pet grooming Elementary or secondary school Religious assembly Restaurant Sewing shop Sporting goods shop Travel agency Variety shop Video rental Jewelry shop	Dwelling located above ground floor	Automobile service station Day care facility Surface parking lot Utility Communication tower Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
C-2 (Commercial District) – Maximum Structure Height: 60 ft.		
Permitted uses in the O&I-3 and C-1 districts: Art supply store Automobile accessory store Bicycle sales Photocopying services Business machine sales Catering establishment Glassware store Exercise gym Community center Crisis center Department store Telecommunications sales Furniture store Furrier store Hobby and craft shop Hotel, motel, apartment hotel Home decorating store Leather goods and luggage store Mail order catalog facility Motor scooter sales and service Musical instrument store Office supply store Medical appliance store Pet grooming Pet shop Photo finishing lab Post office Private club Restaurant Theatre Grave monument sales	Automobile rental Automobile service station Car wash facility Day care facility Veterinary clinic Dwelling unit above ground floor	Indoor amusement establishment Automobile service station Exercise gym Public use facility Utility Communication tower Surface parking lot Wind energy system
C-3 (Commercial District) – Maximum Structure Height: 70 ft.		
Permitted uses in the C-2 district: Exercise gym Home improvement supply Motor vehicle sales Billboards Recreational vehicle campground Surface parking lot	Automotive service station Car wash Veterinary clinic Dwelling unit above ground floor Day care facility	Indoor amusement establishment Automotive service station Public use facility Utility Communication tower Correctional placement residence Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
C-4 (Commercial District) – Maximum Structure Height: 70 ft.		
Permitted uses in the C-3 district: Agricultural machinery sales Indoor amusement establishment Large animal hospital Auction house Automotive service station Bakery Boat sales Construction contractor office or showroom Commercial laundry Flea market Grave monument sales Home improvement supply Lawn and garden center Manufactured home sales Motor vehicle sales Newspaper distribution agency Publishing establishment Photography studio Taxidermist Drive-in theatre Vehicle repair	Dwelling unit located above ground floor Theatre Communication tower Car wash Day care facility	Amusement park Broadcast tower Fairground Public use facility Utility Race track Sports stadium, arena Correctional placement residence Wind energy system
C-5 (Commercial District) – Maximum Structure Height: varies depending on-site characteristics		
Permitted uses in the C-3 district: Parking structure Television transmission tower Auction house Photography studio Newspaper distribution agency Publishing establishment Billboard Commercial laundry Construction contractor office or showroom Bus station	Automotive service station Car wash Veterinary clinic Dwelling unit above ground floor Drive-in or carry-out restaurant Communication tower Day care facility	Indoor amusement establishment Automotive service station Public use facility Utility Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
I-1 (Light Industrial District) – Maximum Structure Height: None, except when in conflict with the airport hazard ordinance		
Uses permitted in C-4, except residential dwellings: On-site caretaker quarters Bottling works Building material sales Construction equipment storage Dairy product processing Demolition landfill Express and shipment facility Manufacturing and processing Railroad facility Utility Warehousing and storage Welding shop Television transmission tower Billboard	Theatre Recycling depot Communication tower	Airport and landing field Amusement park Commercial radio broadcast tower Fairground Public use facility Racetrack Sports stadium, arena Day care facility Correctional placement residence Wind energy system
I-2 (Heavy Industrial) – Maximum Structure Height: None, except when in conflict with the airport hazard ordinance		
Permitted uses in the I-1 light industrial district except residential dwellings: On-site caretaker quarters	Theatre Manufacturing Communication towers	Mineral extraction and processing Sanitary landfill Correctional placement residence Wind energy system
U-1 (University District) – Maximum Structure Height: None, except when in conflict with the airport hazard ordinance		
Alumni center Recreational center Education building Student or faculty housing Religious assembly Data processing center Day care facility Hospital Monument or memorial Surface parking lot Physical plant Public transportation facility Sorority or fraternity housing Student union Post office	None	Television and telecommunication broadcast tower Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
MS-1 (Medical Service District) – Maximum Structure Height: 160 ft. (exceptions apply)		
Human health care facilities Associated health care facilities Human habitation and dwelling facility Group residence	Heliport Emergency transportation facility Incidental retail sales Day care facility Surface parking lot	Bed and breakfast Ambulance station Radio or television broadcasting tower Community living facility Utility Public use facility Surface parking lot Correctional placement residence Wind energy system
X-1 (Mixed Use District) – Maximum Structure Height: 40 ft.		
Single- and two-family dwellings Three- and four-family dwellings Manufactured home Group home Religious assembly School Community facility Parks, recreation, open space Residential care facility Artist studio Automobile service station Bed and breakfast Child care center Clubs and lodges Funeral home Health club Office Pet shop Indoor recreation facility Restaurant Retail establishment Service shop Home care	None	Multi-family dwellings (more than four units) Boarding and lodging house Public use facility Residential care facility Indoor amusement Automobile service station Bars and taverns Entertainment facility Farmers' market Parking lot or garage Motor vehicle sales Research and development Group residence Wind energy system Home care Assisted living facility

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
X-2 (Mixed Use District) – Maximum Structure Height: 50 ft.		
Single- and two-family dwellings Three- and four-family dwellings Manufactured home Schools Community facility Parks, recreation, open space Artist studio Automobile service station Child care center Clubs and lodges Funeral home Health club Motor vehicle sales Office Indoor recreation facility Restaurant Retail establishment Service shop Assembly without fabrication Fabrication of products allowed under I-1 Distribution and processing Warehousing	None	Multi-family dwellings (more than four) Group home Boarding and lodging house Crisis center Religious assembly Conference center Public use facility Residential care facility Amusement park Automobile service station Bar and tavern Bed and breakfast Farmers' market Hotel, motel Parking lot Parking garage Pet shop Unenclosed outdoor equipment storage Correctional placement residence Wind energy system Home care Assisted living facility
X-3 (Mixed use district) – Maximum Structure Height: 50 ft.		
Single- and two-family dwellings Three- and four-family dwellings Multi-family dwelling, more than four-unit Manufactured home Schools Community facility Parks, recreation, open space Artist studio Automobile service station Bar and tavern Bed and breakfast Child care center Clubs and lodges Entertainment facility Farmers' market Health club Night club Office Indoor recreation facility Restaurant Retail establishment Service shop	None	Group home Boarding and lodging house Religious assembly Conference center Public use facility Residential care facility Amusement park Hotel/motel Parking lot Parking garage Pet shop Unenclosed equipment storage Research and development Warehousing Wind energy system

TABLE D1 (Continued)
City of Topeka Zoning
Permitted Uses in the Vicinity of Philip Billard Airport

Permitted	Provisional	Conditional
OS-1 (Open Space District) – Maximum Structure Height: None		
Agriculture Common open space Detached single-family dwelling Drainage or flood prevention facility Golf course Private park Public park Trails	None	Campground Cemetery Commercial equine riding academy Cultural facility Fairground Farmers' market Hunting/fishing preserve Public use facility Recreational field Utility structure Wind energy system

Source: City of Topeka Municipal Code, Chapter 18.50

The City of Topeka has also adopted the Forbes Field and Philip Billard Airports' Hazard Zoning ordinance. The Hazard Zoning ordinance is an overlay zone intended to prevent hazards to aviation within the vicinity of the airport by restricting uses that would:

- Create electrical interference with navigational signals or radio communication between airport and aircraft;
- Make it difficult for pilots to distinguish between airport lights and others;
- Result in a glare in the eyes of pilots using the airport;
- Impair visibility in the vicinity of the airport; or
- Otherwise, in any way, create a hazard or endanger the landing, takeoff, or maneuvering of aircraft intending to use the airport.

The extent of the overlay zone is the airport's Part 77 Horizontal Surface as depicted on **Exhibit D3.**

Comprehensive Plan

Within the vicinity of Philip Billard Airport, land use regulation is under the jurisdiction of the City of Topeka, which adopted the Land Use & Growth Management Plan of its comprehensive plan in February 2004. The Land Use & Growth Management Plan presents land use management policies and provides a map of anticipated future development on a 20- to 30-year time horizon. As indicated in the Land Use & Growth Management Plan, the City of Topeka's population is forecast to increase by approximately 1.5 percent per year through 2030. To accommodate this growth, the City of Topeka has adopted policies to direct new development "toward areas planned for growth and to places where essential urban services can be effectively provided to those developments." To define areas for anticipated growth, the City of Topeka has delineated a planned growth area, which encompasses all of the land surrounding Philip Billard Airport. The closest portion of the planned growth area boundary to the airport is the Kansas River, to the north and east of the airport.

The plan acknowledges that airports are land uses which require special considerations due to "*noise levels and other environmental impacts on nearby properties*" and provides the following summary of Philip Billard Airport:

> Billard Airport is also capable of handling fairly large and noisy aircraft. However, the most prevalent aircraft handled at this facility is small single engine fixed wing aircraft and small helicopters that do not typically cause many complaints from residents living nearby. This airport is a good general aviation airport close to Downtown Topeka. This facility is capable of handling most corporate aircraft and its convenient location makes it ideal for people flying into the region to conduct business in and around Topeka (Pages 31-32).

The Land Use & Growth Management Plan does not include specific policies or recommendations regarding airport land use compatibility, such as locating noise-sensitive development away from the airport, hazardous wildlife attractants, obstructions, or visual/electrical interference. Regarding future development near the airport, the Plan provides the following summary of constraints for the East Area, which includes the airport:

> **EAST AREA – HIGHWAY K-4/OAKLAND EXPRESSWAY/
> INTERSTATE 70 CORRIDOR**
>
> **Industrial development**
>
> This area contains strategic transportations facilities, including Interstate 70/K-4 Highway East Interchange area, a major Kansas River bridge, a major railroad between Topeka and Kansas City, the US Highway 24/K-4/Oakland Expressway Interchange, Billard Airport, and historic US Highway 40. All of these transportation attributes should facilitate freight movement and make it an attractive location for industry. However, there are some major factors limiting industrial development in this area. Water and sewer lines needed to support intense industrialization of this area is not yet in place and will be expensive to install. Compatibility with adjacent residential areas is also an issue, even though several industrial uses are already in the area. There are several large parcels in this area that are well suited for industrial development once upgraded utilities reach the sites. Overall, this area is likely to have several large industrial developments at locations that have good highway access, ample utility capacity, and easily developable land (Page 95).

As noted in the text, while the site may be suitable for industrial development, expansion to this area may be limited by the absence of sufficient utilities. Extension of utilities in this area could promote development that is compatible with airport operations. This area is anticipated to be a "major employment center for the Topeka area over the next three decades," and the city is assessing the feasibility of extending utilities to facilitate development (Page 54).

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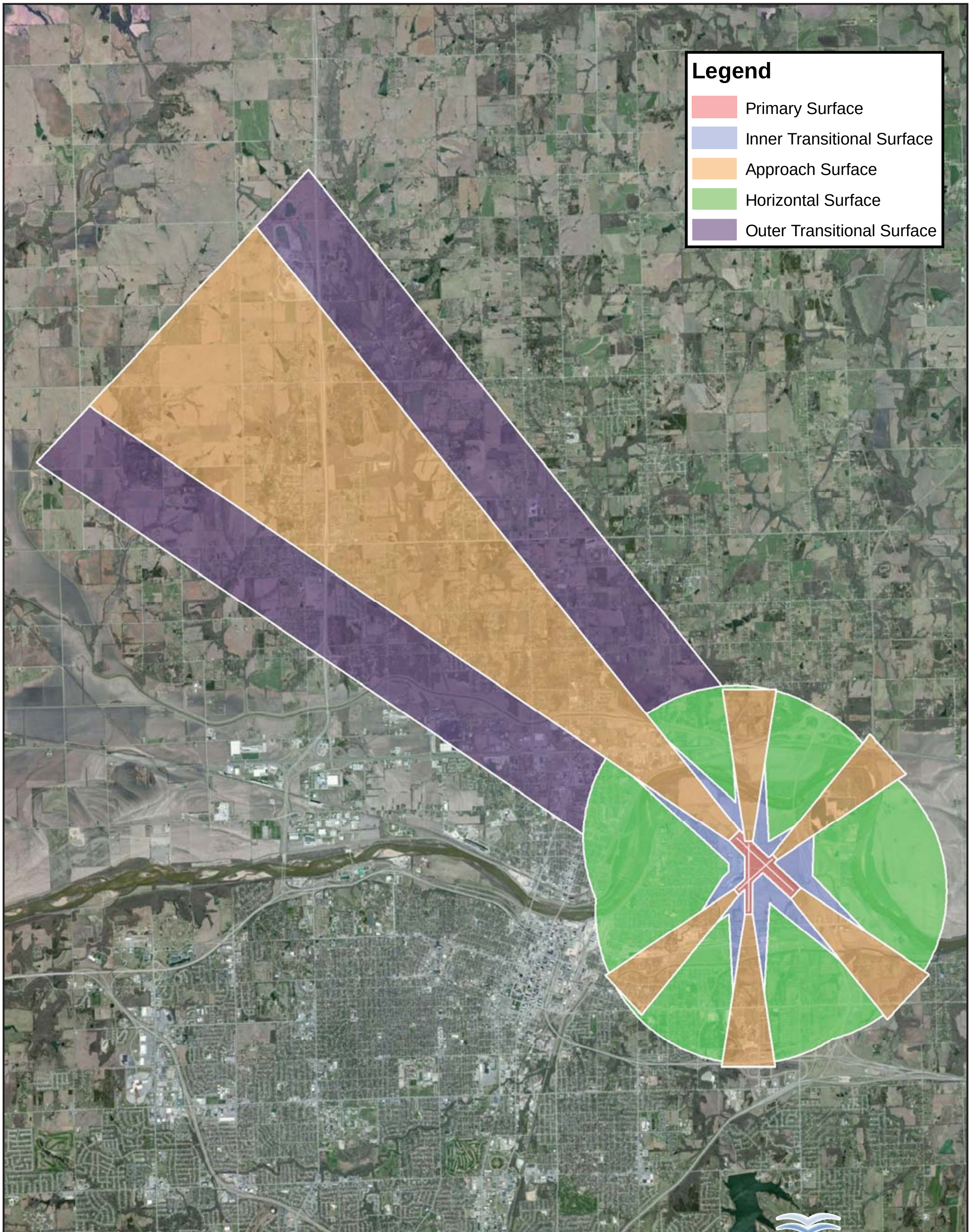

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Exhibit D3
PART 77 SURFACES

The plan also states that commercial and institutional development in this area will be limited due to the anticipated modest growth of residential land uses and limited opportunities for direct access from major thoroughfares.

Regarding residential development in northeast Topeka, the plan states, "residential development in this area should be limited to single-family housing, built at very low densities due to the presence of substantial physical barriers in extending water and sewer lines into this area. An average density of one dwelling unit per acre is expected."

Future land uses, as identified in the Land Use & Growth Management Plan, are depicted on **Exhibit D4**. As noted on the exhibit, the area north of the airport is planned as Parks/Open Space/Recreation, while the areas east and south of the airport are planned for Industrial land uses. To the west of the airport, land is planned for Urban/Suburban Low Density Residential, which is consistent with the existing development.

AIRPORT LAND USE COMPATIBILITY CRITERIA

This section provides criteria on how to develop effective airport land use compatibility guidelines. While aircraft noise impacts and hazards to aircraft on approach or departing the airport are the foundation of airport land use compatibility, safety of people on the ground, electronic/visual interference with aircraft in flight, and wildlife hazards should also be considered. Therefore, the following factors should be considered when preparing an airport land use compatibility assessment:

- In areas adjacent to an airport, cumulative noise impacts, measured in terms of day-night average sound level (DNL) contours, may be the most disruptive factor.

- In areas beyond the outermost contours, noise generated from aircraft overflights can also be considered annoying to residents.

- Minimizing the severity of an aircraft accident by evaluating the land uses near an airport can also be beneficial. Certain land uses involve the concentration of large groups of people.

- Minimizing activities which cause electronic or visual impairments to avigation.

- Minimizing activities that attract wildlife, such as birds and mammals, which are hazardous to aircraft operations per FAA Advisory Circular 150/5200-33B.

- Land uses can create hazards to navigation. Airspace protection generally involves limitations on the height of manmade structures near an airport.

Noise

The objective of noise compatibility criteria is to minimize the number of people exposed to frequent and/or high levels of aircraft noise capable of disrupting noise-sensitive activities. Title 14 of the Code of Federal Regulations Part 150 (Part 150) provides a good starting point for establishing airport land use compatibility guidelines for aircraft noise (See **Exhibit D5**). Part 150 criteria described on **Exhibit D5** limits noise-sensitive development (residential and schools) above 65 DNL.

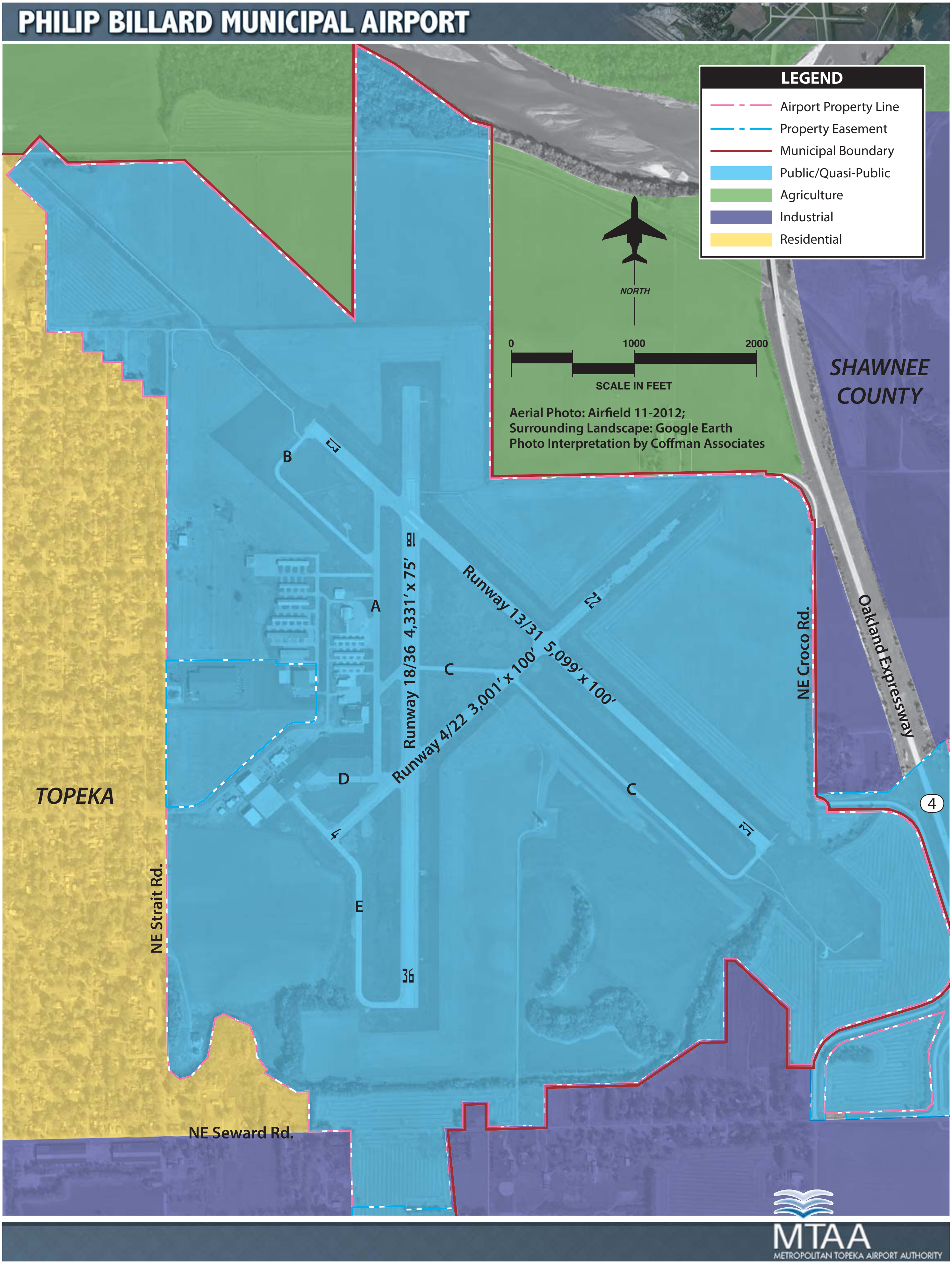
The prevailing noise conditions at an airport are prepared using a computer simulation model. The purpose of the noise model is to produce noise exposure contours that are overlain on a map of the airport and vicinity to graphically represent aircraft noise conditions. With the use of land use, zoning, and general plan maps, the noise exposure contours may be used to identify areas that currently are, or have the potential to be, exposed to aircraft noise.

The FAA has developed the Integrated Noise Model (INM) for analysis in noise compatibility studies. To achieve an accurate representation of an airport's noise conditions, the INM uses a combination of industry standard information and user-supplied inputs specific to the airport. The software provides noise characteristics, standard flight profiles, and manufacturer supplied flight procedures for aircraft within the U.S. civil and military fleets, including those which commonly operate at Philip Billard Airport. As each aircraft has different design and operating characteristics (number and type of engines, weight, and thrust levels), each aircraft emits different noise levels. The most common way to spatially represent the noise levels emitted by an aircraft is a noise exposure contour.

Noise exposure contours were developed using the 2012 aviation forecasts for Philip Billard Airport for the existing condition and long range forecast scenario. As seen on **Exhibit D5**, noise exposure contours have been mapped to the 65 DNL. The FAA and Department of Housing and Urban Development (HUD) both support using the 65 DNL noise exposure contour for airport land use compatibility. Researchers have found that the overall ambient noise level of the surrounding area determines to what degree people will be annoyed by a given level of aircraft noise (i.e., a louder noise environment requires louder aircraft noise events to generate complaints) (Kryter 1984). As indicated on the exhibit, the 2012 65 DNL noise exposure contour remains entirely on airport property and does not encompass any existing or planned noise-sensitive land uses. The 2032 65 DNL, which includes the planned runway extensions and closure of Runway 4-22, extends off airport property northeast of the intersection of Runway 18-36 and 13-31. The contour encompasses land that is presently used for agriculture, zoned as Residential Reserve (RR1), and planned for agriculture.

Airspace

Aircraft takeoffs and landings generally follow a path along the extended centerline of a runway. Approaching and departing aircraft generally enter or exit the airport environ-



Source: Metropolitan Topeka Long Range Transportation Plan, Figure 2-19: Future Land Use

Exhibit D4
FUTURE LAND USE

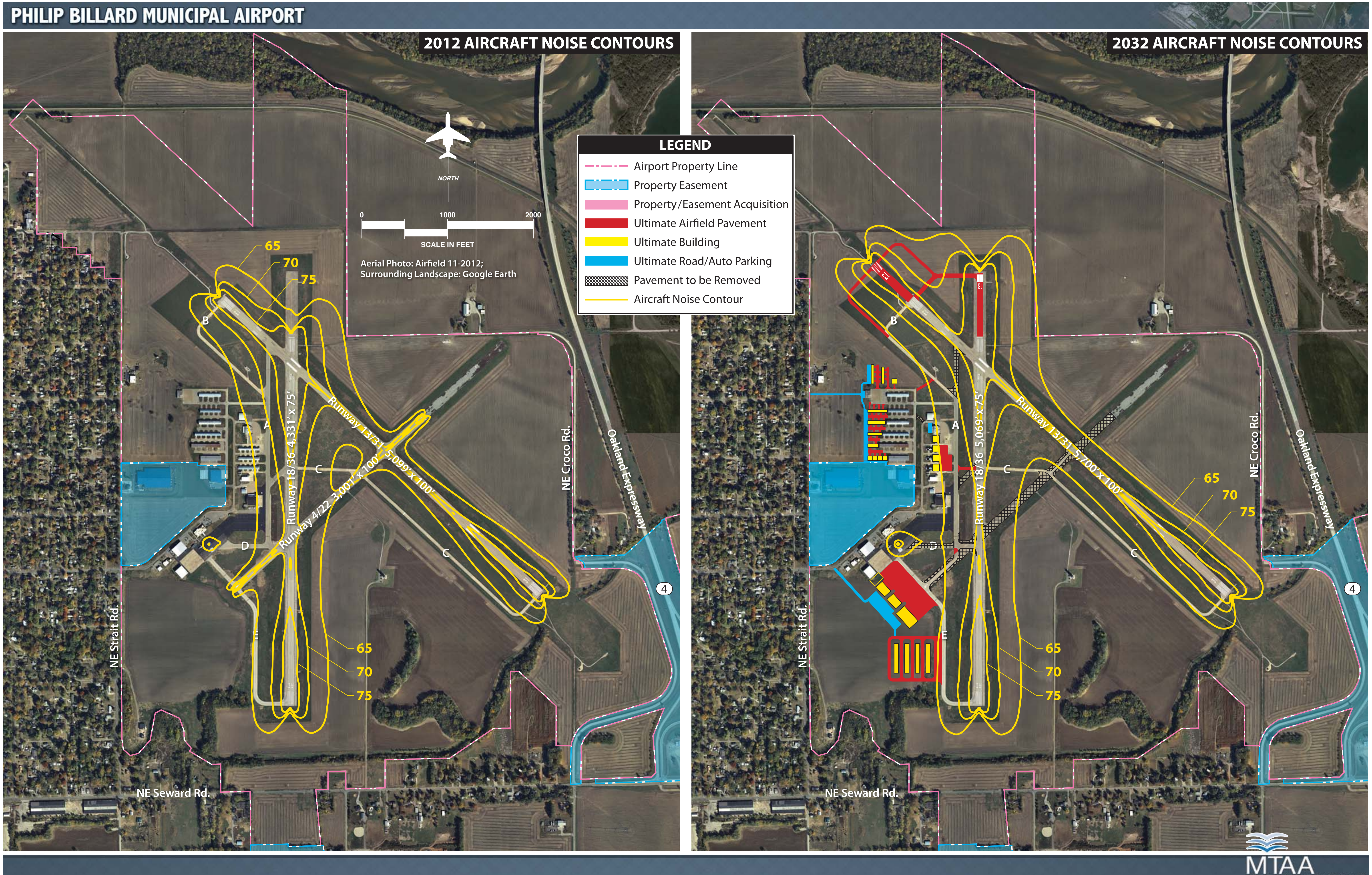


Exhibit D5

EXISTING AND FUTURE NOISE CONTOURS

ment along the extended runway centerline one to five miles from the runway end. Variables, such as the volume of air traffic, published procedures, weather conditions, pilot skill level, or instructions from an air traffic control tower, often cause aircraft to deviate from this path.

The FAA has determined the maximum heights that structures in the vicinity of an airport may be before they are identified as obstructions to air navigation. These heights are contained in Part 77. The Part 77 conical and approach surfaces are designed to protect the aircraft from obstructions when flying in the airport traffic pattern and when descending to the runway. **Exhibit D3** depicts the Part 77 surfaces for Philip Billard Airport. As previously discussed, the Part 77 surfaces are the basis of the Forbes Field and Philip Billard Airports' Hazard Zoning ordinance adopted by the City of Topeka. Additionally, as noted in **Table F1**, each zoning district has a maximum height established for structures.

While these surfaces are important for obstruction avoidance, they also define where aircraft generally fly most frequently in the vicinity of an airport. Therefore, these surfaces provide an indicator of where single event overflight annoyance can occur, as well as potential areas of concern for visual, electronic, and other sources of interference with aircraft in flight discussed in previous sections.

Overflight

Complaints often come from locations beyond any of the defined noise contours discussed in the previous section. Frequently used flight corridors and traffic pattern aircraft operations are commonly referred to as overflights and are known to generate noise complaints. The basis for such complaints may be a desire and expectation that outside noise sources not be intrusive or above the quiet, natural background noise level. Elsewhere, especially in locations beneath the traffic patterns of general aviation airports, a fear factor also contributes to some individuals' sensitivity to aircraft overflights.

While aircraft noise overflight impacts may be important community concerns, it is very difficult to prevent/restrict noise-sensitive land uses in such a large area. Land use planning actions that disclose the noise situation to potential owners are more reasonable options. As an example, Part 150 land use compatibility criteria outlined on **Exhibit D6** could be expanded to reduce the impact of aircraft noise on noise-sensitive land uses by requiring fair disclosure statements if built inside the traffic pattern airspace. Expanded criteria for noise-sensitive development can be found in **Table D2**.

TABLE D2
Noise Compatibility Criteria

	DNL	
	Traffic Pattern	**65+**
RESIDENTIAL		
Single-family, duplex, multi-family, manufactured housing	Y[1]	N
Manufactured housing	Y[1]	N
PUBLIC FACILITIES		
Education facilities	Y	N
Religious facilities, libraries, museums, galleries, clubs and lodges	Y	N
Outdoor sport events, entertainment and public assembly except amphitheaters	Y	N
Indoor recreation, amusements, athletic clubs, gyms and spectator events, parks, outdoor recreation: tennis, golf courses, riding trails, etc.	Y	Y
COMMERCIAL		
Hotels/motels	Y[1]	N
Hospitals and other health care services	Y[1]	N
Services: finance, real estate, insurance, professional and government offices	Y	Y[1]
Retail sales: building materials, farm equipment, automotive, marine, mobile homes, recreational vehicles and accessories	Y	Y[1]
Restaurants, eating and drinking establishments	Y	Y[1]
Retail sales: general merchandise, food, drugs, apparel, etc.	Y	Y[1]
Personal services: barber and beauty shops, laundry and dry cleaning, etc.	Y	Y[1]
Automobile service stations	Y	Y
Repair services	Y	Y

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Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

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

See other side for notes and key to table.

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Exhibit D6
LAND USE COMPATIBILITY GUIDELINES

Key

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

Notes

1 Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB, respectively, should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

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

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

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

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

6 Residential buildings require an NLR of 25.

7 Residential buildings require an NLR of 30.

8 Residential buildings not permitted.

Source: ***14 CFR Part 150***, Appendix A, Table 1.

Exhibit D6
LAND USE COMPATIBILITY GUIDELINES

TABLE D2 (Continued)
Noise Compatibility Criteria

	DNL	
	Traffic Pattern	**65-70**
INDUSTRIAL		
Processing of food, wood and paper products; printing and publishing; warehouses, wholesale and storage activities	Y	Y
Refining, manufacturing and storage of chemicals, petroleum and related products, manufacturing and assembly of electronic components, etc.	Y	Y
Manufacturing of stone, clay, glass, leather, gravel and metal products; construction and salvage yards; natural resource extraction and processing, agricultural, mills and gins	Y	Y
AGRICULTURE		
Animal husbandry, livestock farming, breeding and feeding; plant nurseries (excluding retail sales)	Y	Y
Farming (except livestock)	Y	Y

1 Fair disclosure statement required as a condition of development approval or building permit issuance.

Safety

For land use planning purposes, the definition of safety is minimizing the risks of aircraft accidents beyond the runway environment. There are two factors that must be considered in the interaction between airports and nearby land uses:

- Protecting people and property on the ground.
- Preventing creation of hazards to flight.

Reducing the concentration of people and structures in areas where aircraft accidents have occurred historically can reduce the risk of injury and damage. **Exhibit D7** depicts National Transportation Safety Board (NTSB) general aviation aircraft accident data as depicted in the *California Airport Land Use Planning Handbook, 2011.* It is important to note that this accident data is taken from all airports and not just Phillip Billard, and is intended to give a graphic representation of accident locations.

Based upon the accident data depicted on **Exhibit D7**, restricting or limiting the density of residential development off the runway ends should be considered. In addition, restricting uses that attract large concentrations of people (schools, libraries, hospitals, arenas, stadiums, etc.) in the immediate vicinity should be considered.

Land uses that attract large quantities of birds and wildlife (landfills, bodies of water, etc.) should also be discouraged off the runway ends and in the vicinity of the airport. Criteria should also be established to prevent uses that create excessive glare (mirror solar farms), electrical interference, or visual impairment (smoke or steam) in the vicinity of the airport.

AIRPORT LAND USE COMPATIBILITY RECOMMENDATIONS

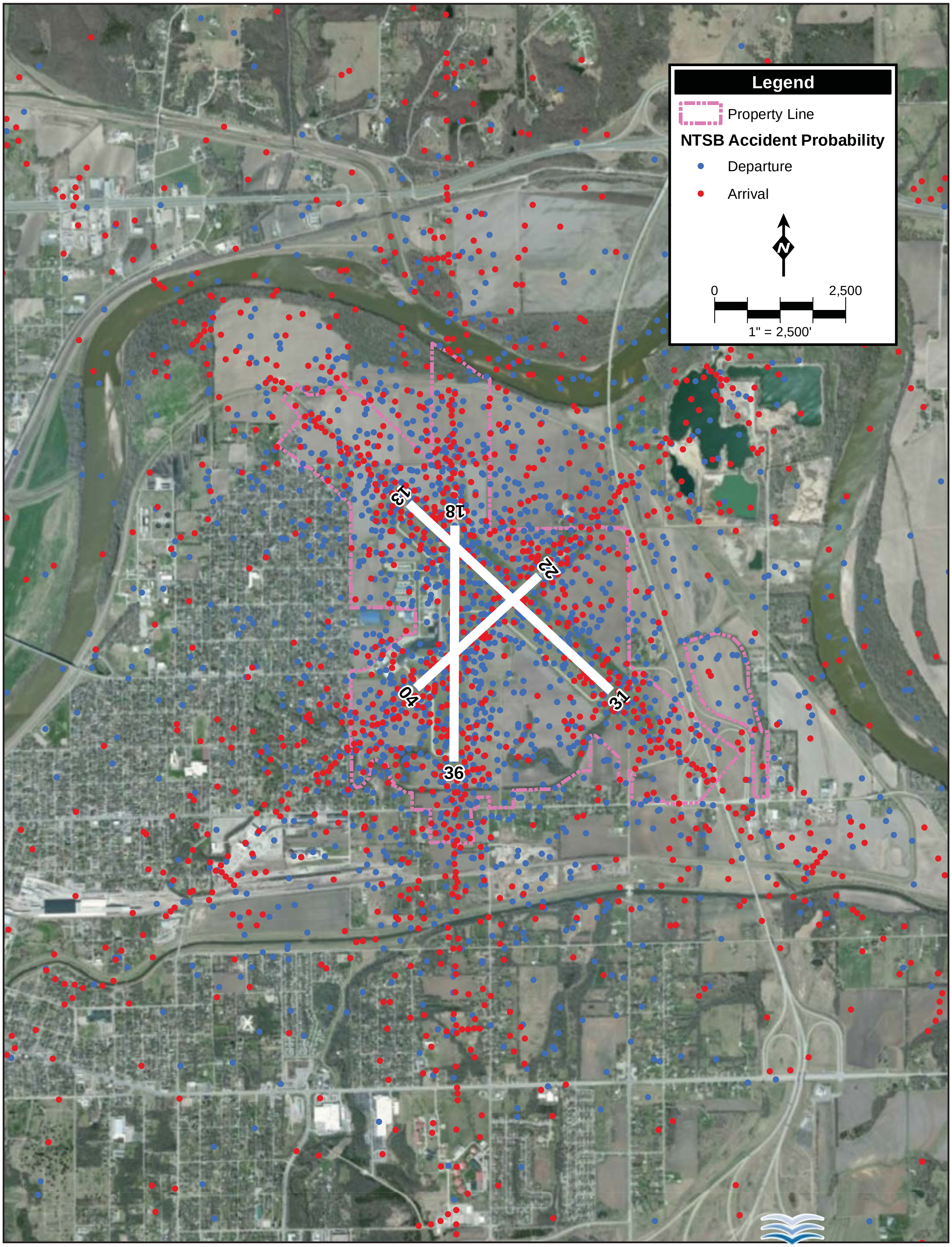
This section outlines airport land use compatibility recommendations based upon the information described in the previous sections of this appendix. Aircraft noise levels at or above 65 DNL, concentration of flight tracks, and accident sites should be considered as the community plans for the future. Based upon **Exhibit D8**, there are several vacant parcels planned or zoned for land uses (residential, schools, places of worship) that are not compatible with airport operations. These land uses are planned in critical areas off the runway ends (both existing and future).

- **Rezone Undeveloped R1 Parcels** - Along the extended Runway 18-36 centerline to the north and south, and to the northwest along the Runway 13-31 centerline, there are undeveloped parcels of land are zoned Single-Family Residential (R1). The primary concerns with residential in these locations are aircraft noise, overflight, and safety due to increased potential for accidents based upon the NTSB data. Therefore, changes to the zoning designations for these properties to reflect more compatible land uses, such as industrial, should be considered.

- **Rezone Airport Property to I1 -** As previously stated, the airport property is zoned Single-Family Residential. Although it would be in conflict with the airport's grant assurances with FAA, this zoning designation would allow the development of single-family residences on the airport. To eliminate the potential for the development of non-compatible uses on airport property, consideration should be given to rezoning airport property to Light Industrial (I1), which allows airports and landing strips as a conditional use and is also consistent with airport development.

- **Consider Adopting an Expanded Land Use Compatibility Table** - As previously discussed, while aircraft noise overflight impacts may be important community concerns, it is difficult to prevent/restrict noise-sensitive land uses in such a large area. Land use planning actions that disclose the noise situation to potential owners are more reasonable options. Criteria outlined in **Table D2** expands on Part 150 crite-

PHILIP BILLARD MUNICIPAL AIRPORT

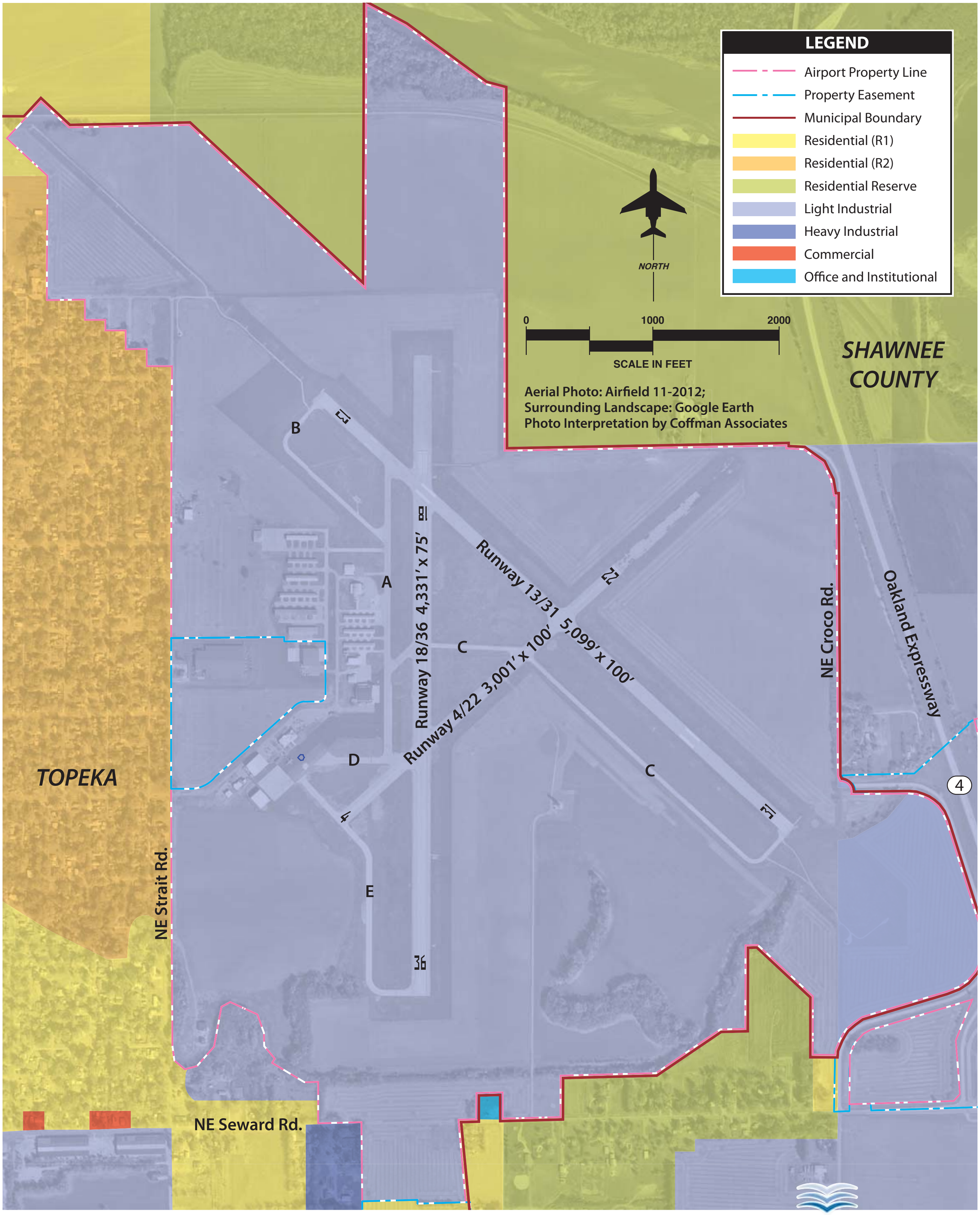


MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Source: California Airport Land Use Planning Handbook, 2011
General Aviation Accident Data 1990 to 2000.

Exhibit D7
NTSB ACCIDENT DATA

PHILIP BILLARD MUNICIPAL AIRPORT



MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Source: City of Topeka Zoning Viewer, http://maps.topeka.org/website/NewZoning/viewer.htm, accessed June 2013

Exhibit D8
RECOMMENDED ZONING CHANGES

ria to reduce the impact of aircraft noise on noise-sensitive land uses by requiring fair disclosure statements if built inside the traffic pattern airspace which coincides with the horizontal surface shown on **Exhibit D3**.

- **Amend Forbes Field and Philip Billard Airports' Hazard Zoning –** As part of the ongoing Airport Master Plan Update for Philip Billard, the Part 77 airspace drawing, which is the foundation of the City of Topeka's airport hazard zoning ordinance will be updated. Accordingly, the map on record with the city should be updated with the most recent version of the Philip Billard Airport Part 77 airspace drawing which reflects the runway extensions in the master plan development concept.

SUMMARY

This airport land use compatibility assessment reviewed agency roles and responsibilities, area land use regulatory framework, compatibility criteria, and compatibility recommendations. **Table D3** summarizes the airport land use compatibility recommendations for Philip Billard Airport.

TABLE D3
Summary of Recommendations

Recommendation	Priority
Rezone Undeveloped R1 Parcels	High
Rezone Airport Property to I1	High
Consider Adopting an Expanded Land Use Compatibility Table	Low
Amend Forbes Field and Philip Billard Airports' Hazard Zoning	High

Source: Coffman Associates analysis

REFERENCES

Coffman Associates, 2013. *Draft Airport Master Plan for Philip Billard Airport*, *Topeka, Kansas*.

Kryter, K.D. 1984. Physiological, Psychological, and Social Effects of Noise, NASA Reference Publication 1115.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2011-2015.

Planners and Planes: Airports and Land-Use Compatibility, Planning Advisory Service (PAS) Report Number 562, 2010

City of Topeka, 2004. *Land Use & Growth Management Plan – 2025.*

City of Topeka Municipal Code, Chapter 18.50.

Construction or Establishment of Landfills near Public Airports – FAA Advisory Circular (AC) 150/5200-34A

Hazardous Wildlife Attractants On or Near Airports– FAA Advisory Circular (AC) 150/5200-33B

Appendix E

WILDLIFE PERIMETER

The Federal Aviation Administration (FAA) requests that airport master plans include an exhibit and a discussion of potential wildlife attractants in relation to safe airport operations. Advisory Circular (AC) 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, is the primary reference source. The AC provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants.

The wildlife species and the size of the populations attracted to the airport environment vary considerably depending on several factors, including land-use practices on or near the airport. The following is a list of land uses that are specifically identified as being of concern in the airport environment:

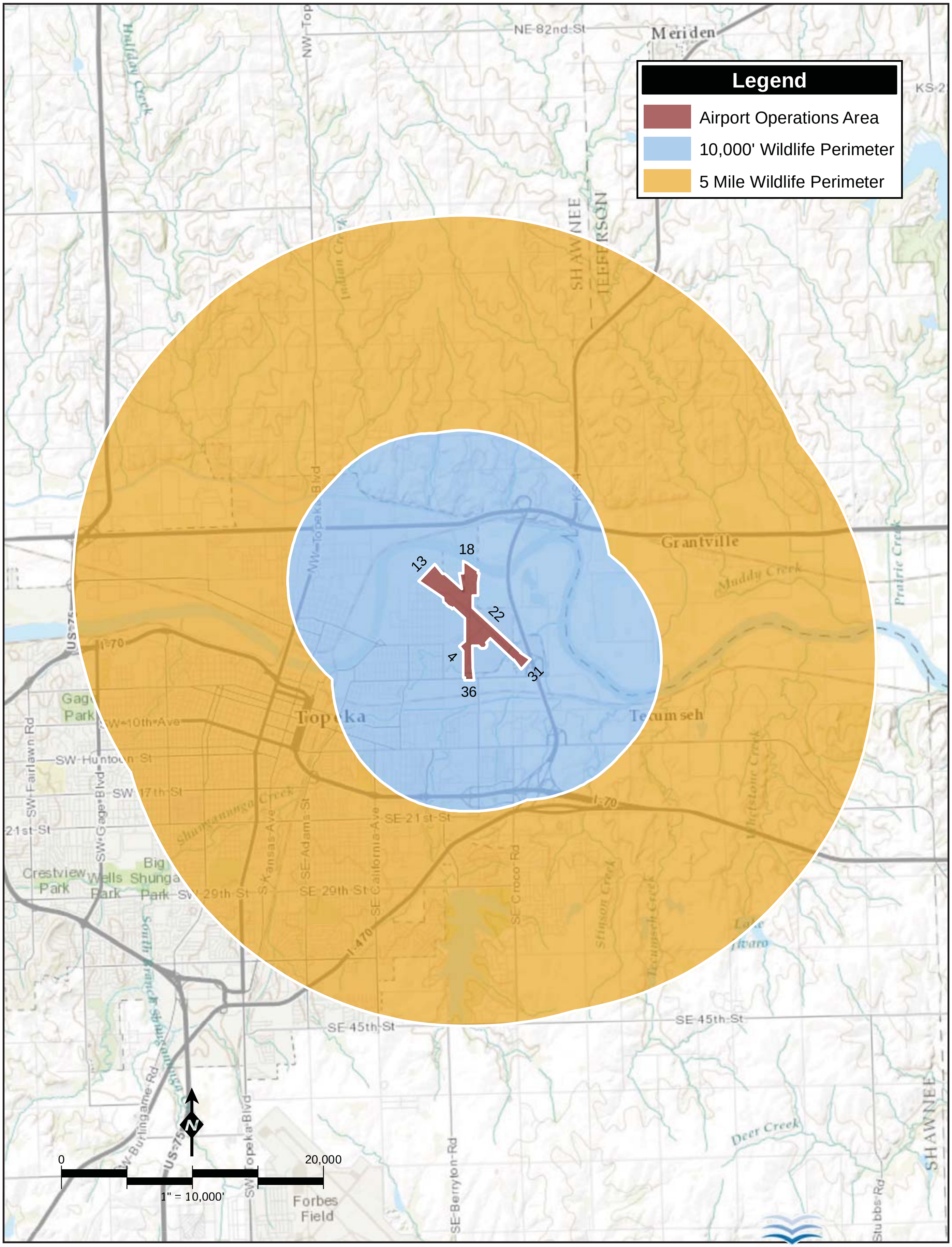
- Waste Disposal Operations
- Water Management Facilities
- Wetlands
- Dredge Spoil Containment Areas
- Agricultural Activities
- Golf Courses, Landscaping, and other Land Use Considerations

Airport operators should reference both AC 150/5200-33B and *Wildlife Hazard Management at Airports,* prepared by the FAA and U.S. Department of Agriculture (USDA) staff, which can be downloaded from the FAA's wildlife hazard mitigation web site: http://wildlife-mitigation.tc.FAA.gov. Another resource is *Prevention and Control of Wild-*

life Damage, compiled by the University of Nebraska Cooperative Extension Division, available at: http://pcwd.info/Pages/default.aspx.

For airports serving turbine-powered aircraft, such as Philip Billard Municipal Airport, the FAA recommends a separation distance of 10,000 feet for any of the wildlife attractants. In addition, the FAA recommends a distance of five statute miles between the farthest edge of the airport's operations area and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace. **Exhibit E1** presents the separation distances for Philip Billard Municipal Airport within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.

PHILIP BILLARD MUNICIPAL AIRPORT



MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

Exhibit E1
WILDLIFE BOUNDARY

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY
TOPEKA REGIONAL AIRPORT & BUSINESS CENTER | BILLARD AIRPORT

Appendix F

AIRPORT LAYOUT PLANS

Appendix F
AIRPORT LAYOUT PLANS

As part of this Airport Master Plan, the Federal Aviation Administration (FAA) requires the development of several technical drawings detailing specific parts of the airport and its environs. The technical drawings are collectively referred to as the Airport Layout Plan (ALP) set. These drawings were created on a computer-aided drafting system (CAD) and serve as the official depiction of the current and planned condition of the airport. These drawings will be delivered to the FAA for their review and approval. The FAA will critique the drawings from a technical perspective to be sure all applicable federal regulations are met.

The five primary functions of the ALP that define its purpose are:

1) An approved plan is necessary for the airport to receive financial assistance under the terms of the *Airport and Airway Improvement Act of 1982* (AIP), as amended, and to be able to receive specific Passenger Facility Charge funding. An airport must keep its ALP current and follow that plan, since those are grant assurance requirements of the AIP and previous airport development programs, including the 1970 Airport Development Aid Program (ADAP) and Federal Aid Airports Program (FAAP) of 1946, as amended. While ALPs are not required for airports other than those developed with assistance under the aforementioned federal programs, the same guidance can be applied to all airports.

2) An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP provides a guideline by which the airport sponsor can ensure that development maintains airport design standards and safety requirements and is consistent with airport and community land use plans.

3) The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.

4) The approved ALP enables the airport sponsor and the FAA to plan for facility improvements at the airport. It also allows the FAA to anticipate budgetary and procedural needs. The approved ALP will also allow the FAA to protect the airspace required for facility or approach procedure improvements.

5) The ALP can be a working tool for the airport sponsor, including its development and maintenance staff.

It should be noted that the FAA requires that any planned changes to the airfield (i.e., runway and taxiway system, etc.) be represented on the drawings. A landside configuration is also depicted on the drawings, but the FAA recognized that landside development is much more fluid and often dependent upon specific developer needs. Thus, an updated drawing set is not typically necessary for future landside alterations provided they do not impact planned airside facilities and land use designations.

AIRPORT LAYOUT PLAN SET

The ALP set includes several technical drawings which depict various aspects of the current and future layout of the airport. The following is a description of the ALP drawings included with this Airport Master Plan.

AIRPORT LAYOUT PLAN DRAWING

An official Airport Layout Plan (ALP) drawing has been developed for Philip Billard Municipal Airport, a draft of which is included in this appendix. The ALP drawing graphically presents the existing and ultimate airport layout plan. The ALP drawing will include such elements as the physical airport features, wind data tabulation, location of airfield facilities (i.e., runways, taxiways, navigational aids), and existing general aviation development. Also presented on the ALP are the runway safety areas, airport property boundary, and revenue support areas.

The computerized plan provides detailed information on existing and future facility layouts on multiple layers that permit the user to focus on any section of the airport at a desired scale. The plan can be used as base information for design and can be easily updated in the future to reflect new development and more detail concerning existing conditions as made available through design surveys.

AIRPORT LAND USE DRAWING

The objective of the Airport Land Use Drawing is to coordinate uses of the airport property in a manner compatible with the functional design of the airport facility. Airport land use planning is important for orderly development and efficient use of available space. There are two primary considerations for airport land use planning. These are to secure those areas essential to the safe and efficient operation of the airport and to determine compatible land uses for the balance of the property which would be most advantageous to the airport and community.

In the development of an airport land use plan for Philip Billard Municipal Airport, the airport property was broken into several large general tracts. Each tract was analyzed for specific site characteristics, such as tract size and shape, land characteristics, and existing land uses. The availability of utilities and the accessibility to various transportation modes were also considered. Limitations and constraints to development such as height and noise restrictions, runway visibility zones, and contiguous land uses were analyzed next. Finally, the compatibility of various land uses in each tract was analyzed.

The depiction of on-airport land uses on this drawing becomes the official FAA acceptance of current and future land uses. There are three different land uses identified for Philip Billard Municipal Airport: Airfield Operations, Aviation Development, Revenue Support.

Airfield Operations

The Airfield Operations category includes the immediate runway and taxiway environment and includes the Navaid critical areas, runway visibility zone, runway and taxiway safety areas, and the runway protection zones. The Airfield Operations area is reserved for facilities critical to the safe operations of aircraft on the runways and taxiways.

Aviation Development

The Aviation Development category reserves critical space adjacent to the Airfield Operations area for aviation-specific activity. This activity includes all facilities necessary for aviation-related functions including hangars, terminal buildings, and fuel farms. Essentially, any facilities to be developed in the Aviation Development area must be intended for a function that requires access to the runway and taxiway system.

Revenue Support

The Revenue Support category is airport property that can support development; however, planned development may not require access to the runway and taxiway system. This land use category may be capable of supporting aviation development; however, it is also available for airport compatible non-aviation uses. Typically, non-aviation uses will include commercial and industrial uses.

For Philip Billard Municipal Airport, the areas beyond the Aviation Development area have been identified for revenue support functions. These areas will likely never be needed for aviation development and are thus identified as being available for revenue support development.

FAR PART 77 AIRSPACE DRAWING

Federal Aviation Regulation (F.A.R.) Part 77, *Objects Affecting Navigable Airspace*, was established for use by local authorities to control the height of objects near airports. The FAR Part 77 Airspace Drawing included in this Airport Master Plan is a graphic depiction of this regulatory criterion. The FAR Part 77 Airspace Drawing is a tool to aid local authorities in determining if proposed development could present a hazard to aircraft using the airport. The FAR Part 77 Airspace Drawing can be a critical tool for the airport sponsor's use in reviewing proposed development in the vicinity of the airport.

The airport sponsors should do all in their power to ensure development stays below the FAR Part 77 surfaces to protect the role of the airport. The following discussion will describe those surfaces that make up the recommended FAR Part 77 surfaces at Philip Billard Municipal Airport.

The FAR Part 77 Airspace Drawing assigns three-dimensional imaginary surfaces associated with the airport. These imaginary surfaces emanate from the runway centerline(s) and are dimensioned according to the visibility minimums associated with the approach to the runway end and size of aircraft to operate on the runway. The FAR Part 77 imaginary surfaces include the primary surface, approach surface, transitional surface, horizontal surface, and conical surface. Each surface is described as follows.

Primary Surface

The primary surface is longitudinally centered on the runway and extends 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation along the nearest associated point on the runway centerline. The primary surface for Runway 13-31 is 1,000 feet wide as centered on the runway. The primary surface for Runway 18-36 is currently 500 feet wide as centered on the runway.

Approach Surface

An approach surface is also established for each runway end. The approach surface begins at the end of the primary surface, extends upward and outward, and is centered along an extended runway centerline. The approach surface leading to each runway is based upon the type of approach available (instrument or visual) or planned.

In an effort to protect the airport from future adjacent incompatible land uses, approach surfaces with instrument approach procedures are planned to each runway end. The approach surface for Runway 13 extends a horizontal distance of 10,000 feet at a 50:1 slope with an additional 40,000 feet at a slope of 40:1. The outer width of the approach surface is 16,000 feet. The approach surface for Runways 31 and 36 extends a horizontal distance of 10,000 feet to a width of 3,500 feet and slopes upward at a 34:1 ratio. Runway 18 is planned for instrument approaches with 1-mile visibility minimums. This approach surface has a horizontal distance of 10,000 feet and an outer width of 3,500 feet. The approach slope is a 34:1 ratio.

Transitional Surface

Each runway has a transitional surface that begins at the outside edge of the primary surface at the same elevation as the runway. The transitional surface also connects with the approach surfaces of runways with a precision approach, such as Runway 13. The surface rises at a slope of 7:1, up to a height 150 feet above the highest runway elevation. At that point, the transitional surface ends and the horizontal surface begins.

Horizontal Surface

The horizontal surface is established at 150 feet above the highest elevation of the runway surface. Having no slope, the horizontal surface connects the transitional and approach surfaces to the conical surface at a distance of 10,000 feet from the end of the primary surfaces of each runway.

Conical Surface

The conical surface begins at the outer edge of the horizontal surface. The conical surface then continues for an additional 4,000 feet horizontally at a slope of 20:1. Therefore, at 4,000 feet from the horizontal surface, the elevation of the conical surface is 350 feet above the highest airport elevation.

APPROACH SURFACE PROFILE DRAWINGS

The runway profile drawing presents the entirety of the FAR Part 77 approach surface to the runway ends. It also depicts the runway centerline profile with elevations. This drawing provides profile details that the Airspace Drawing does not.

The approach surface profile drawings include identified penetrations to the approach surface. Penetrations to the approach surface are considered obstructions. The FAA will determine if any obstruction are also hazards which require mitigation. The FAA utilizes other design criteria such as the threshold siting surface (TSS) and various surfaces defined in FAA Order 8260.3B, *Terminal Instrument Procedures* (TERPS), to determine if an obstruction is a hazard.

If an obstruction is a hazard, the FAA can take many steps to protect air navigation. The mitigation options range from removing the hazard to installing obstruction lighting to adjusting the instrument approach minimums.

AIRPORT PROPERTY MAP

The Airport Property Map provides information on property under airport control and is, therefore, subject to FAA grant assurances. The various recorded deeds that make up the airport property are listed in tabular format. The primary purpose of the drawing is to provide information for analyzing the current and future aeronautical use of land acquired with federal funds.

DEPARTURE SURFACE DRAWING

For runways supporting instrument operations, a separate drawing depicting the departure surface is required. The departure surface, when clear, allows pilots to follow standard departure procedures. The departure surface emanates from the departure end of the runway to a distance of 10,200 feet. The inner width is 1,000 feet and the outer width is 6,466 feet. The slope of the departure surface is 40:1.

Obstacles frequently penetrate the departure surface. Where object penetrations exist, the departure procedure can be adjusted by:

a) Non-standard climb rates, and/or
b) Non-standard (higher) departure minimums.

Therefore, it is important for the airport sponsor to identify and remove departure surface obstacles whenever possible in order to enhance takeoff operations at the airport. The airport sponsor should also prevent any new obstacles from developing.

ALP SET DISCLAIMER

The preparation of the ALP set has been supported, in part, through financial assistance from the FAA through the Airport Improvement Program (AIP). The contents do not necessarily reflect the official views or policy of the United States or FAA. Acceptance of the airport master plan does not in any way constitute a commitment on the part of the United States or FAA to participate in any development depicted on the ALP drawing, nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws.

U.S. Department
of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas,
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

December 16, 2013

Eric Johnson
Metropolitan Topeka Airport Authority
Forbes Field
P O Box 19053
Topeka, KS 66619

Dear Mr. Johnson:

Philip Billard Municipal Airport
Topeka, Kansas
AIP No. 3-20-0082-018
14 CFR Part 77 – Airspace Case No. 2013-ACE-1773-NRA
Determination –No Objection with Provisions

We conducted a review of the subject Airport Layout Plan (ALP) based on considerations relating to the safe and efficient utilization of airspace, factors affecting the control of air traffic, conformance with FAA design criteria, and Federal grant assurances or conditions of a Federal property conveyance. Our determination of "No Objection" is derived from the analysis of information supplied in the ALP. We conclude that the proposal will not adversely affect the safe and efficient use of navigable airspace by aircraft provided certain conditions are met as explained in the enclosed FAA Memorandum dated November 19, 2013.

We have reviewed the proposal from an airport's planning viewpoint and the effect on airport programs. We have coordinated the proposal with the appropriate FAA offices, and their comments are contained in the enclosed FAA Memorandum. We have reviewed the ALP for structures that may adversely affect the flight or movement of aircraft, cause electromagnetic interference to NAVAIDs, communication facilities, or, when applicable, derogate the line-of-sight visibility from a control tower. Comments on objects that exceed the obstruction standards of 14 CFR Part 77 are enclosed. Comments on the development of the ALP, which are based on requirements contained in FAA Advisory Circular (AC) 150/5070-6, *Airport Master Plans*, and AC 150/5300-13A, *Airport Design*, have already been provided.

This determination does not constitute a commitment to provide Federal financial assistance to implement any development contained on the ALP. An ALP is a graphic depiction of the existing and future airport facilities showing the clearance and dimensional requirements to meet applicable standards. The ALP serves as a record of aeronautical requirements and is used by the FAA in its review of proposals that may affect the navigable airspace or other missions of the FAA.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

The FAA cannot prevent the construction of structures near an airport. The airport environs can only be protected through such means as local zoning ordinances, acquisitions of property in fee title or aviation easements, letters of agreement, or other means.

As a reminder, the sponsor is advised to coordinate the completion of project construction with the cycle of FAA publications, and to notify the FAA with the required information before the cut-off date coinciding with the next publication cycle.

This determination does not constitute a commitment of Federal funds and does not indicate that the proposed development is environmentally acceptable in accordance with applicable Federal laws. An environmental finding is a prerequisite to any major airport development project when Federal aid will be granted for the project. This approval is given subject to the condition that the proposed airport development identified below shall not be undertaken without prior written environmental approval by the FAA. These items include:

- Extending Runway 18-36
- Extending Runway 13-31
- Abandoning Runway 04-22
- Terminal Area development
- Apron construction
- Taxiway construction
- Hangar development
- Miscellaneous land acquisition

If you have any questions regarding this project please call me at (816)329-2637 or email me at jeff.deitering@faa.gov.

Sincerely,

Original Signed By
Jeffrey D. Deitering

Jeffrey D. Deitering, P.E.
Airport Planning Engineer-Kansas

cc: Jesse R. Romo, C.M., KDOT
Patrick Taylor, C.M., Coffman Associates

AIRPORT LAYOUT PLAN

PHILIP BILLARD MUNICIPAL AIRPORT

Topeka, Kansas

MTAA
METROPOLITAN TOPEKA AIRPORT AUTHORITY

LOCATION MAP

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3. AIRPORT AIRSPACE DRAWING CONICAL SURFACE
4. AIRPORT AIRSPACE DRAWING PART 77 OUTER LIMITS
5. RUNWAY 13 APPROACH SURFACE PROFILES
6. RUNWAY 31 & 18-36 APPROACH SURFACE PROFILES
7. INNER PORTION OF RUNWAY 13-31 APPROACH SURFACE DRAWING
8. INNER PORTION OF RUNWAY 18-36 APPROACH SURFACE DRAWING
9. TERMINAL AREA DRAWING
10. AIRPORT LAND USE DRAWING
11. AIRPORT PROPERTY MAP EXHIBIT A
12. RUNWAY 13-31 DEPARTURE SURFACE DRAWING
13. RUNWAY 18-36 DEPARTURE SURFACE DRAWING
14. RUNWAY 13-31 INNER-APPROACH OFZ DRAWING

VICINITY MAP

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

PHILIP BILLARD MUNICIPAL AIRPORT

COVER SHEET

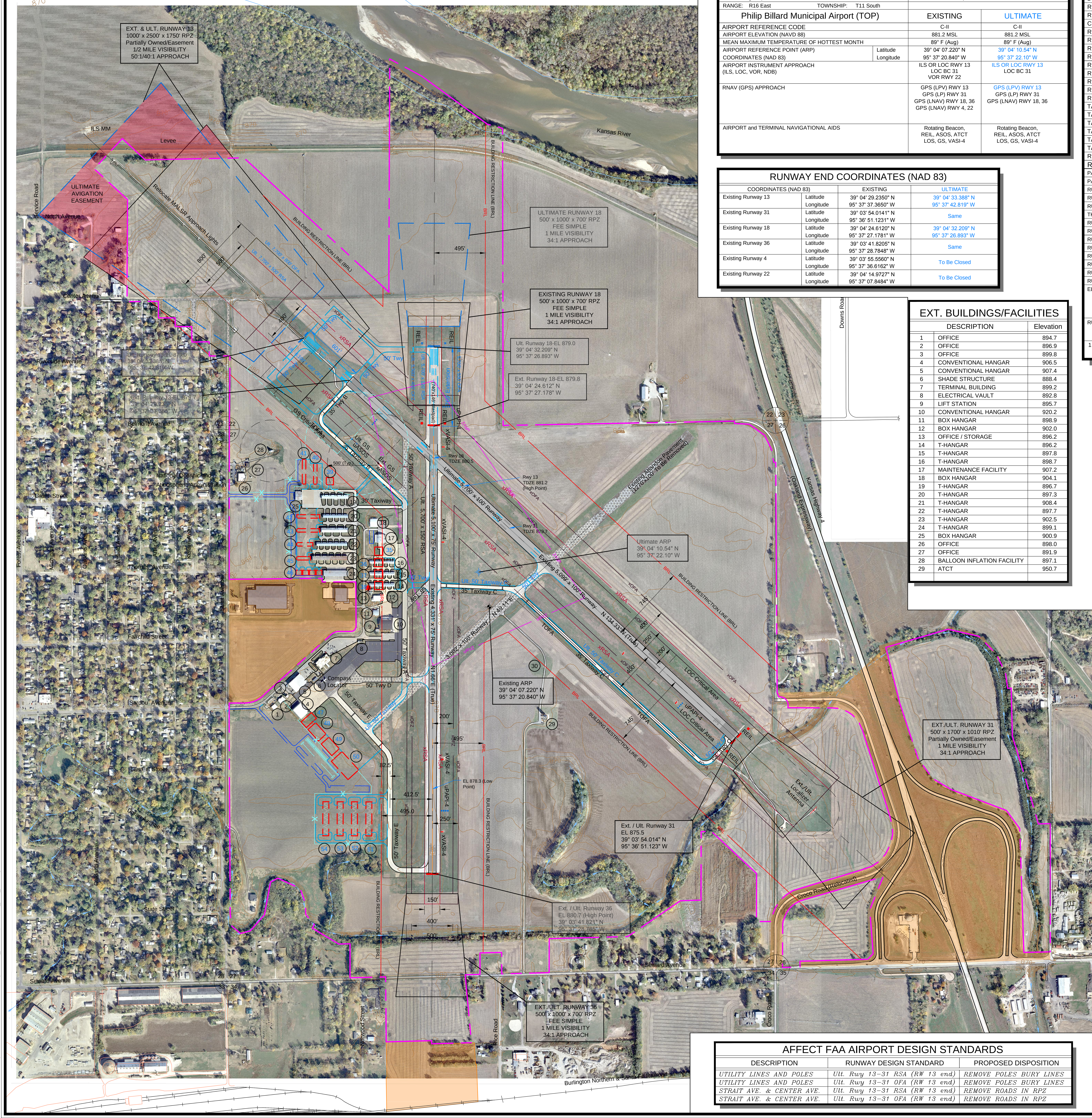
Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013

Sheet 1 of 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com



AIRPORT DATA

OWNER: MTAA	AIRPORT NPIAS CODE: General Aviation Reliever
CITY: Topeka, Kansas	COUNTY: Shawnee, KS
RANGE: R16 East TOWNSHIP: T11 South	

Philip Billard Municipal Airport (TOP)		EXISTING	ULTIMATE
AIRPORT REFERENCE CODE		C-II	C-II
AIRPORT ELEVATION (NAVD 88)		881.2 MSL	881.2 MSL
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		89° F (Aug)	89° F (Aug)
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83)	Latitude	39° 04' 07.220" N	39° 04' 10.54" N
	Longitude	95° 37' 20.840" W	95° 37' 22.10" W
AIRPORT INSTRUMENT APPROACH (ILS, LOC, VOR, NDB)		ILS OR LOC RWY 13 LOC BC 31 VOR RWY 22	ILS OR LOC RWY 13 LOC BC 31
RNAV (GPS) APPROACH		GPS (LPV) RWY 13 GPS (LP) RWY 31 GPS (LNAV) RWY 18, 36 GPS (LNAV) RWY 4, 22	GPS (LPV) RWY 13 GPS (LP) RWY 31 GPS (LNAV) RWY 18, 36
AIRPORT and TERMINAL NAVIGATIONAL AIDS		Rotating Beacon, REIL, ASOS, ATCT LOS, GS, VASI-4	Rotating Beacon, REIL, ASOS, ATCT LOS, GS, VASI-4

RUNWAY END COORDINATES (NAD 83)

COORDINATES (NAD 83)		EXISTING	ULTIMATE
Existing Runway 13	Latitude	39° 04' 29.2350" N	39° 04' 33.388" N
	Longitude	95° 37' 37.3650" W	95° 37' 42.819" W
Existing Runway 31	Latitude	39° 03' 54.0141" N	Same
	Longitude	95° 36' 51.1231" W	
Existing Runway 18	Latitude	39° 04' 24.6120" N	39° 04' 32.209" N
	Longitude	95° 37' 27.1781" W	95° 37' 26.893" W
Existing Runway 36	Latitude	39° 03' 41.8205" N	Same
	Longitude	95° 37' 28.7848" W	
Existing Runway 4	Latitude	39° 03' 55.5560" N	To Be Closed
	Longitude	95° 37' 36.6162" W	
Existing Runway 22	Latitude	39° 04' 14.9727" N	To Be Closed
	Longitude	95° 37' 07.8484" W	

EXT. BUILDINGS/FACILITIES

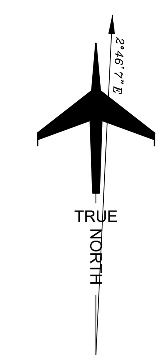
	DESCRIPTION	Elevation
1	OFFICE	894.7
2	OFFICE	896.9
3	OFFICE	899.8
4	CONVENTIONAL HANGAR	906.5
5	CONVENTIONAL HANGAR	907.4
6	SHADE STRUCTURE	888.4
7	TERMINAL BUILDING	899.2
8	ELECTRICAL VAULT	892.8
9	LIFT STATION	895.7
10	CONVENTIONAL HANGAR	920.2
11	BOX HANGAR	898.9
12	BOX HANGAR	902.0
13	OFFICE / STORAGE	896.2
14	T-HANGAR	896.2
15	T-HANGAR	897.8
16	T-HANGAR	898.7
17	MAINTENANCE FACILITY	907.2
18	BOX HANGAR	904.1
19	T-HANGAR	896.7
20	T-HANGAR	897.3
21	T-HANGAR	908.4
22	T-HANGAR	897.7
23	T-HANGAR	902.5
24	T-HANGAR	899.1
25	BOX HANGAR	900.9
26	OFFICE	898.0
27	OFFICE	891.9
28	BALLOON INFLATION FACILITY	897.1
29	ATCT	950.7

RUNWAY DATA

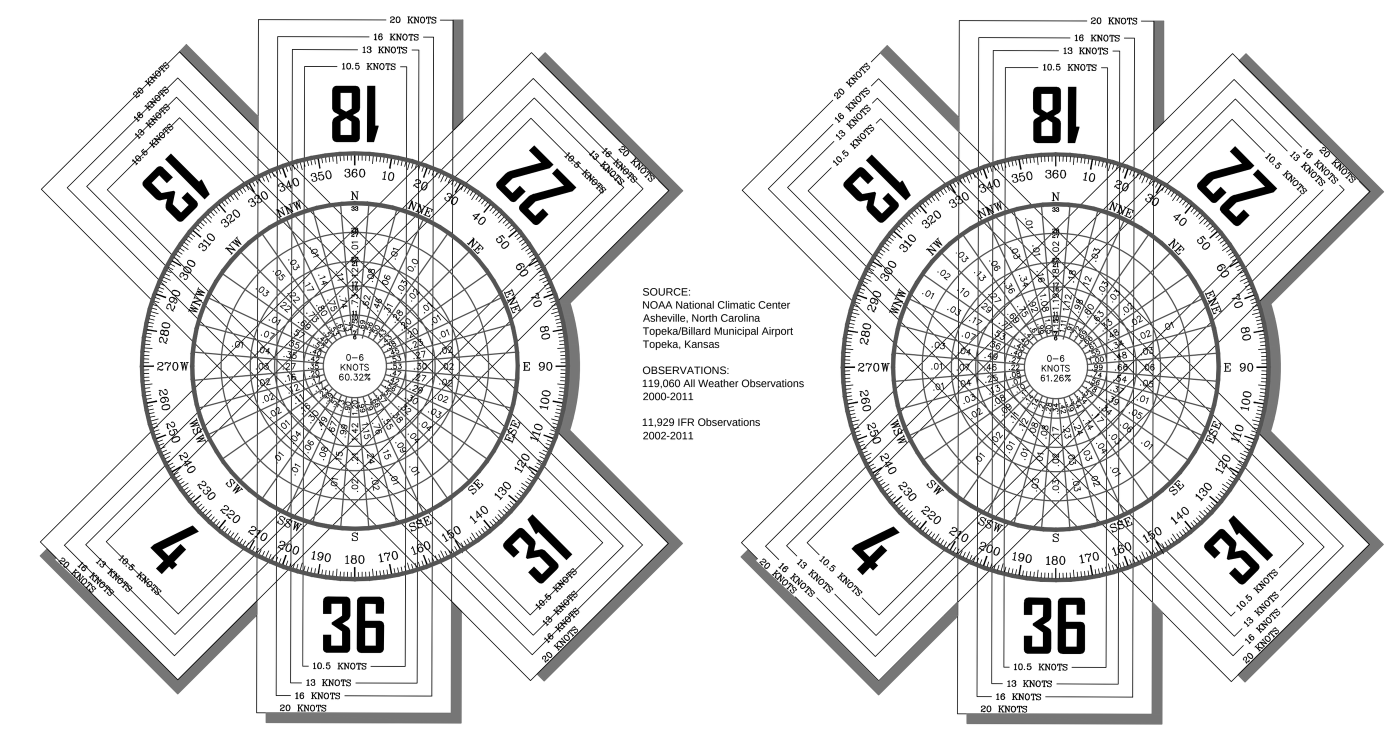
RUNWAY DATA	Runway 13-31 EXISTING	Runway 13-31 ULTIMATE	Runway 18-36 EXISTING	Runway 18-36 ULTIMATE	Runway 4-22 EXISTING (To Be Closed)
DESIGN AIRCRAFT	C-II-3	SAME	B-II-2	SAME	B-II-2
RUNWAY DESIGN CODE (RDC)	C-II-2400	SAME	B-II-5000	B-II-5000	B-II-NP1
RUNWAY REFERENCE CODE (RRC)	C-II-2400	SAME	B-II-4000	B-II-4000	B-II-NP1
CRITICAL DESIGN AIRCRAFT TYPE	Cessna Citation 750	SAME	King Air 200	SAME	King Air 200
RUNWAY DIMENSIONS (L X W)	5,099' x 100'	5,700' x 100'	4,331' x 75'	5,100' x 75'	3,001' x 100'
RUNWAY BEARING (TRUE)	134.33° / 314.34°	SAME	181.67° / 1.67°	SAME	49.12° / 229.13°
RUNWAY WIND COVERAGE (16 KNOTS/18 MPH)	99.35 %	SAME	99.36 %	SAME	97.47 %
RUNWAY MAXIMUM ELEVATION	881.3 MSL	SAME	880.7 MSL	SAME	879.5 MSL
RUNWAY LIGHTING	HIRL, PCL	SAME	MIRL, PCL	SAME	MIRL
RUNWAY EFFECTIVE GRADIENT (MAXIMUM)	0.1 %	SAME	0.1 %	SAME	0.1 %
RUNWAY PAVEMENT MATERIAL / SURFACE TREATMENT	Asphalt	SAME	Asphalt	SAME	Asphalt
RUNWAY PAVEMENT STRENGTH (IN THOUSAND LBS.) 1	50(SW)/72(DW)/110(DDT)	SAME	60(SW)/80(DW)/96(DDT)	SAME	29(SW)
RUNWAY CENTERLINE TO PARALLEL TAXIWAY CENTERLINE	400'	SAME	240'	SAME	240'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'	SAME	65.5'	SAME	65.5'
TAXIWAY WIDTH / TAXIWAY DESIGN GROUP (TDG)	VARIES (35' & 50') / (TDG-3)	SAME	VARIES (35' & 50') / (TDG-3)	SAME	None
TAXIWAY LIGHTING	MITL	SAME	MITL	SAME	MITL
TAXIWAY SURFACE MATERIAL	Asphalt	SAME	Asphalt	SAME	Asphalt
TAXIWAY SAFETY AREA WIDTH	79'	SAME	79'	SAME	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'	SAME	131'	SAME	131'
RUNWAY TO TAXIWAY HOLDING POSITION MARKING/SIGN	250'	SAME	200'	SAME	200'

RUNWAY ENDS DATA	RUNWAY 13	RUNWAY 31	RUNWAY 13 (Ult.)	RUNWAY 31 (Ult.)	RUNWAY 18	RUNWAY 36	RUNWAY 18 (Ult.)	RUNWAY 36 (Ult.)	RUNWAY 4	RUNWAY 22
PART 77 APPROACH SLOPE	50:1/40:1	34:1	50:1/40:1	SAME	34:1	34:1	34:1	SAME	34:1	34:1
PART 77 APPROACH (Type Used)	PIR	NP-C	PIR	SAME	NP-C	NP-C	NP-C	SAME	NP-C	NP-C
RUNWAY MARKING	Precision	Nonprecision	Precision	SAME	Nonprecision	Nonprecision	Nonprecision	SAME	Nonprecision	Nonprecision
RUNWAY APPROACH VISIBILITY MINIMUMS (LOWEST)	1/2 mile	1 mile	1/2 mile	SAME	1 mile	1 mile	1 mile	SAME	1 mile	1 mile
RUNWAY APPROACH LIGHTING	MALSR, PCL	None	MALSR, PCL	SAME	None	None	SAME	SAME	None	None
THRESHOLD SITING REQUIREMENTS (AC 150/5300-13A)	34:1	20:1	34:1	SAME	20:1	20:1	20:1	SAME	20:1	20:1
RUNWAY END ELEVATION (NAVD88)	879.7 MSL	875.5 MSL	879.0 MSL	SAME	879.8 MSL	880.7 MSL	879.0 MSL	SAME	878.0 MSL	879.2 MSL
RUNWAY TOUCHDOWN ZONE ELEVATION (TDZE NAVD88)	881.2 MSL	879.7 MSL	881.2 MSL	SAME	880.5 MSL	880.7 MSL	880.5 MSL	SAME	879.5 MSL	879.5 MSL
RUNWAY SAFETY AREA (RSA BEYOND STOP END)	1000'	1000'	1000'	SAME	300'	300'	300'	SAME	300'	300'
RUNWAY SAFETY AREA WIDTH	500'	500'	500'	SAME	150'	150'	150'	SAME	150'	150'
RUNWAY OBJECT FREE AREA (OFA BEYOND STOP END)	1000'	1000'	1000'	SAME	300'	300'	300'	SAME	300'	300'
RUNWAY OBJECT FREE AREA WIDTH	800'	800'	800'	SAME	500'	500'	500'	SAME	500'	500'
RUNWAY OBSTACLE FREE ZONE (BEYOND STOP END)	200'	200'	200'	SAME	200'	200'	200'	SAME	200'	200'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'	400'	400'	SAME	400'	400'	400'	SAME	400'	400'
ELECTRONIC NAVIGATIONAL AIDS	ILS / LOC / GS RNAV (GPS)	RNAV (GPS)	ILS / LOC / GS RNAV (GPS)	RNAV (GPS)	RNAV (GPS)	RNAV (GPS)	RNAV (GPS)	SAME	RNAV (GPS) VOR	RNAV (GPS)
RUNWAY VISUAL NAVIGATIONAL AIDS (ALS, REIL, VGSI)	-	VASI-4L REIL	PAPI-4	PAPI-4 REIL	VASI-4L REIL	VASI-4L	PAPI-4 REIL	PAPI-4	None	None

1 PAVEMENT STRENGTHS ARE EXPRESSED IN SINGLE (SW), DUAL (DW), DUAL TANDEM (DT), AND/OR DOUBLE DUAL TANDEM (DDT) WHEEL LOAD CAPACITIES.



Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year



0 500 1000 1500
SCALE IN FEET

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4–22	89.18%	93.78%	97.47%	99.17%
Runway 13–31	93.04%	96.85%	99.35%	99.90%
Runway 18–36	94.32%	97.12%	99.36%	99.90%
Combined	99.86%	99.98%	100.00%	100.00%

IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4–22	89.19%	93.78%	97.47%	99.17%
Runway 13–31	92.97%	96.71%	99.37%	99.91%
Runway 18–36	92.01%	95.61%	98.83%	99.75%
Combined	99.69%	99.93%	99.99%	100.00%

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.
5. See the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS for TSS Object Penetrations.

LEGEND

DESCRIPTION
ABANDONED PAVEMENT (To Be Removed)
AIRPORT PROPERTY LINE
AIRPORT REFERENCE POINT (ARP)
AIRPORT ROTATING BEACON
BUILDING ABANDONMENT (To Be Removed)
BUILDING
DRAINAGE
PAVEMENT
FENCING
NAVIGATIONAL AID INSTALLATION
NAVIGATIONAL AID INSTALLATION (PAPI-4)
RUNWAY THRESHOLD LIGHTS and REIL
SECTION CORNER
TOPOGRAPHY (NAVD 88)
HOLDING POSITION MARKING
PARCELS
TAXIWAY OFA
EXTENDED OBJECT FREE AREA
OBSTACLE FREE ZONE
RUNWAY SAFETY AREA
RUNWAY OBJECT FREE AREA
SURVEY MONUMENT (PACS/SACS)
RUNWAY PROTECTION ZONE (RPZ)
BUILDING RESTRICTION LINE (BRL)
ASOS
LOCALIZER CRITICAL AREA
GLIDE SLOPE CRITICAL AREA
LOCALIZER ANTENNA
GLIDE SLOPE ANTENNA
MALSR APPROACH LIGHT SYSTEM
PRECISION OBSTACLE FREE ZONE (POFZ)
TIE-DOWNS
RUNWAY SHADE
TREES
EASEMENT

ULTIMATE BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
35	HANGAR (80' x80')	25' AGL
36	HANGAR (80' x80')	25' AGL
37	HANGAR (80' x80')	25' AGL
38	HANGAR (80' x80')	25' AGL
39	HANGAR (60' x60')	23' AGL
40	T-HANGAR	23' AGL
41	T-HANGAR	23' AGL
42	T-HANGAR	23' AGL
43	T-HANGAR	23' AGL
44	T-HANGAR	23' AGL
45	T-HANGAR	23' AGL
46	HANGARS (55' x 55')	23' AGL
47	FUEL FARM	N/A
48	HANGAR (150' x 100')	30' AGL
49	HANGAR (150' x 100')	30' AGL
50	HANGAR (240' x 140')	35' AGL
51	T-HANGAR	23' AGL
52	T-HANGAR	23' AGL
53	T-HANGAR	23' AGL
54	T-HANGAR	23' AGL

FOR APPROVAL BY:

BY: Eric M. Johnson President/Director of Airports — DATE: 1/15/14

FAA APPROVAL STAMP

CONDITIONAL APPROVAL

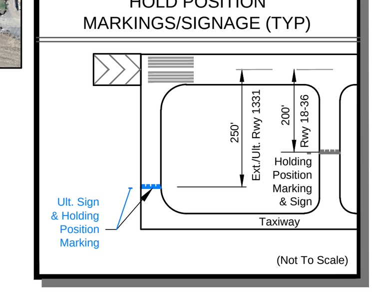
The approval indicated by my signature is given subject to the condition that the items identified in our approval letter dated January 21, 2014 may not be undertaken without prior written environmental approval by the Federal Aviation Administration. This approval action does not imply any commitment for Federal funding, or approval of future structures requiring notice under FAR Part 77.

Airport Planning Engineer
FAA Central Region
Date: 1-21-2014

AFFECT FAA AIRPORT DESIGN STANDARDS

DESCRIPTION	RUNWAY DESIGN STANDARD	PROPOSED DISPOSITION
UTILITY LINES AND POLES	Ult. Rwy 13–31 RSA (RW 13 end)	REMOVE POLES BURY LINES
UTILITY LINES AND POLES	Ult. Rwy 13–31 OFA (RW 13 end)	REMOVE POLES BURY LINES
STRAIT AVE. & CENTER AVE.	Ult. Rwy 13–31 RSA (RW 13 end)	REMOVE ROADS IN RPZ
STRAIT AVE. & CENTER AVE.	Ult. Rwy 13–31 OFA (RW 13 end)	REMOVE ROADS IN RPZ

HOLD POSITION MARKINGS/SIGNAGE (TYP)



No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

PHILIP BILLARD MUNICIPAL AIRPORT

AIRPORT LAYOUT DRAWING

Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

Coffman Associates
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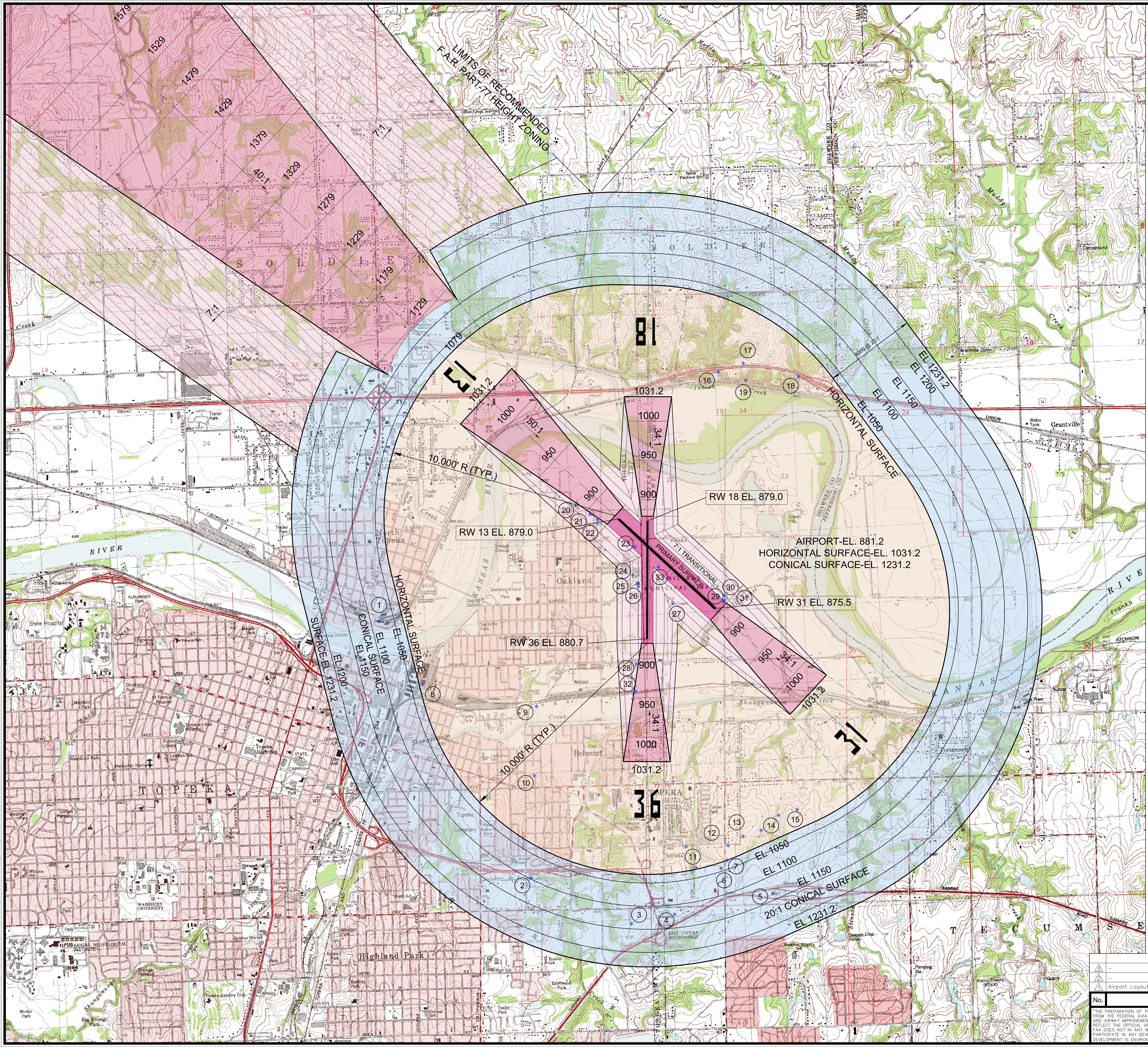
August 27, 2013 — Sheet 2 of 14



OBSTRUCTION LEGEND

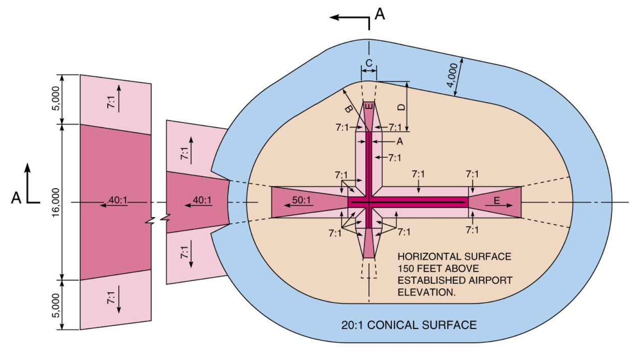
- OBSTRUCTION
- TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

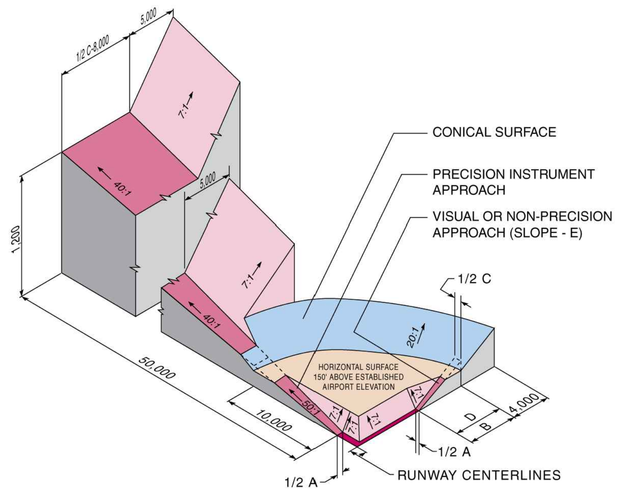
OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	Proposed Object Disposition
1. ELEVATOR-EL 1093	CONICAL SURFACE	10.2'	ADD OBSTRUCTION LIGHT
2. TOWER-EL 1187	CONICAL SURFACE	89.8'	ADD OBSTRUCTION LIGHT
3. TOWER-EL 1139	CONICAL SURFACE	1'	NO ACTION
4. TOWER-EL 1150	CONICAL SURFACE	29.4'	ADD OBSTRUCTION LIGHT
5. TOWER-EL 1142	CONICAL SURFACE	5.9'	ADD OBSTRUCTION LIGHT
6. POLE-EL 1102	CONICAL SURFACE	58.4'	ADD OBSTRUCTION LIGHT
7. TOWER-EL 1069	CONICAL SURFACE	37.4'	ADD OBSTRUCTION LIGHT
8. STACK-EL 1134	HORIZONTAL SURFACE	102.8'	ADD OBSTRUCTION LIGHT
9. TOWER-EL 1061	HORIZONTAL SURFACE	29.8'	ADD OBSTRUCTION LIGHT
10. TOWER-EL 1060	HORIZONTAL SURFACE	28.8'	ADD OBSTRUCTION LIGHT
11. POLE-EL 1096	HORIZONTAL SURFACE	64.8'	ADD OBSTRUCTION LIGHT
12. POLE-EL 1092	HORIZONTAL SURFACE	60.8'	ADD OBSTRUCTION LIGHT
13. POLE-EL 1114	HORIZONTAL SURFACE	82.8'	ADD OBSTRUCTION LIGHT
14. POLE-EL 1104	HORIZONTAL SURFACE	72.8'	ADD OBSTRUCTION LIGHT
15. POLE-EL 1082	HORIZONTAL SURFACE	50.8'	ADD OBSTRUCTION LIGHT
16. POLE-EL 1037	HORIZONTAL SURFACE	5.8'	ADD OBSTRUCTION LIGHT
17. POLE-EL 1036	HORIZONTAL SURFACE	4.8'	ADD OBSTRUCTION LIGHT
18. POLE-EL 1048	HORIZONTAL SURFACE	16.8'	ADD OBSTRUCTION LIGHT
19. POLE-EL 1040	HORIZONTAL SURFACE	8.8'	ADD OBSTRUCTION LIGHT
20. BUILDING-EL 928.4	INNER TRANSITIONAL	2.8'	ADD OBSTRUCTION LIGHT
21. POLE-EL 909.2	INNER TRANSITIONAL	3.7'	BURY LINES / REMOVE POLES
22. POLE-EL 909.5	INNER TRANSITIONAL	11.7'	BURY LINES / REMOVE POLES
23. GLIDE SLOPE-EL 910	PRIMARY SURFACE	30.8'	NO ACTION
24. AIRPORT BEACON-EL 951	INNER TRANSITIONAL	14.1'	NO ACTION
25. BUILDING-EL 927	INNER TRANSITIONAL	28.6'	NO ACTION
26. POLE-EL 908.5	INNER TRANSITIONAL	8.7'	NO ACTION
27. TOWER-EL 965	INNER TRANSITIONAL	3'	NO ACTION
28. TREES-EL 940	INNER TRANSITIONAL	40.6'	TRIM TREES
29. TREES/POLE-EL 879	PRIMARY SURFACE	3.4'	REMOVE ALL TREES/POLE
30. POLE-EL 911	INNER TRANSITIONAL	6.5'	BURY LINES / REMOVE POLES
31. POLE-EL 903	INNER TRANSITIONAL	21.8'	BURY LINES / REMOVE POLES
32. POLE-EL 944	APPROACH SURFACE	2.3'	ADD OBST. LIGHT
33. WIND TEE-EL 894	PRIMARY SURFACE	15.9'	NO ACTION



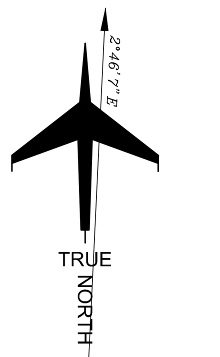
DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.



Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year

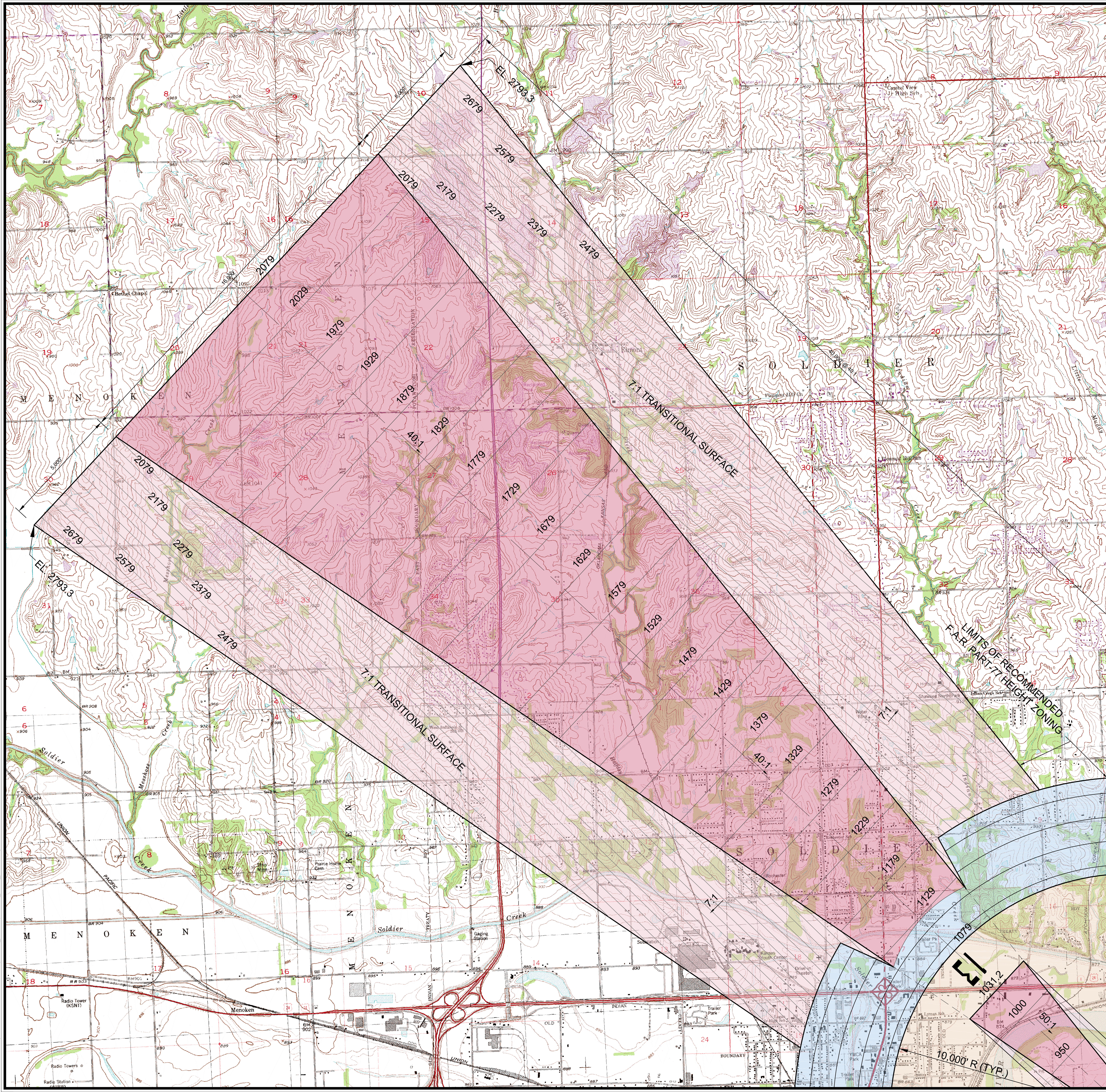
0 2000 4000 6000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

PHILIP BILLARD MUNICIPAL AIRPORT
AIRPORT AIRSPACE DRAWING
PART 77 CONICAL SURFACE
Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

Coffman Associates Airport Consultants www.coffmanassociates.com



OBSTRUCTION LEGEND

- OBSTRUCTION
- TOPOGRAPHIC OBSTRUCTION

OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	Proposed Object Disposition
- NONE	-	-	-

GENERAL NOTES:

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4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

TRUE NORTH

2° 46' 7"

Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year

0 2000 4000 6000

SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
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PHILIP BILLARD MUNICIPAL AIRPORT

AIRPORT AIRSPACE DRAWING PART 77 OUTER LIMITS

Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013

Sheet 4 of 14

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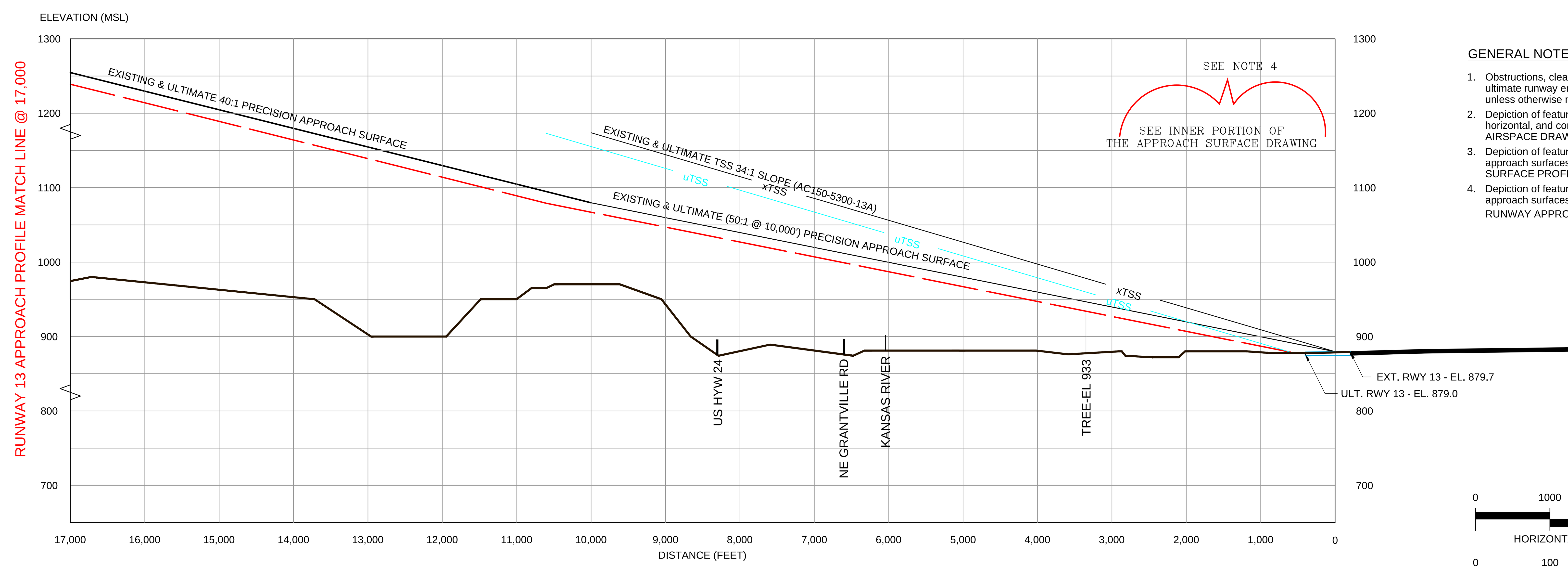

RUNWAY 13 PRECISION APPROACH PROFILES

GENERAL NOTES:

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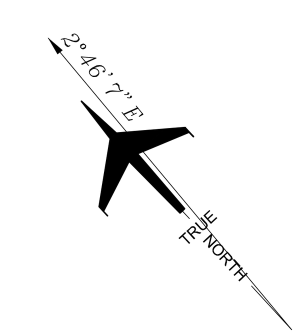
OBSTRUCTION TABLE

Runway 13 Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS 20:1 Penetration	Proposed Object Disposition
- None	-	-	-	-
- -	-	-	-	-



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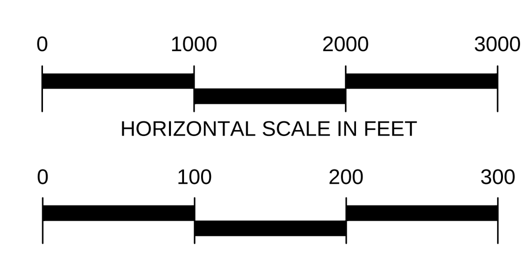
Annual Rate of Change 7.7' West/Year



No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT
RUNWAY 13
APPROACH SURFACE PROFILES
Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko
August 27, 2013
Sheet 5 of 14

Coffman Associates
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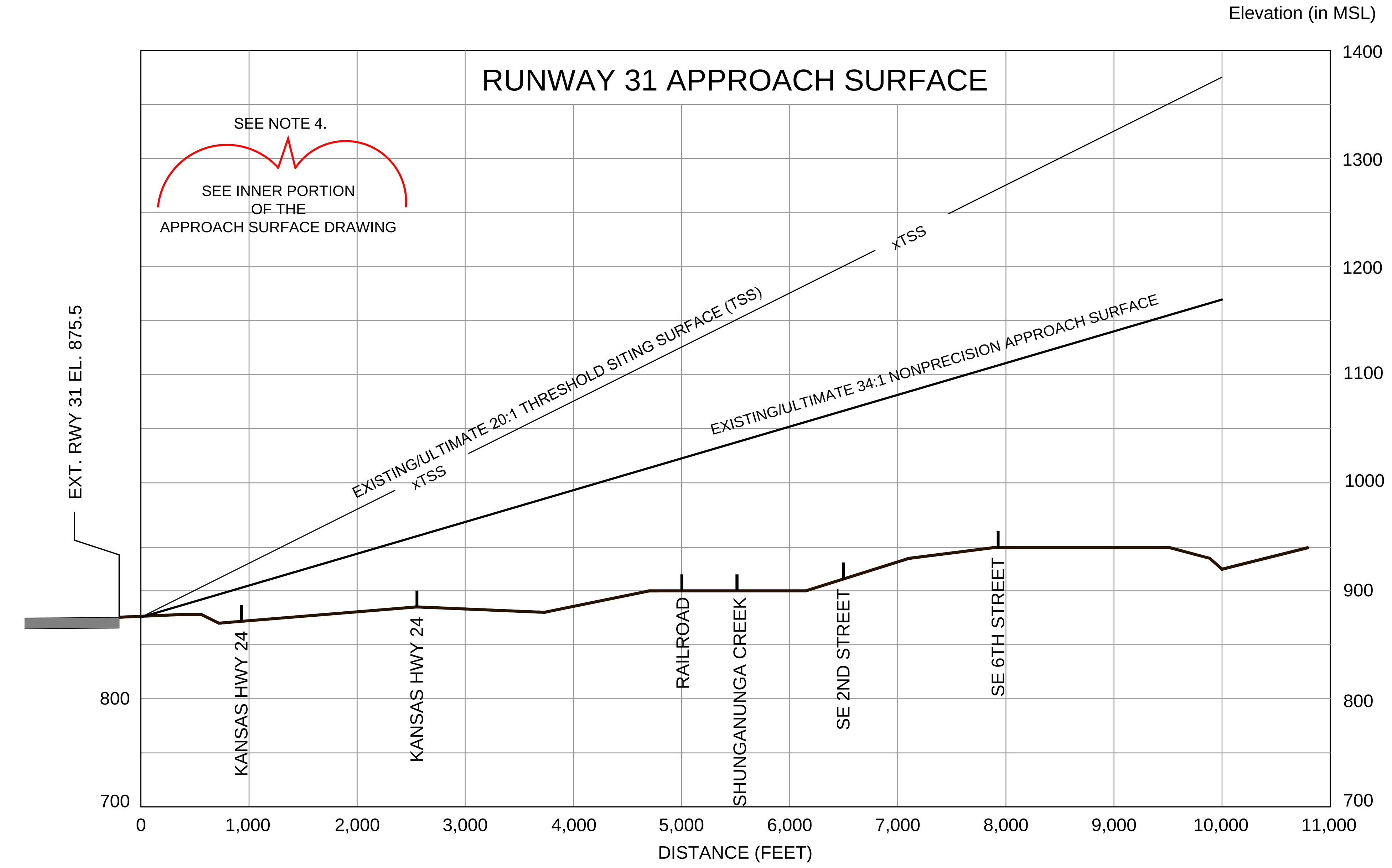
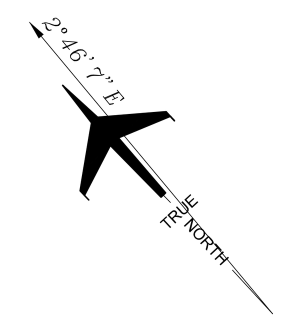


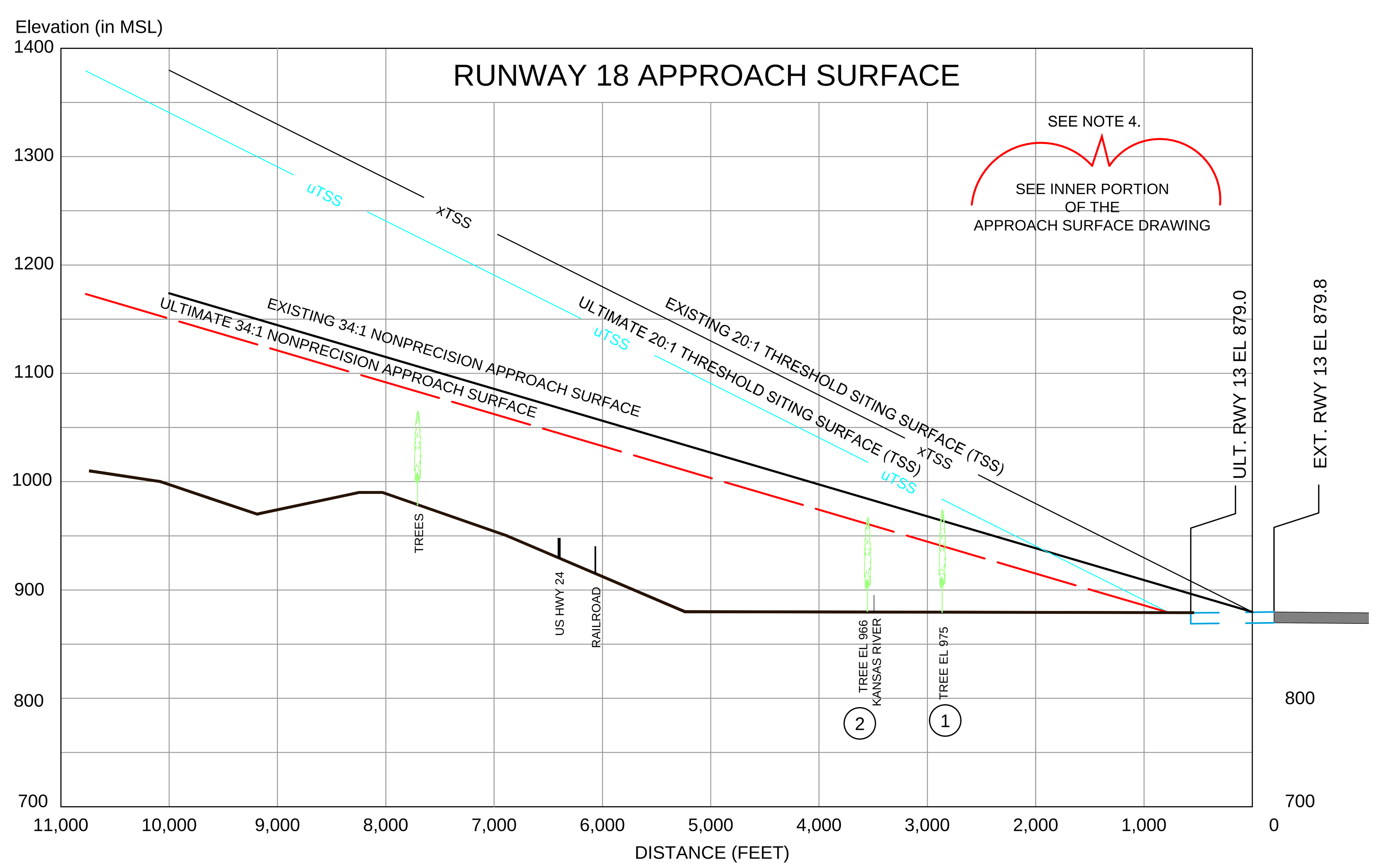


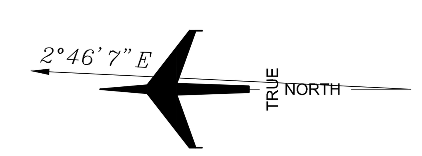
GENERAL NOTES:

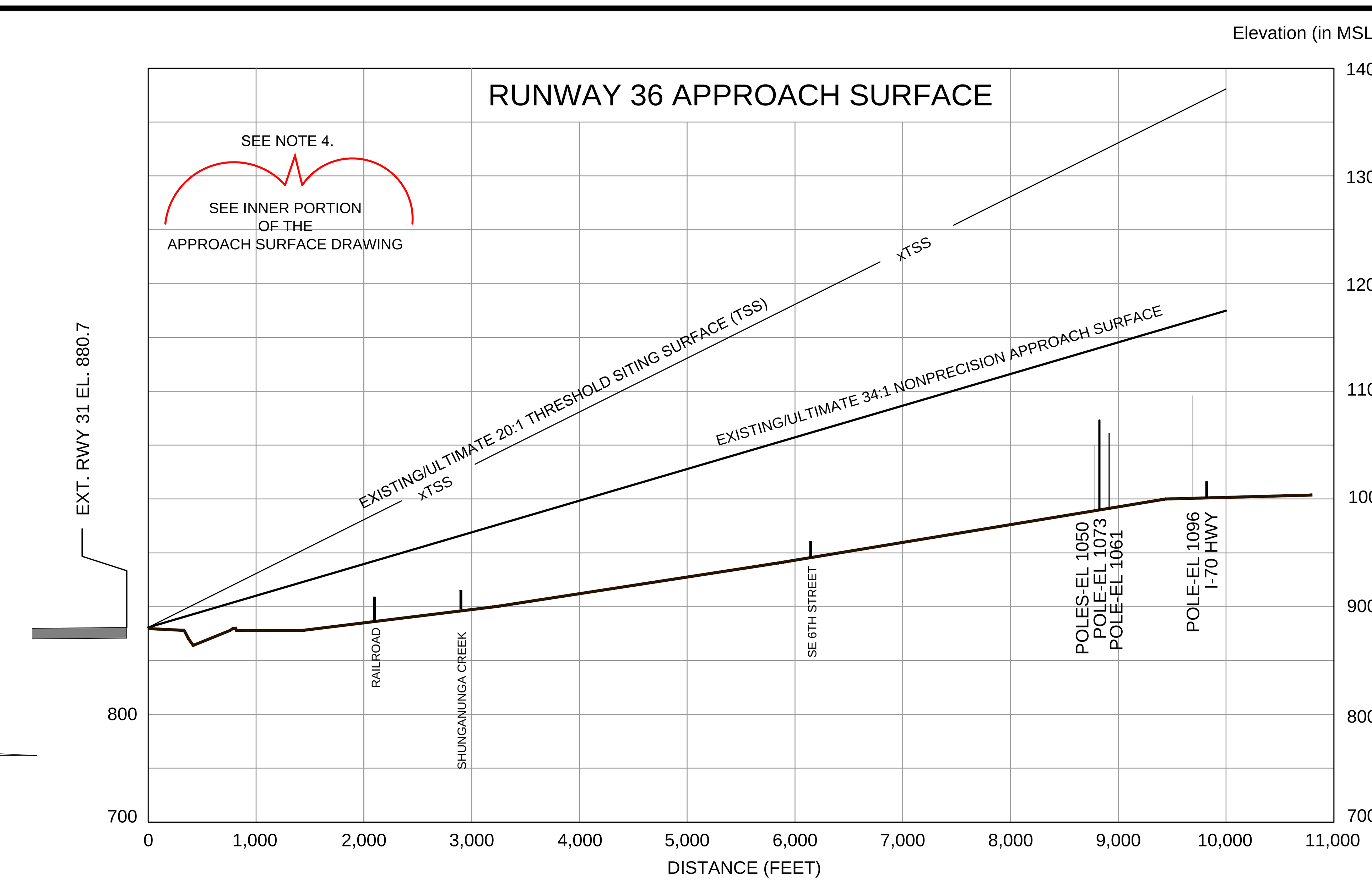
1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

OBSTRUCTION TABLE

Runway 31 Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS 20:1 Penetration	Proposed Object Disposition
None	-	-	-	-







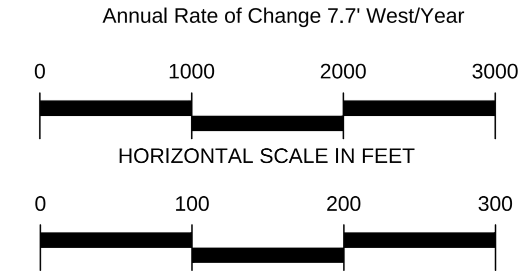
OBSTRUCTION TABLE

Runway 18 Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS 20:1 Penetration	Proposed Object Disposition
1. TREE EL 975	ULT. 34:1 APPROACH	34'	0'	TRIM TREES
2. TREE EL 966	ULT. 34:1 APPROACH	5'	0'	TRIM TREES

OBSTRUCTION TABLE

Runway 36 Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS 20:1 Penetration	Proposed Object Disposition
None	-	-	-	-

Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year



No.	REVISIONS	DATE	BY	APP'D.
	-	-	-	-
	-	-	-	-
	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT

APPROACH SURFACE PROFILES

Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013 — Sheet 6 of 14

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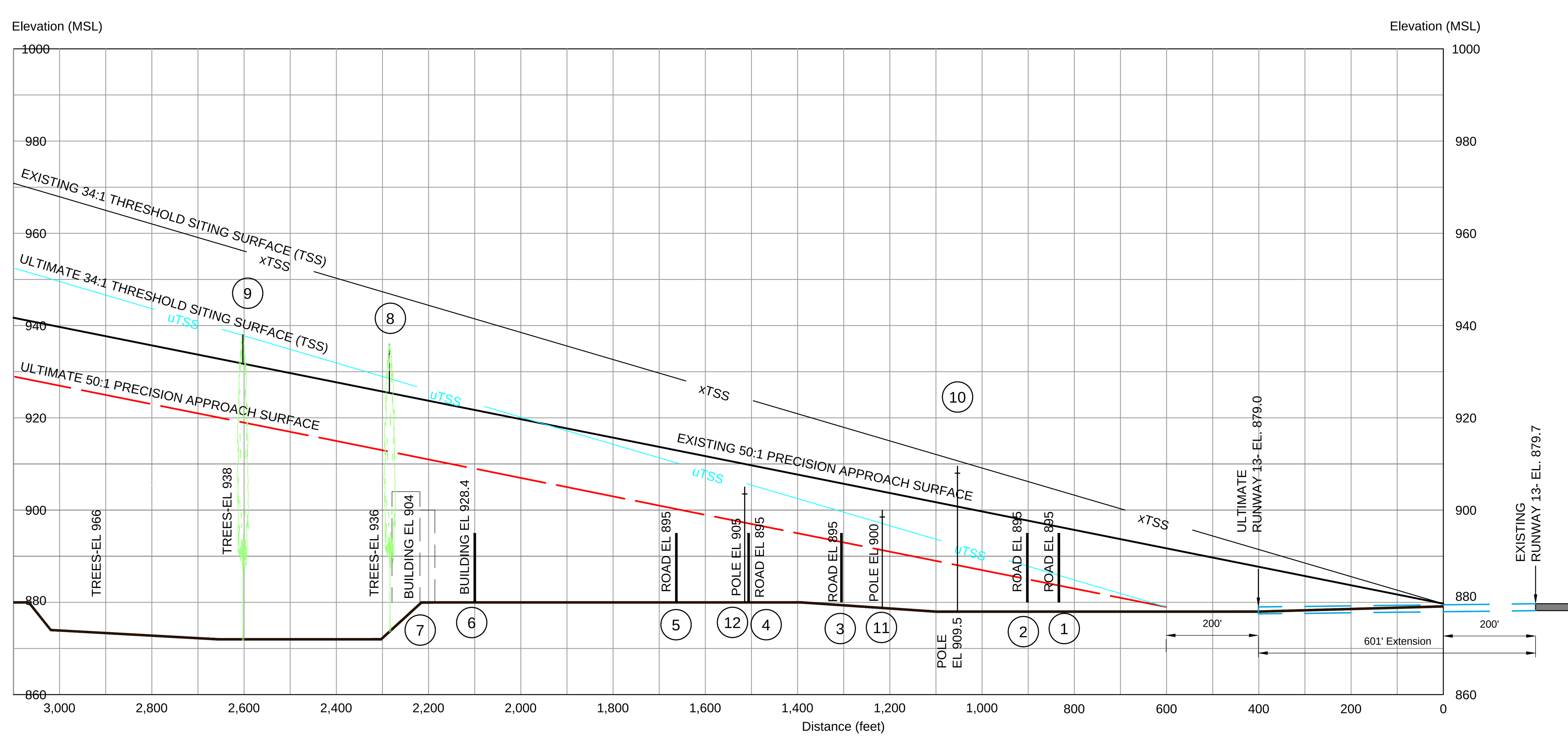
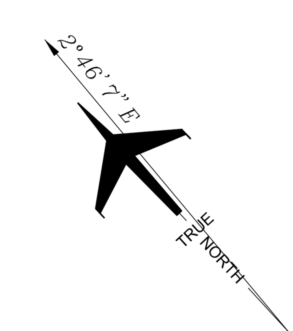
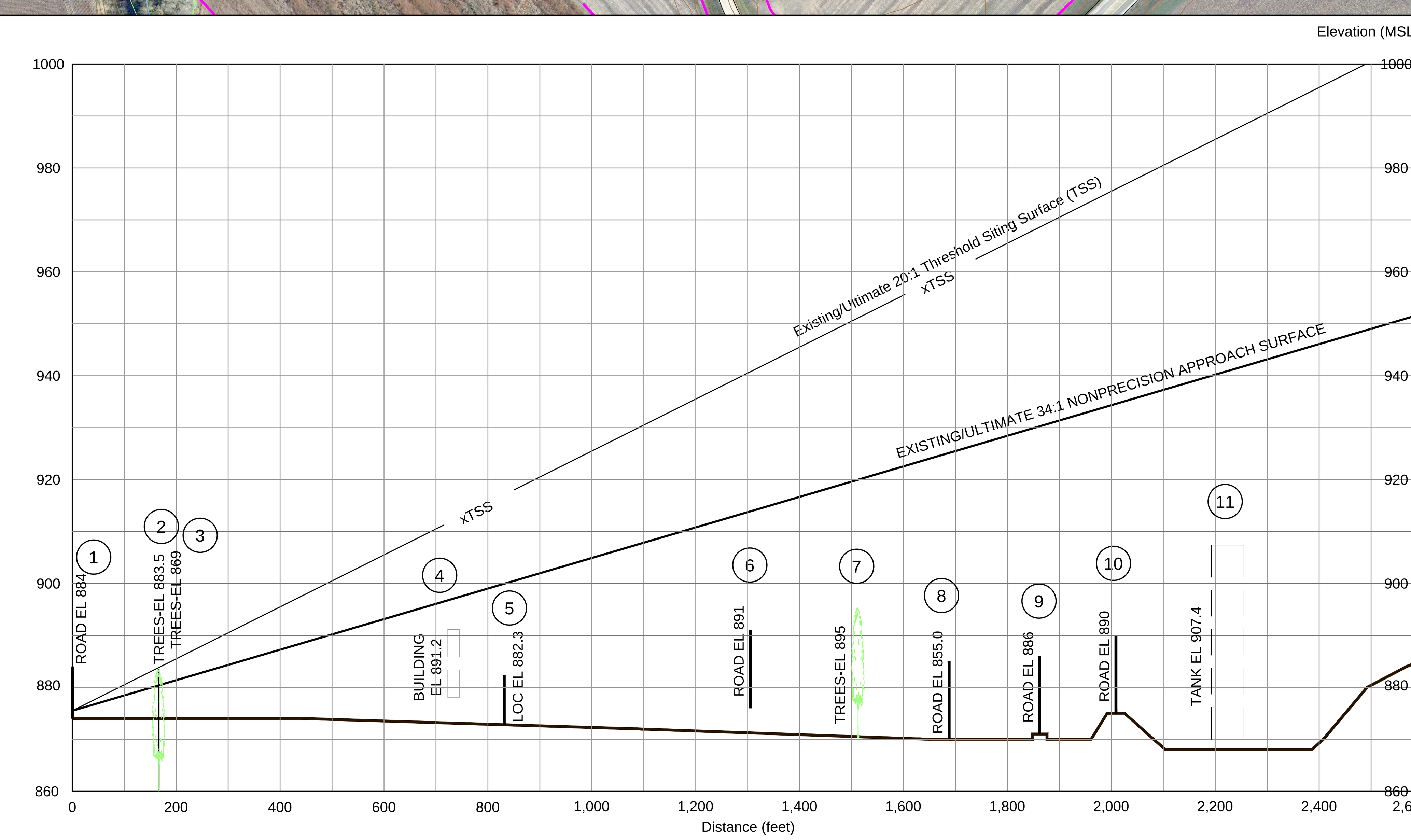




Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year



GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

0 200 400 600
HORIZONTAL SCALE IN FEET

0 20 40 60
VERTICAL SCALE IN FEET

RUNWAY 13 OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 50:1	Ult. 50:1	Ext. 34:1 TSS	Ult. 34:1 TSS	
2. ROAD–EL. 895	0'	10'	0'	7.2'	CLOSE ROAD/TBR
3. ROAD–EL. 895	0'	2'	0'	0'	CLOSE ROAD/TBR
8. TREES–EL. 936	6.2'	23.4'	0'	7.6'	TRIM TREES
9. TREES–EL. 938	10.6'	19'	0'	1'	TRIM TREES
10. POLE–EL. 909.5	8.7'	21.4'	0'	17.2'	BURY LINE/REMOVE POLES
11. POLE–EL. 900	0'	9'	0'	3'	BURY LINE/REMOVE POLES
12. POLE–EL. 905	0'	7.8'	0'	0'	BURY LINE/REMOVE POLES

RUNWAY 31 OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 34:1	Ult. 34:1	Ext. 20:1 TSS	Ult. 20:1 TSS	
1. SERVICE ROADS–EL. 884	8.5'	8.5'	8.5'	8.5'	CLOSED ROAD
2. TREES–EL. 883	3.1'	3.1'	–	–	TRIM TREES
– –	–	–	–	–	–
– –	–	–	–	–	–

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT
INNER PORTION OF RUNWAY 13-31 APPROACH SURFACE DRAWING
Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013

Coffman Associates
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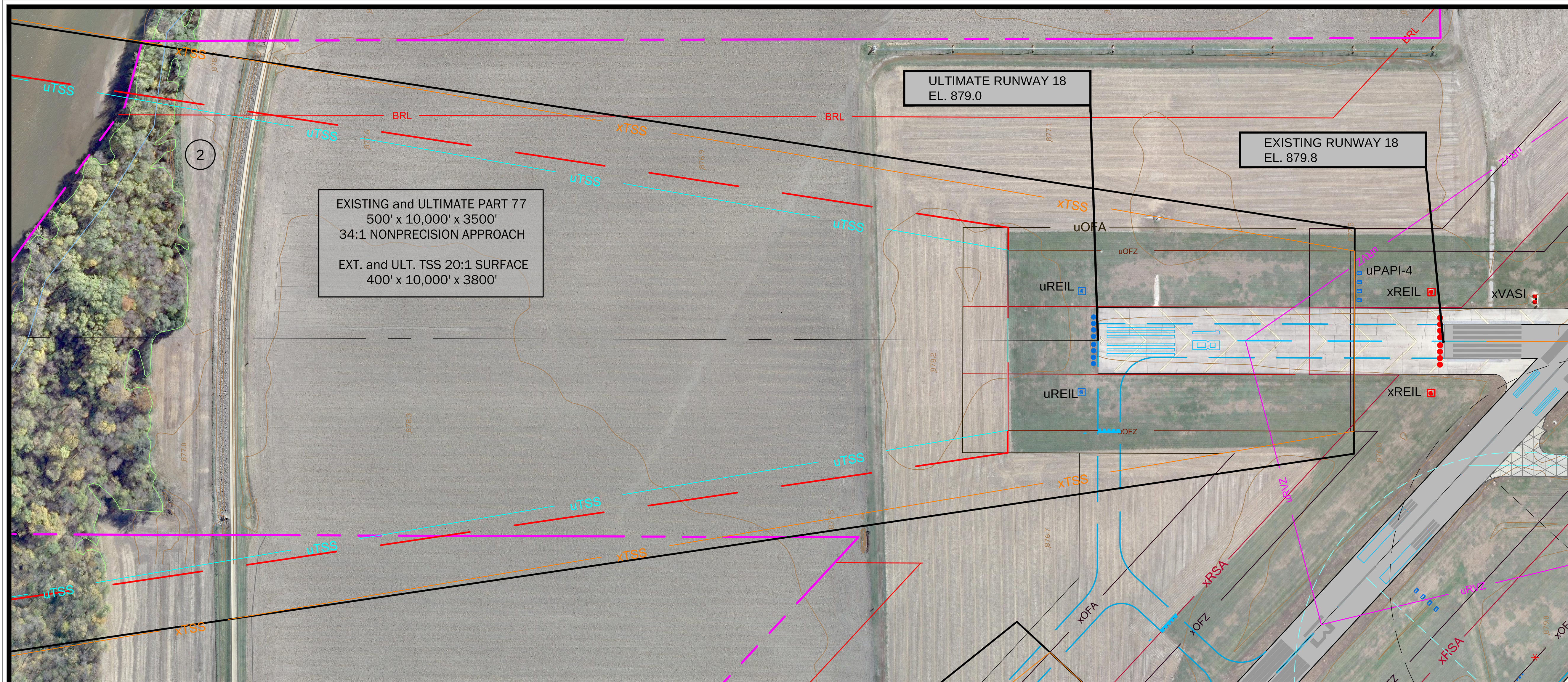

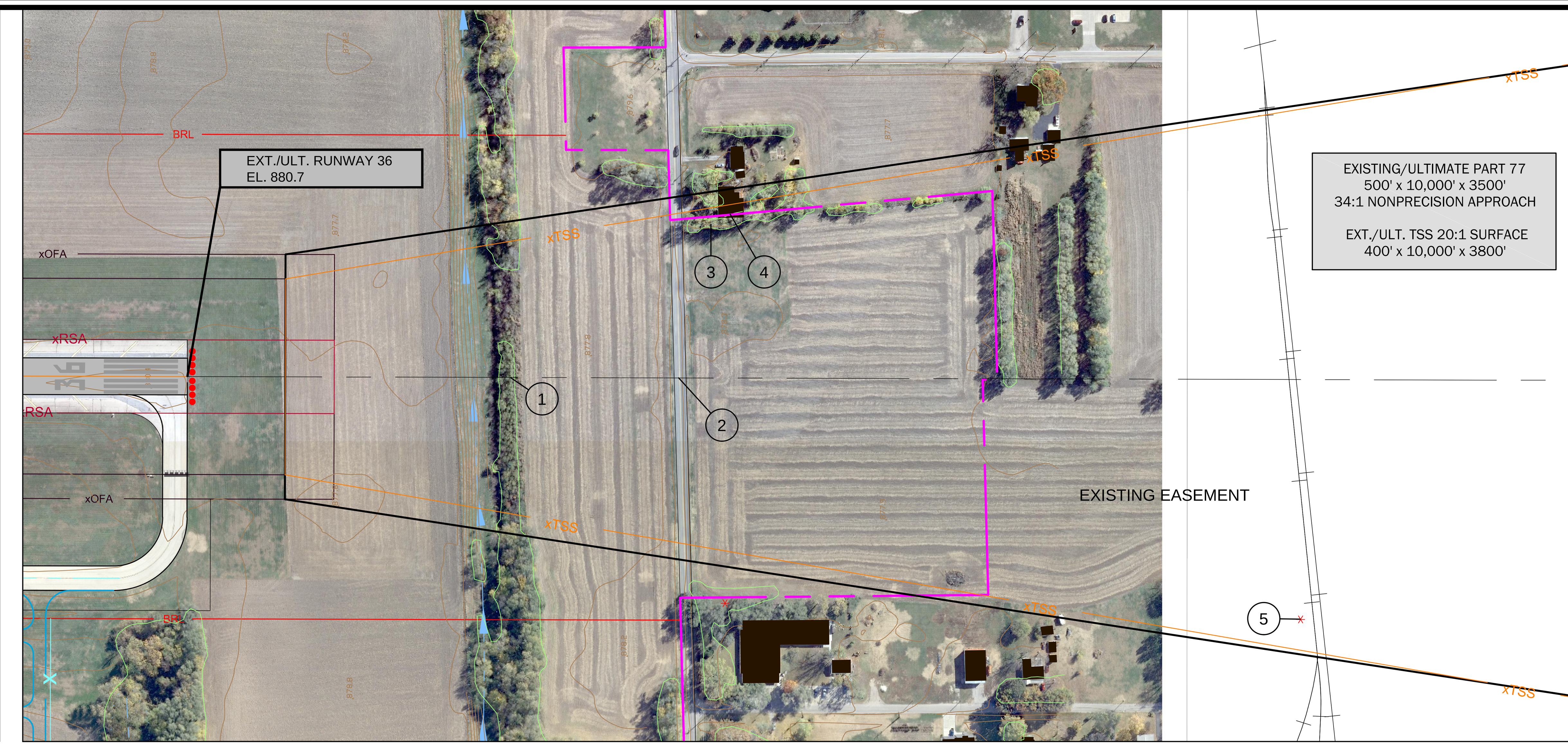

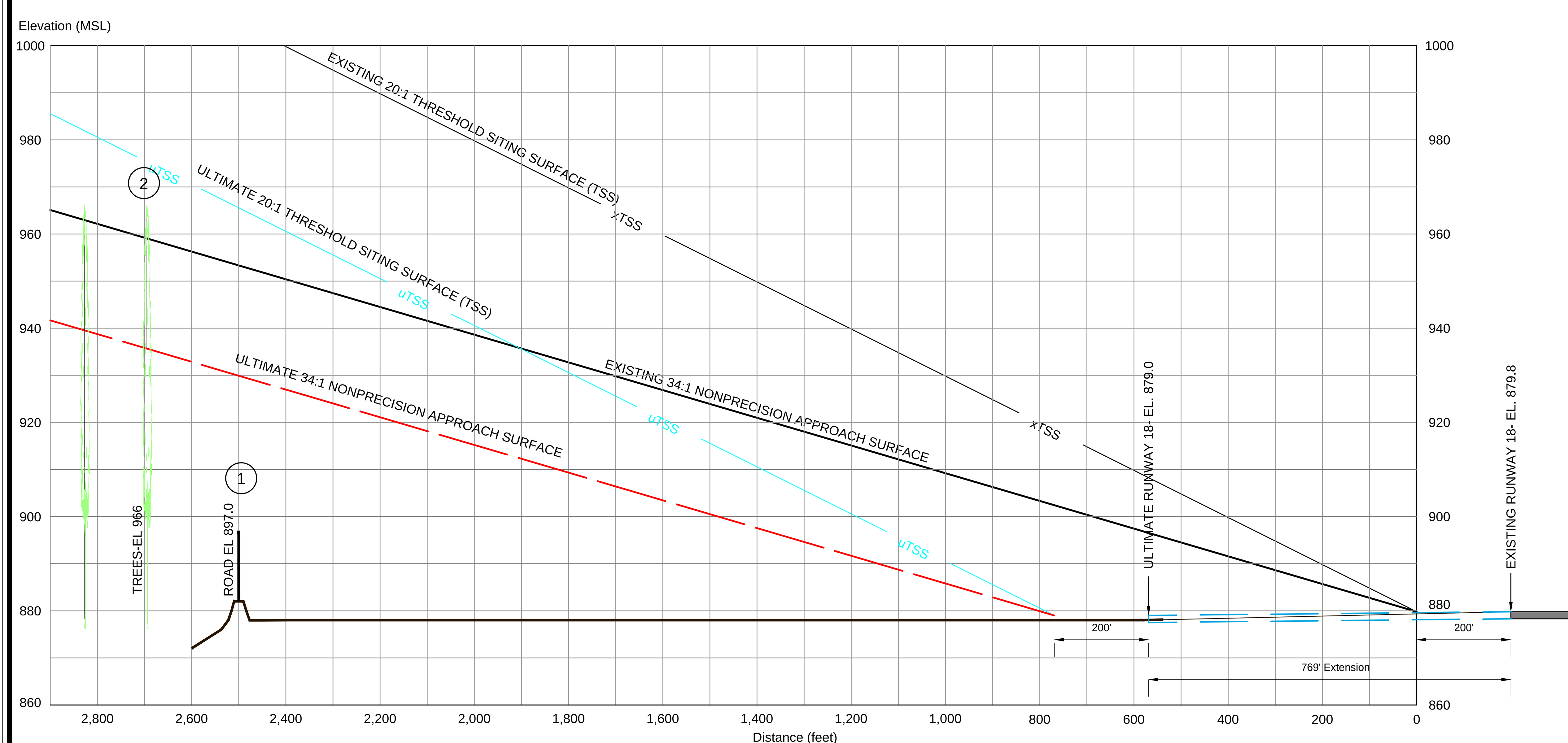

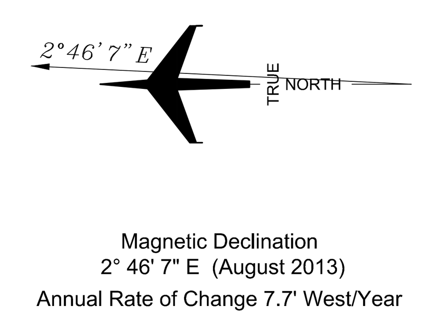

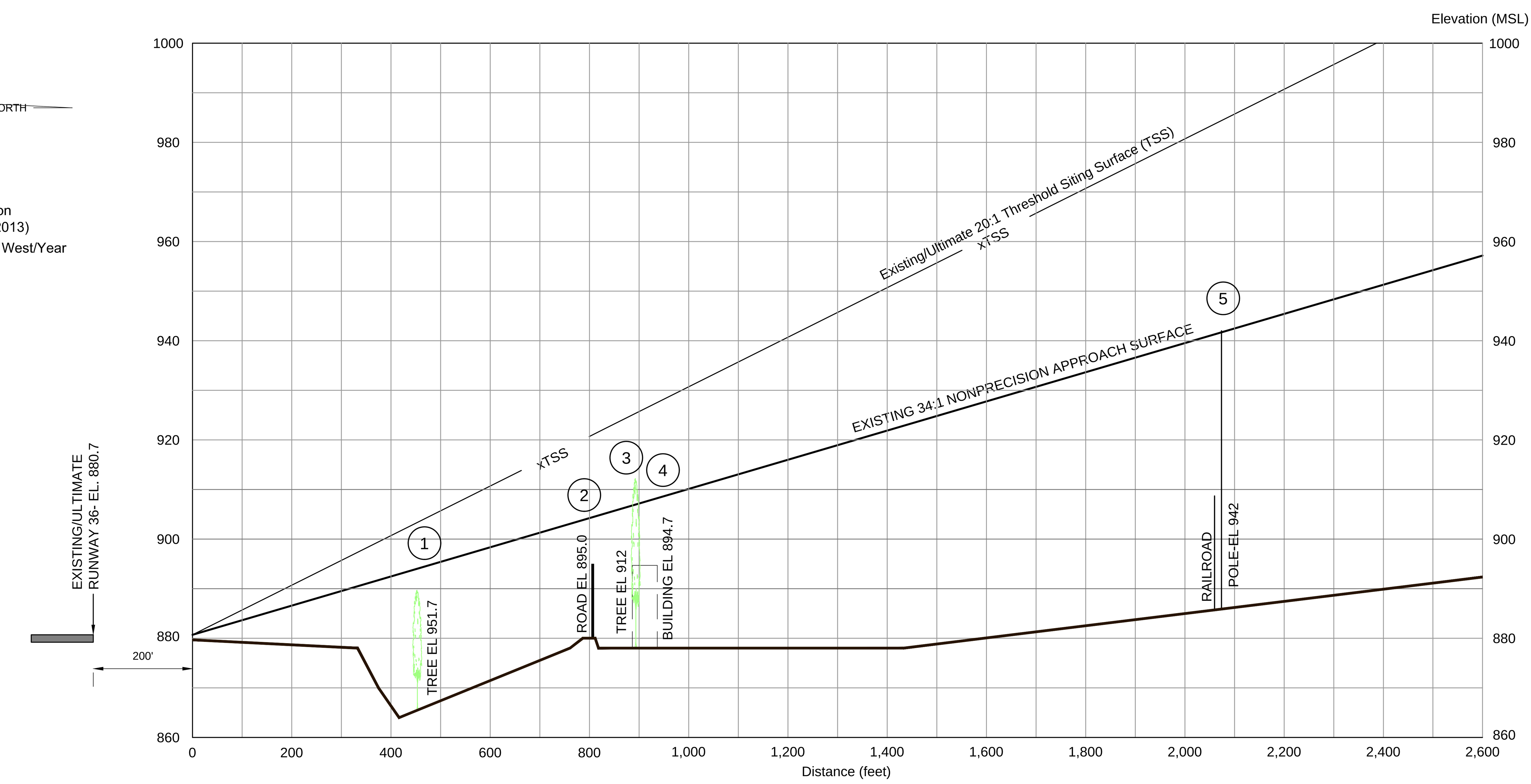

GENERAL NOTES:

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2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

HORIZONTAL SCALE IN FEET (0, 200, 400, 600)

VERTICAL SCALE IN FEET (0, 20, 40, 60)

RUNWAY 18 OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 34:1	Ult. 34:1	Ext. 20:1 TSS	Ult. 20:1 TSS	
2. TREES EL. 966	7'	30'	0'	0'	TRIM TREES

RUNWAY 36 OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 34:1	Ult. 34:1	Ext. 20:1 TSS	Ult. 20:1 TSS	
3. TREE-EL 912	6'	6'	0'	0'	TRIM TREES
5. POLE-EL 942	1'	1'	0'	0'	LOWER POLE

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT

INNER PORTION OF RUNWAY 18-36 APPROACH SURFACE DRAWING

Topeka, Kansas

PLANNED BY: Patrick C. Taylor

DETAILED BY: Larry D. Johnson

APPROVED BY: Mike W. Dmyterko

August 27, 2013

Sheet 8 of 14

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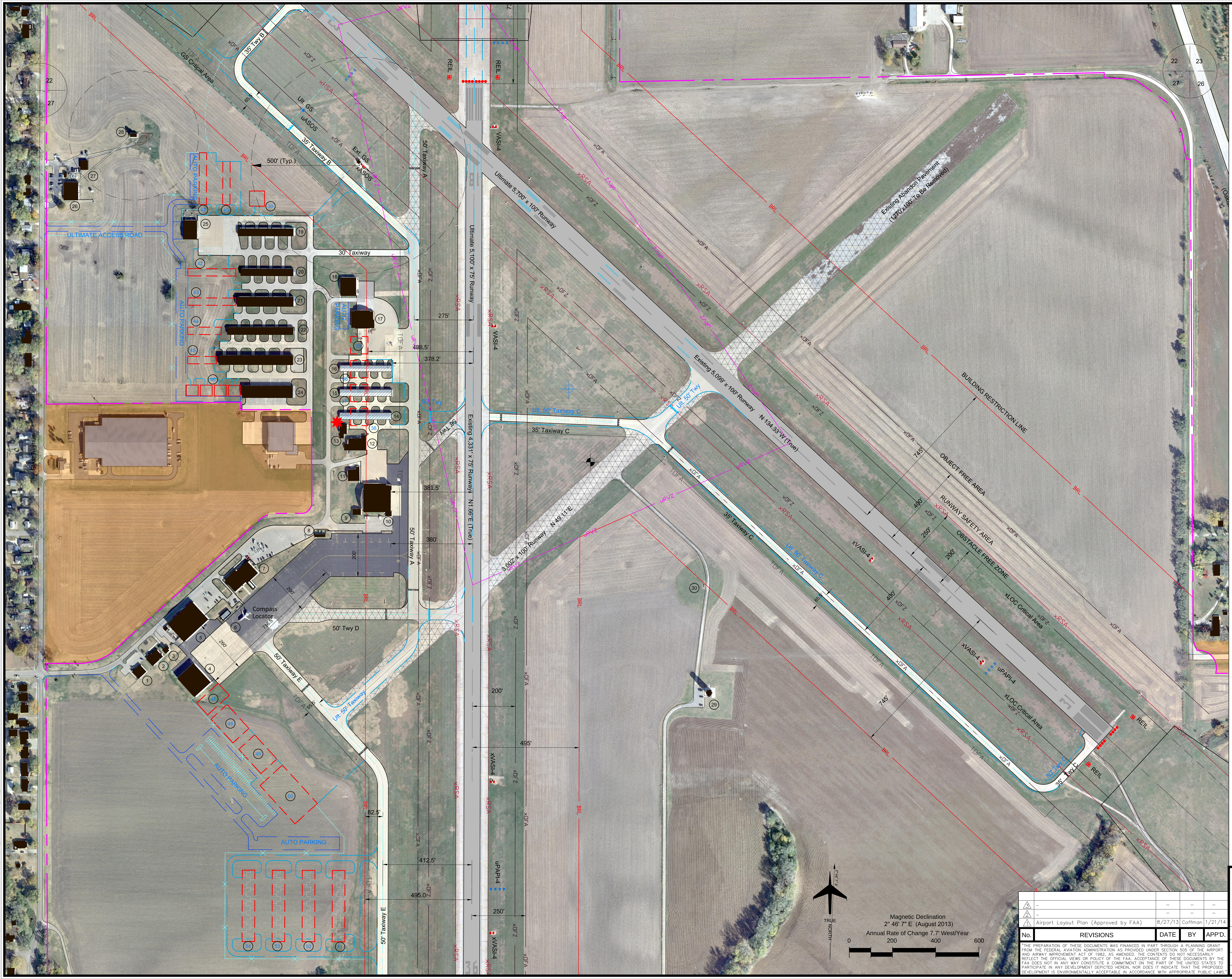

EXT. BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
1	OFFICE	894.7
2	OFFICE	896.9
3	OFFICE	899.8
4	CONVENTIONAL HANGAR	906.5
5	CONVENTIONAL HANGAR	907.4
6	SHADE STRUCTURE	888.4
7	TERMINAL BUILDING	899.2
8	ELECTRICAL VAULT	892.8
9	LIFT STATION	895.7
10	CONVENTIONAL HANGAR	920.2
11	BOX HANGAR	898.9
12	BOX HANGAR	902.0
13	OFFICE / STORAGE	896.2
14	T-HANGAR	896.2
15	T-HANGAR	897.8
16	T-HANGAR	898.7
17	MAINTENANCE FACILITY	907.2
18	BOX HANGAR	904.1
19	T-HANGAR	896.7
20	T-HANGAR	897.3
21	T-HANGAR	908.4
22	T-HANGAR	897.7
23	T-HANGAR	902.5
24	T-HANGAR	899.1
25	BOX HANGAR	900.9
26	OFFICE	898.0
27	OFFICE	891.9
28	BALLOON INFLATION FACILITY	897.1
29	ATCT	950.7
30	ANTENNA	901.0

ULTIMATE BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
35	HANGAR (80' x80')	25' AGL
36	HANGAR (80' x80')	25' AGL
37	HANGAR (80' x80')	25' AGL
38	HANGAR (80' x80')	25' AGL
39	HANGAR (60' x60')	23' AGL
40	T-HANGAR	23' AGL
41	T-HANGAR	23' AGL
42	T-HANGAR	23' AGL
43	T-HANGAR	23' AGL
44	T-HANGAR	23' AGL
45	T-HANGAR	23' AGL
46	HANGARS (55' x 55')	23' AGL
47	FUEL FARM	N/A
48	HANGAR (150' x 100')	30' AGL
49	HANGAR (150' x 100')	30' AGL
50	HANGAR (240' x 140')	35' AGL
51	T-HANGAR	23' AGL
52	T-HANGAR	23' AGL
53	T-HANGAR	23' AGL
54	T-HANGAR	23' AGL

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING
VASI–4	PAPI–4	NAVIGATIONAL AID INSTALLATION
	SAME	TIE-DOWNS
		RUNWAY THRESHOLD LIGHTS and REIL
34 35 3 2	SAME	SECTION CORNER
878	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TOFA	SAME	TAXIWAY OFA
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
xRSA	uRSA	RUNWAY SAFETY AREA
xOFA	uOFA	RUNWAY OBJECT FREE AREA
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
	SAME	ASOS
xLOC	SAME	LOCALIZER CRITICAL AREA
xGS	SAME	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
	SAME	GLIDE SLOPE ANTENNA
N/A		RUNWAY SHADE

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT

TERMINAL AREA DRAWING

Topeka, Kansas

PLANNED BY: Patrick C. Taylor

DETAILED BY: Larry D. Johnson

APPROVED BY: Mike W. Dmyterko

August 27, 2013

Coffman Associates
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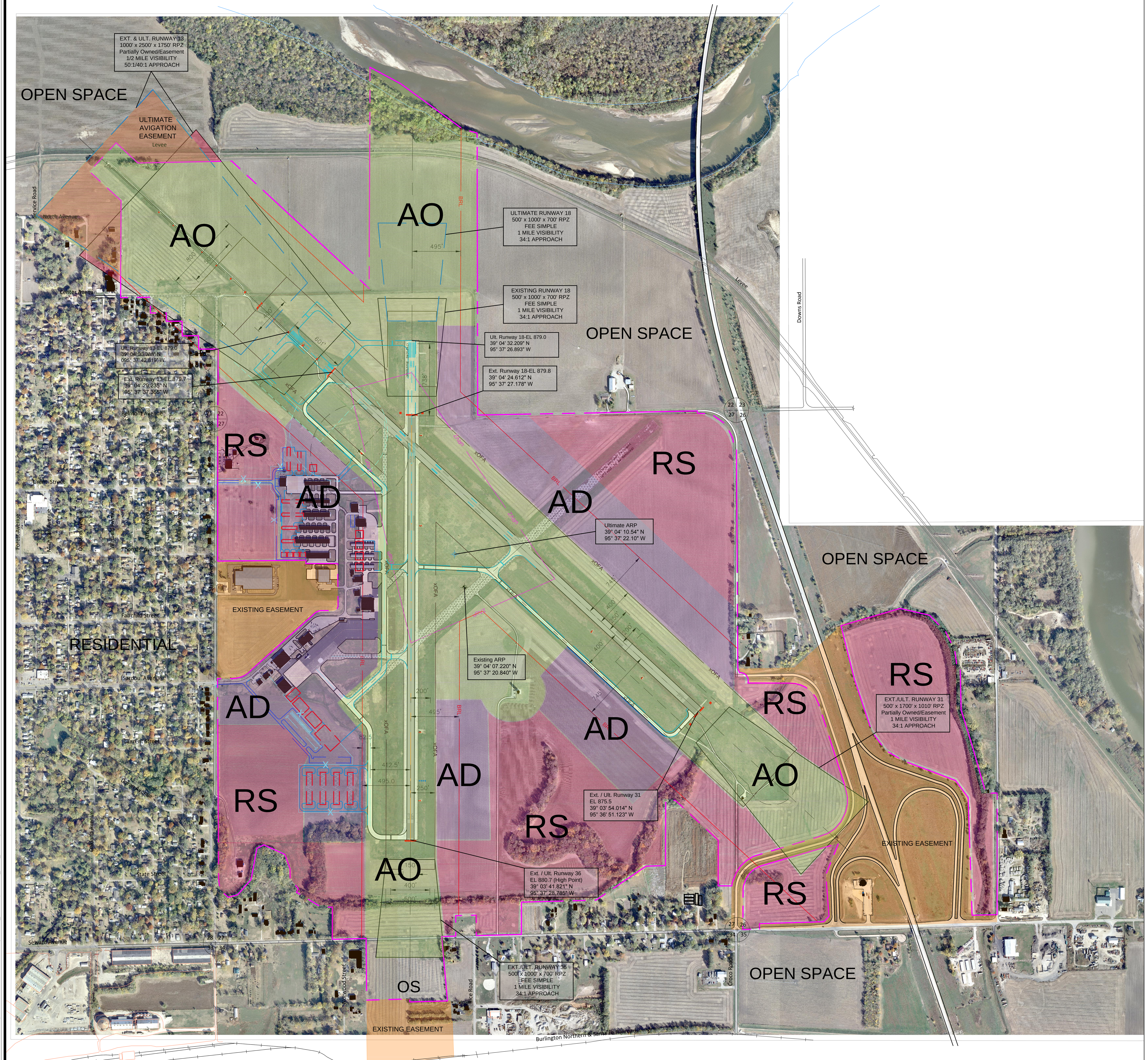
AIRPORT LAND USE LEGEND

AO	AIRFIELD OPERATIONS
AD	AVIATION DEVELOPMENT
RS	REVENUE SUPPORT
OS	OPEN SPACE



EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
		PAVEMENT
		FENCING
34 35 3 2	SAME	SECTION CORNER
TOFA	SAME	TAXIWAY OFA
xOFA	uOFA	RUNWAY OBJECT FREE AREA
		RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
N/A		RUNWAY SHADE
		EASEMENT

TRUE NORTH

Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year

0 500 1000 1500
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
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PHILIP BILLARD MUNICIPAL AIRPORT

AIRPORT LAND USE DRAWING

Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013 | Sheet 10 of 14

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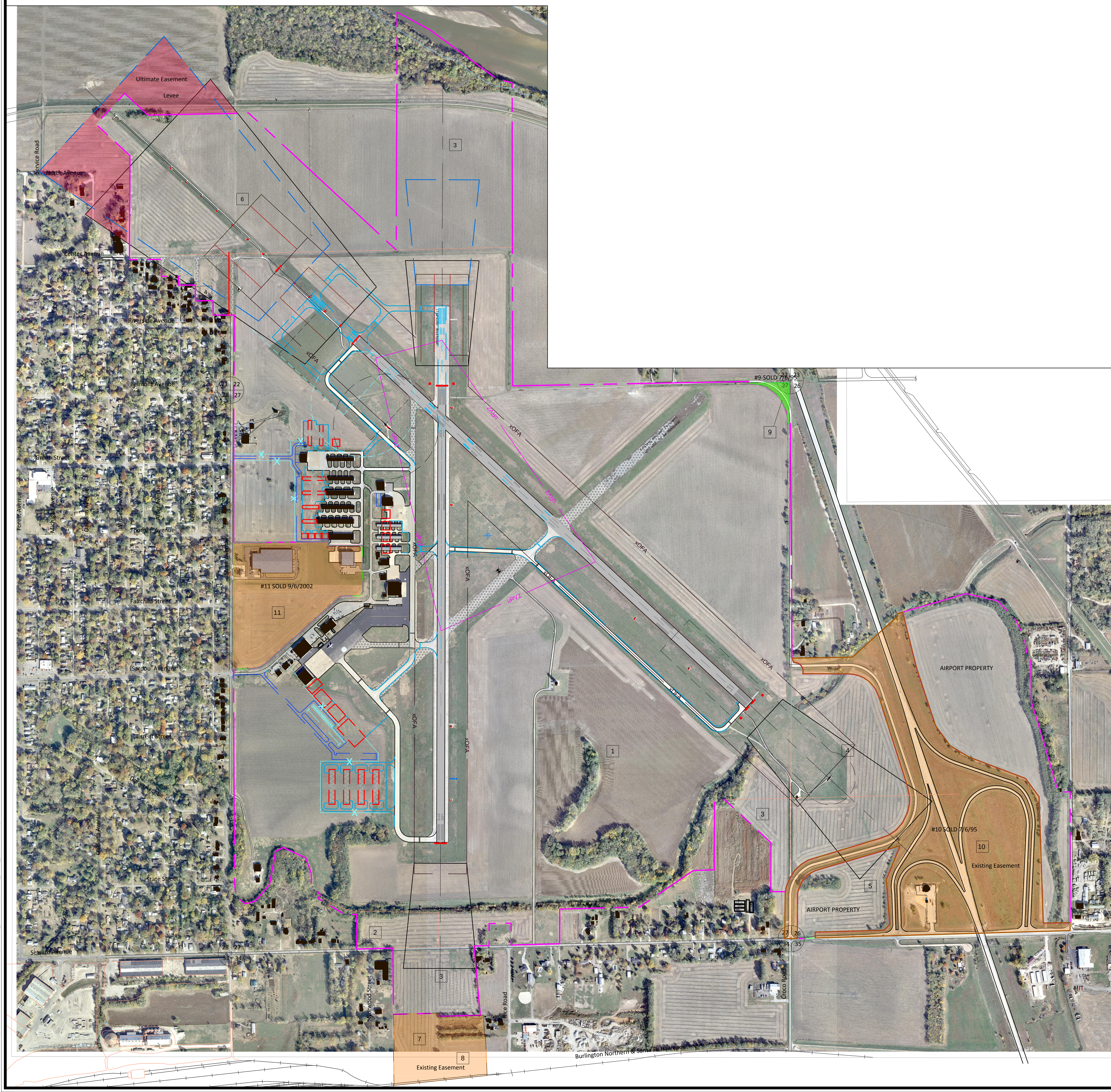

EXISTING AIRPORT PROPERTY

AREA	DATE ACQUIRED (A) OR SOLD (S)	FEDERAL PROJ. NO.	PROPERTY INTEREST	ACREAGE
1	4/11/51 (A)	9-14-035-702	FEE	669.15
2	10/29/56 (A)	9-14-035-5707	FEE	6.18
3	7/25/68 (A)	9-14-035-C912	FEE	65.11
4	6/29/65 (A)	9-14-035-C511	FEE	6.60
5	2/11/69 (A)	9-14-035-C913	FEE	13.27
6	5/31/63 (A)	9-14-035-C309	FEE	57.82
7	10/22/69 (A)	9-14-035-C912	EASEMENT	8.67
8	4/1/70 (A)	9-14-035-C912	EASEMENT	3.86
9	7/6/95 (S)	*SOLD TO STATE OF KANSAS	WARRANTY DEED	0.84
10	7/6/95 (S)	*SOLD TO STATE OF KANSAS	WARRANTY DEED	69.85
11	09/06/02 (S)	**SOLD TO STATE OF KANSAS	QUIT-CLAIM DEED	24.85

*Sold to Secretary of Transportation of the State of Kansas for highway purposes subject to avigation rights, airspace restrictions and proportionate use of sale price per government's share of cost acquisition of land to be placed in an account to be used for eligible airport improvement projects.

**Sold to Kansas Highway Patrol for the State of Kansas for the purpose of constructing new facilities subject to avigation rights, airspace restrictions and proportionate use of sale price per government's share of cost acquisition of land to be placed in an account to be used for eligible airport improvement projects.

ULTIMATE PROPERTY ACQUISITION TABLE

AREA	U-1	U-2	U-3	U-4	U-5
ACREAGE	3.81	1.98	0.13	1.18	0.54

TRUE NORTH

Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year

0 500 1000 1500
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
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PHILIP BILLARD MUNICIPAL AIRPORT
AIRPORT PROPERTY MAP
EXHIBIT A
Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013 | Sheet 11 of 14

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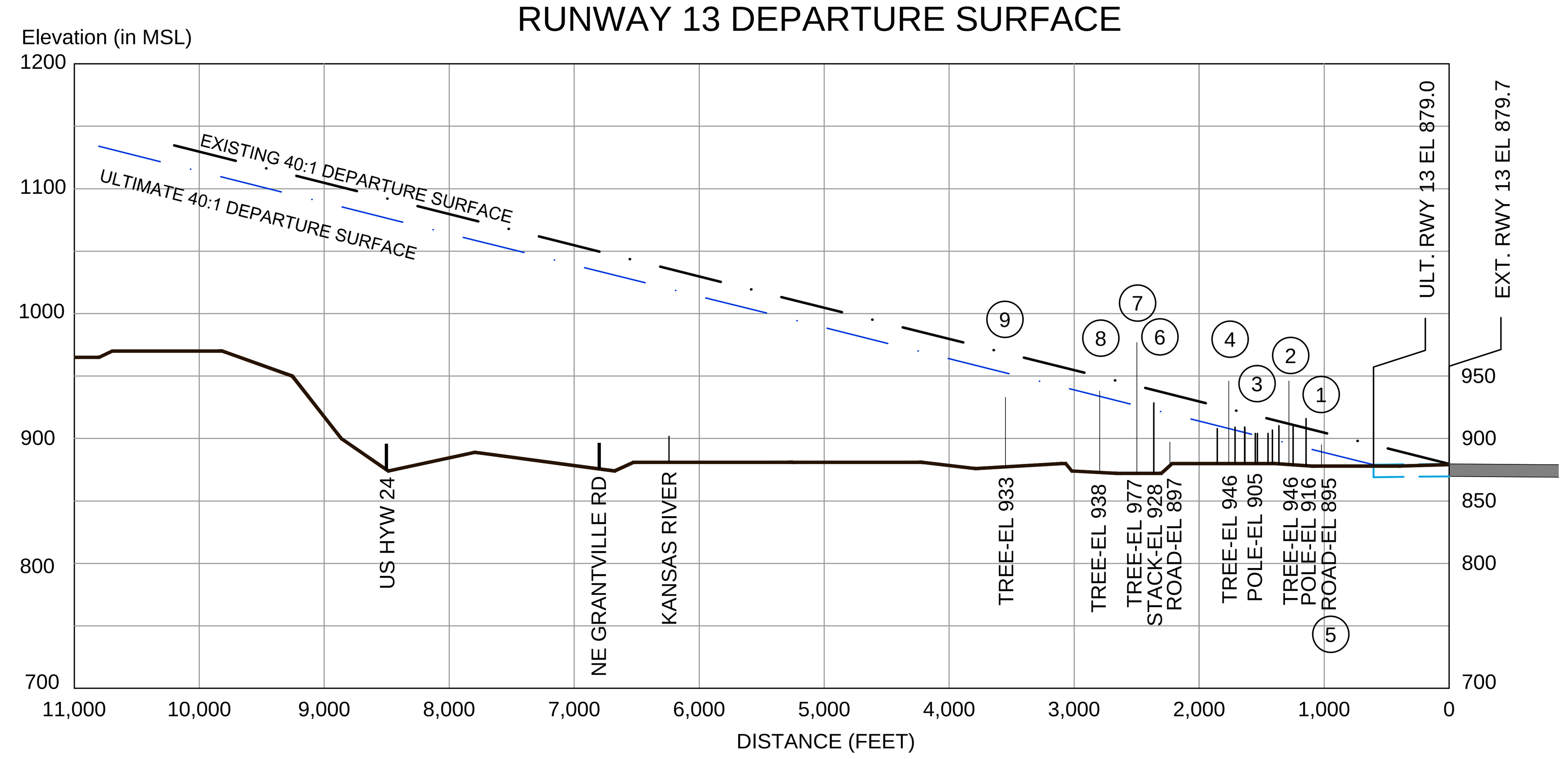
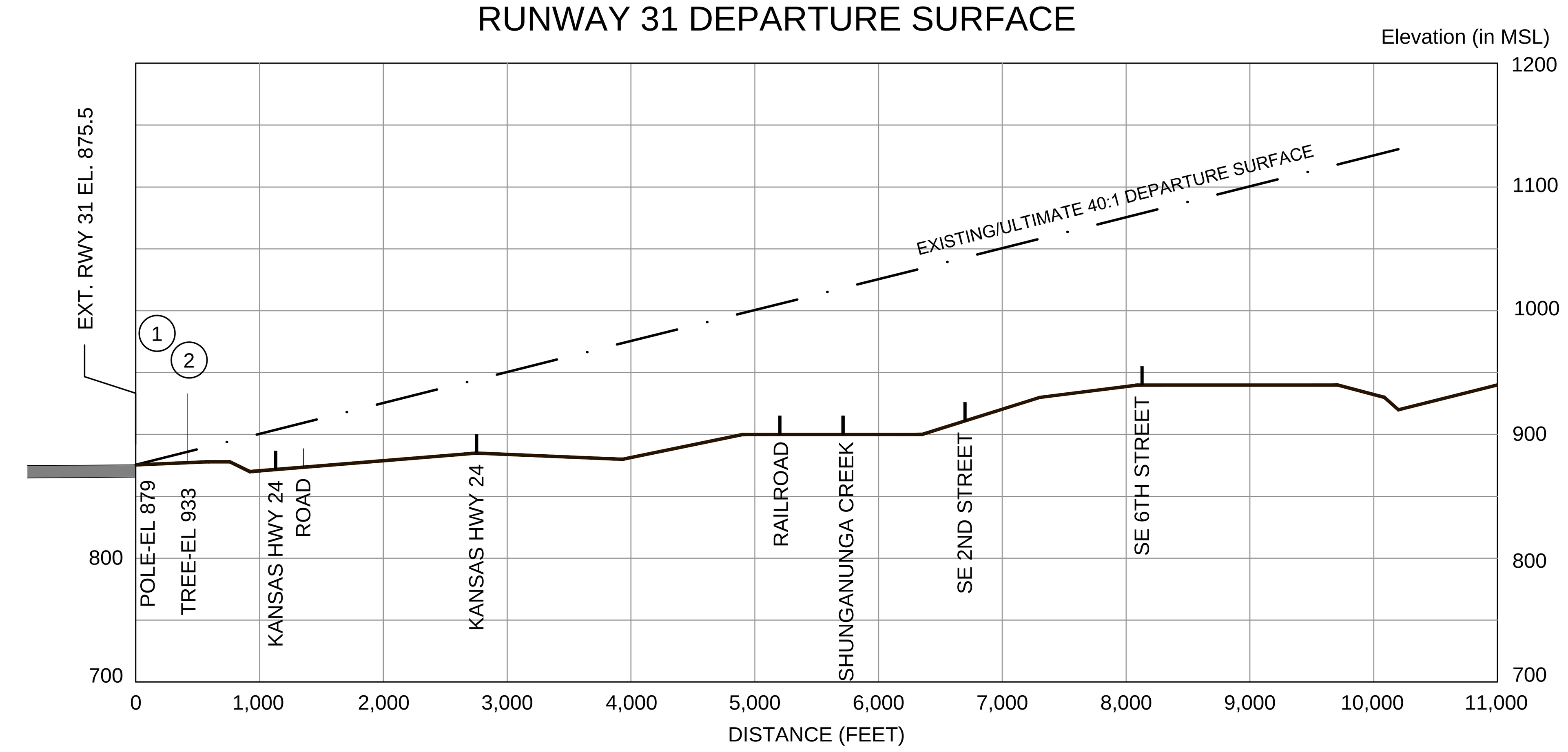
RUNWAY 13 DEPARTURE SURFACE



RUNWAY 31 DEPARTURE SURFACE



DEPARTURE SURFACE OBSTRUCTION TABLE

RUNWAY 13 OBJECT DESCRIPTION / ELEVATION	SURFACE PENETRATIONS		PROPOSED OBJECT DISPOSITION
	EXISTING 40:1	ULTIMATE 40:1	
1. POLES-EL 916	8'	23'	REMOVE / RELOCATE POLES
2. TREE-EL 946	34'	51'	REMOVE TREES
3. POLES-EL 905	0'	1'	REMOVE / RELOCATE POLES
4. TREE-EL 946	22'	38'	REMOVE TREES
5. ROAD-EL 895	0'	5'	CLOSED ROAD
6. STACK-EL 928	0'	5'	LOWER STACK/REMOVE
7. TREE-EL 977	35'	50'	REMOVE TREES
8. TREE-EL 938	0'	4'	REMOVE TREES

DEPARTURE SURFACE OBSTRUCTION TABLE

RUNWAY 31 OBJECT DESCRIPTION / ELEVATION	SURFACE PENETRATION		PROPOSED OBJECT DISPOSITION
	EXISTING 40:1	ULTIMATE 40:1	
1. POLE-EL 879	3'	3'	REMOVE / RELOCATE POLE
2. TREE-EL 933	N/A	N/A	REMOVE TREES

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt roads or private roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroad.
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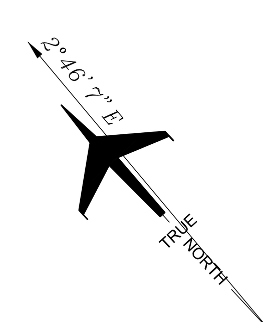
3. See AC 150/5300-13A, Paragraph 303 (c).



Magnetic Declination
2° 46' 7" E (August 2013)
Annual Rate of Change 7.7' West/Year

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
	-	-	-	-
	-	-	-	-
	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT

RUNWAY 13-31 DEPARTURE SURFACE

Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013 — Sheet 12 of 14

Coffman Associates
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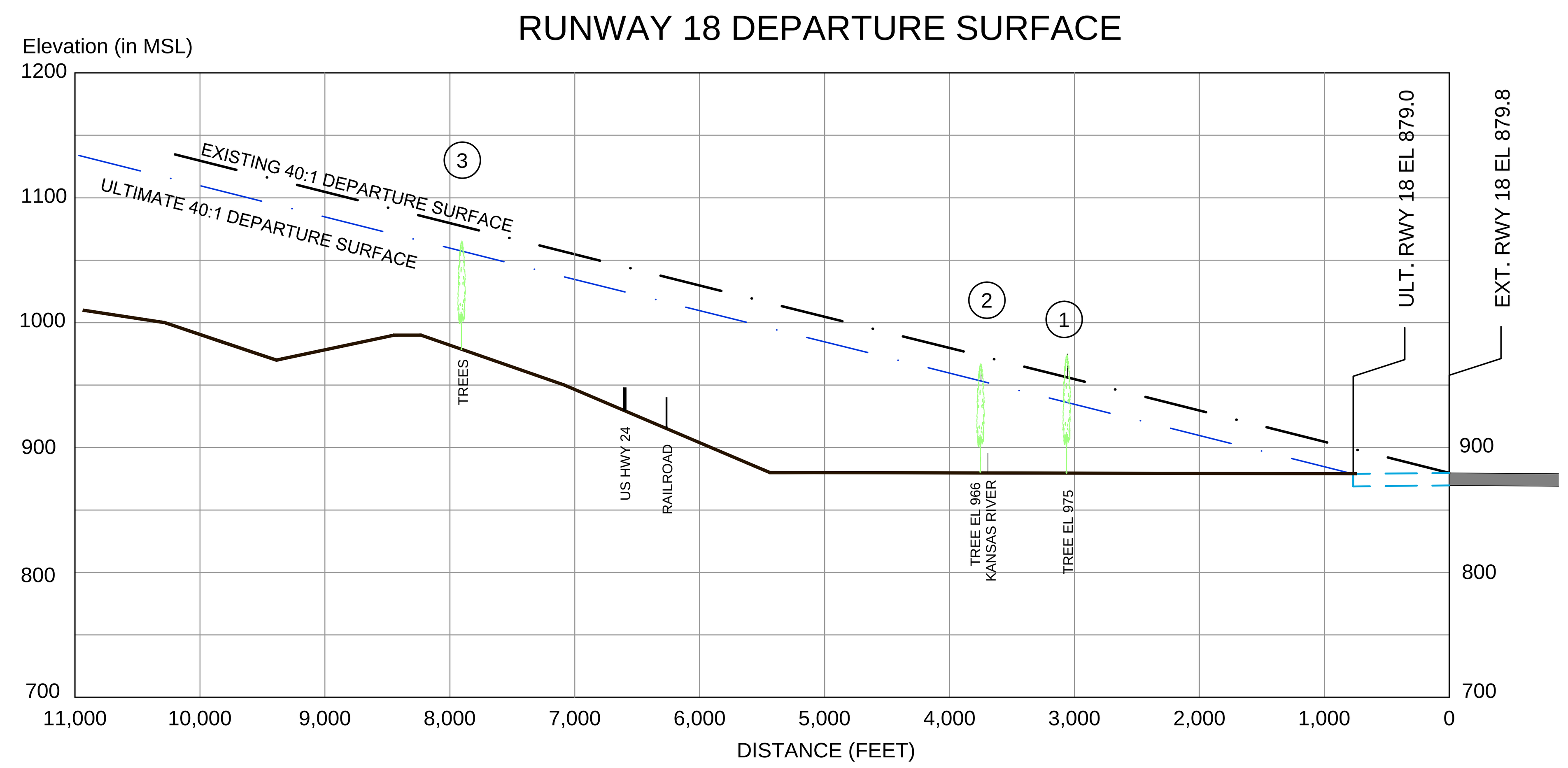

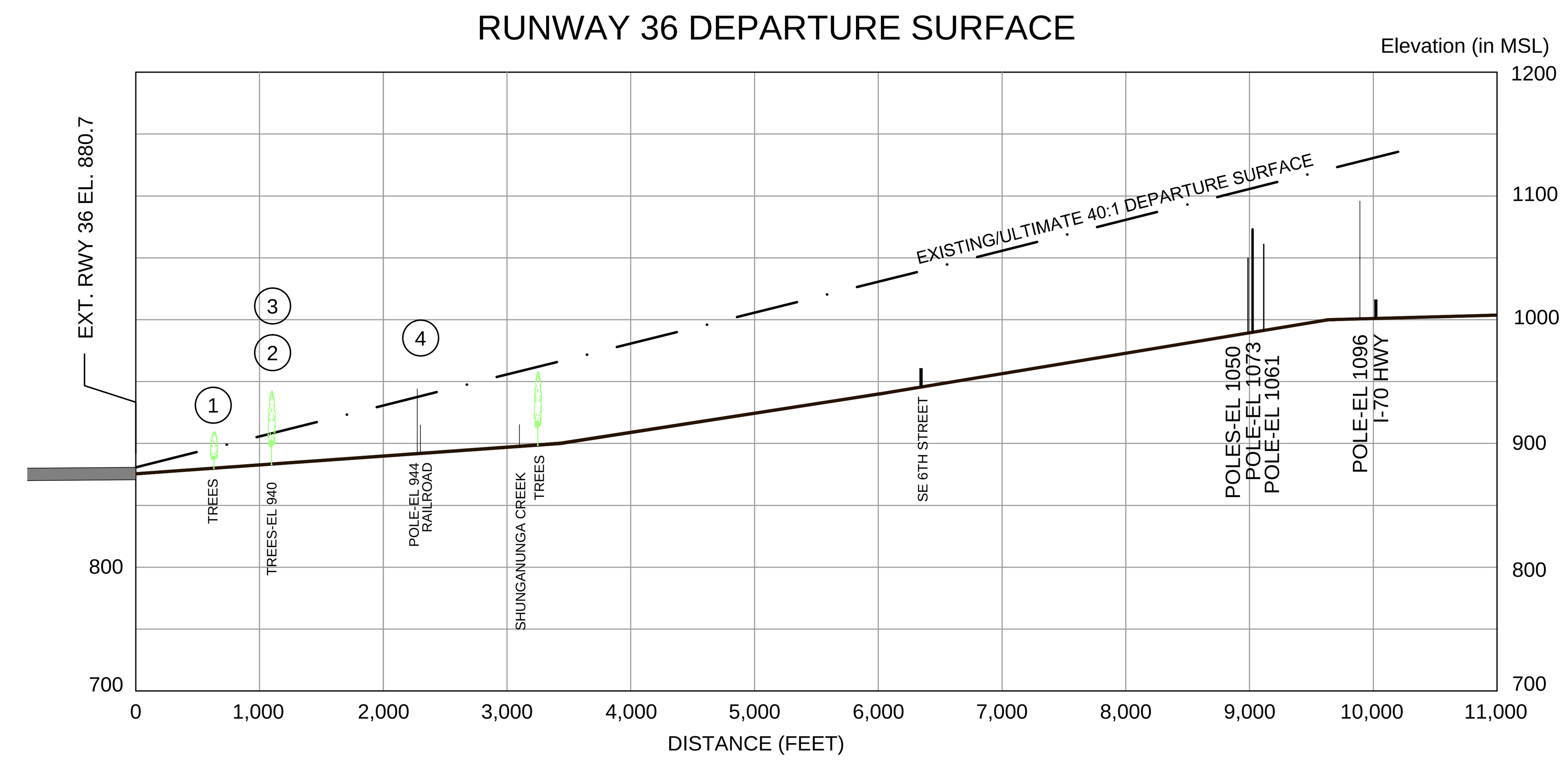

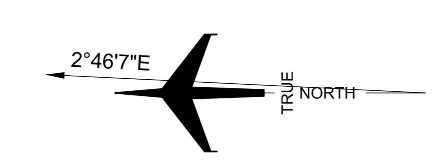

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VERTICAL SCALE IN FEET

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2. Roads and Buildings Clearance of more than 50 feet AGL are not detail in Departure Surface Profiles.
3. See AC 150/5300-13A, Paragraph 303 (c).

DEPARTURE SURFACE OBSTRUCTION TABLE

RUNWAY 18 OBJECT DESCRIPTION / ELEVATION	SURFACE PENETRATIONS		PROPOSED OBJECT DISPOSITION
	EXISTING 40:1	ULTIMATE 40:1	
1. TREES	-	-	TRIM TREES
2. TREES	-	-	TRIM TREES
3. TREES	-	-	TRIM TREES

DEPARTURE SURFACE OBSTRUCTION TABLE

RUNWAY 36 OBJECT DESCRIPTION / ELEVATION	SURFACE PENETRATIONS		PROPOSED OBJECT DISPOSITION
	EXISTING 40:1	ULTIMATE 40:1	
1. TREES	-	-	REMOVE TREES
3. TREES-EL 940	36'	SAME	REMOVE TREES
4. POLE-EL 944	6.4'	SAME	REMOVE / RELOCATE POLES

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan (Approved by FAA)	8/27/13	Coffman	1/21/14

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PHILIP BILLARD MUNICIPAL AIRPORT

RUNWAY 18-36 DEPARTURE SURFACE

Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013

ULTIMATE RUNWAY 13-31 INNER-TRANSITIONAL OFZ DRAWING

EXISTING RUNWAY 13-31 INNER-TRANSITIONAL OFZ DRAWING

Inner-Transitional OFZ Definition, Calculations AC 150/5300-13A

c. Inner-transitional OFZ. The inner-transitional OFZ is a defined volume of airspace along the sides of the runway OFZ and inner-approach OFZ. It applies only to runways with lower than 3/4-statute mile (1 200 m) approach visibility minimums.

(1) For runways serving small airplanes exclusively, the inner-transitional OFZ slopes 3 (horizontal) to 1 (vertical) out from the edges of the runway OFZ and inner-approach OFZ to a height of 150 feet (45 m) above the established airport elevation.

(2) For runways serving large airplanes, separate inner-transitional OFZ criteria apply for Category (CAT) I and CAT II/III runways.

(a) For CAT I runways, the inner-transitional OFZ begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet (45 m) above the established airport elevation.

1) In U.S. customary units,
$H_{feet} = 61 - 0.094(S_{feet}) - 0.003(E_{feet})$.

2) In SI units,
$H_{meters} = 18.4 - 0.094(S_{meters}) - 0.003(E_{meters})$.

3) S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level.

(b) For CAT II/III runways, the inner-transitional OFZ begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", then slopes 5 (horizontal) to 1 (vertical) out to a distance "Y" from runway centerline, and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet (45 m) above the established airport elevation.

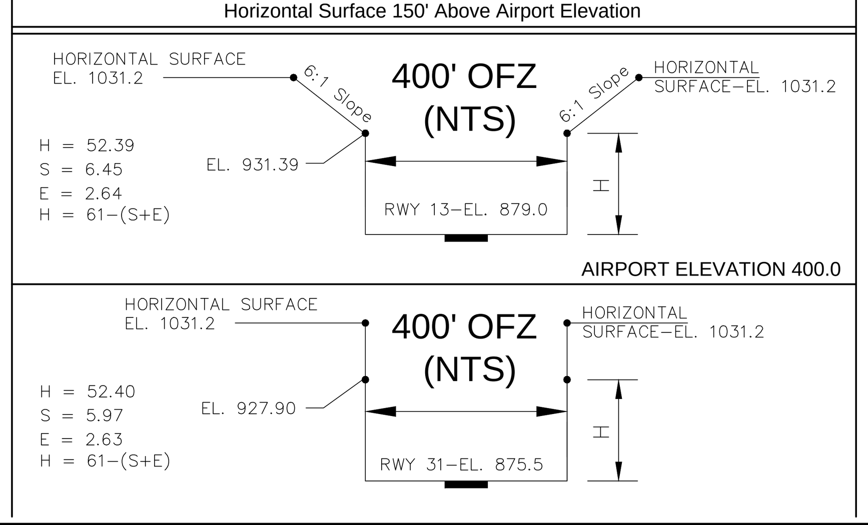
1) In U.S. customary units,
$H_{feet} = 53 - 0.13(S_{feet}) - 0.0022(E_{feet})$ and distance
$Y_{feet} = 440 + 1.08(S_{feet}) - 0.024(E_{feet})$.

2) In SI units,
$H_{meters} = 16 - 0.13(S_{meters}) - 0.0022(E_{meters})$ and distance
$Y_{meters} = 132 + 1.08(S_{meters}) - 0.024(E_{meters})$.

3) S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level. Beyond the distance "Y" from runway centerline the inner-transitional CAT II/III OFZ surface is identical to that for the CAT I OFZ.

INNER APPROACH OFZ

Horizontal Surface 150' Above Airport Elevation



OBSTACLE FREE ZONE (OFZ)

OBJECT	OFZ SURFACE	PENETRATION	DISPOSITION
-	-	-	-
- -	-	-	-

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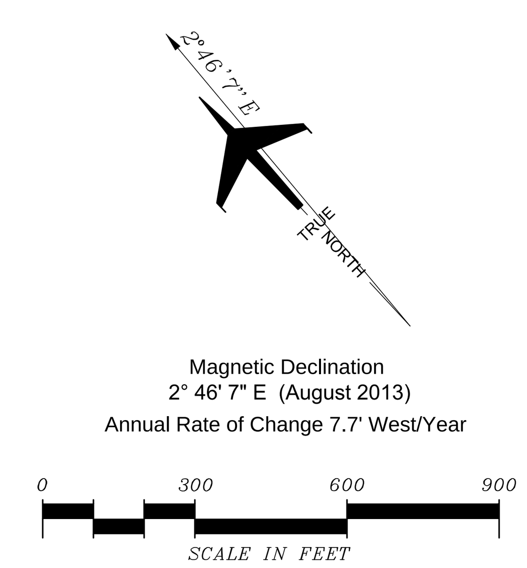

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PHILIP BILLARD MUNICIPAL AIRPORT
RUNWAY 13-31
INNER-TRANSITIONAL OFZ DRAWING
Topeka, Kansas

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

August 27, 2013

Coffman Associates
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