# Elton Hensley Memorial Airport

## Fulton, Missouri

FTT



## Airport Master Plan Update
## 2012

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# Elton Hensley Memorial Airport (FTT)

## Master Plan Update

MoDOT Project Number: 10-040A-1

*Prepared for:*

city of Fulton
Proudly Serving You

*Prepared by:*

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## MoDOT DISCLAIMER



"The airport runway is the most important main street in any town."

*- Norm Crabtree, former aviation director of Ohio(1)*

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

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# Existing Conditions

## INTRODUCTION

As the initial step in the master plan process, the existing conditions chapter is a comprehensive data collection process that provides background information regarding the airport's physical and operational characteristics. The data collected as part of this chapter provides the basis for evaluating existing facilities and subsequently determining future demand forecasts and facility needs for the Elton Hensley Memorial Airport (FTT).

Once facility needs to accommodate projected demand have been identified, the master plan seeks to provide a series of recommended airfield and terminal area layouts to ensure future airside, landside, airport property and airspace infrastructure are protected. Safeguarding these airport elements will permit the continued viability of the airport and allow necessary expansion as demand warrants throughout the 20-year master plan period.

To ensure environmental compatibility with proposed expansion and development alternatives, the master plan will document a Federal, state and local coordination process highlighting potential environmental impacts associated with airport expansion. The key is to minimize significant impacts to the environment throughout the planning process.

The latter elements of the master plan process include the formulation of the airport's future development plan, or Capital Improvement Program (CIP). The CIP will be developed based on airfield and terminal area facility requirements necessary to accommodate projected demand. The CIP is a comprehensive list of prioritized projects and associated costs meant to provide the city with a strategic plan to expand the airport in an orderly, timely and feasible manner. The CIP not only includes the project costs, but funding sources and recommended practices to administer fees rates and charges, as well as maximize revenues and reduce expenditures associated with airport operation.

The centerpiece of the master plan is the completion of the airport layout plan (ALP) which will be updated during the latter stages of the master plan. The ALP is a set of scaled drawings which depicts the current and proposed facility expansion necessary to safely and efficiently accommodate projected aviation demand. The ALP will illustrate existing and ultimate airfield and terminal area facilities and proposed layouts, property interests, land use and airspace improvements.

More that just a strategic plan for future expansion, the master plan plays an important role for the city in the following ways:

*Educational Process*
The airport master plan is intended to educate Federal and state aviation agencies, city leaders and citizens about the benefits and importance of the Airport to the local community.

*Promotional Process*
The master plan is intended to assist the city with attracting businesses and additional users to the Airport by promoting the services offered at the Airport that benefit airport users and the community.

*Preserve Airport Infrastructure*
The master plan identifies future facility needs to ensure that airside, landside, airspace and support facilities can be feasibly developed as demand warrants.

*Improve Airport Facilities*
The master plan identifies ultimate facility needs to accommodate current and future users, as well as safely and efficiently provide facilities that can serve a wide array of aircraft.

Lastly, the master plan update is and will be conducted in accordance with FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*.

## FACILITY INFORMATION

**Airport Location**
FTT is situated on nearly 424 acres located approximately three miles southwest of the central business district of the City of Fulton, Callaway County, MO. The main access route to/from the airport is via County Road 304 which connects the facility with Missouri Highway F as well as U.S. Highway 54 both situated to the east of the airport. Exhibit 1.1 illustrates the general location of FTT.

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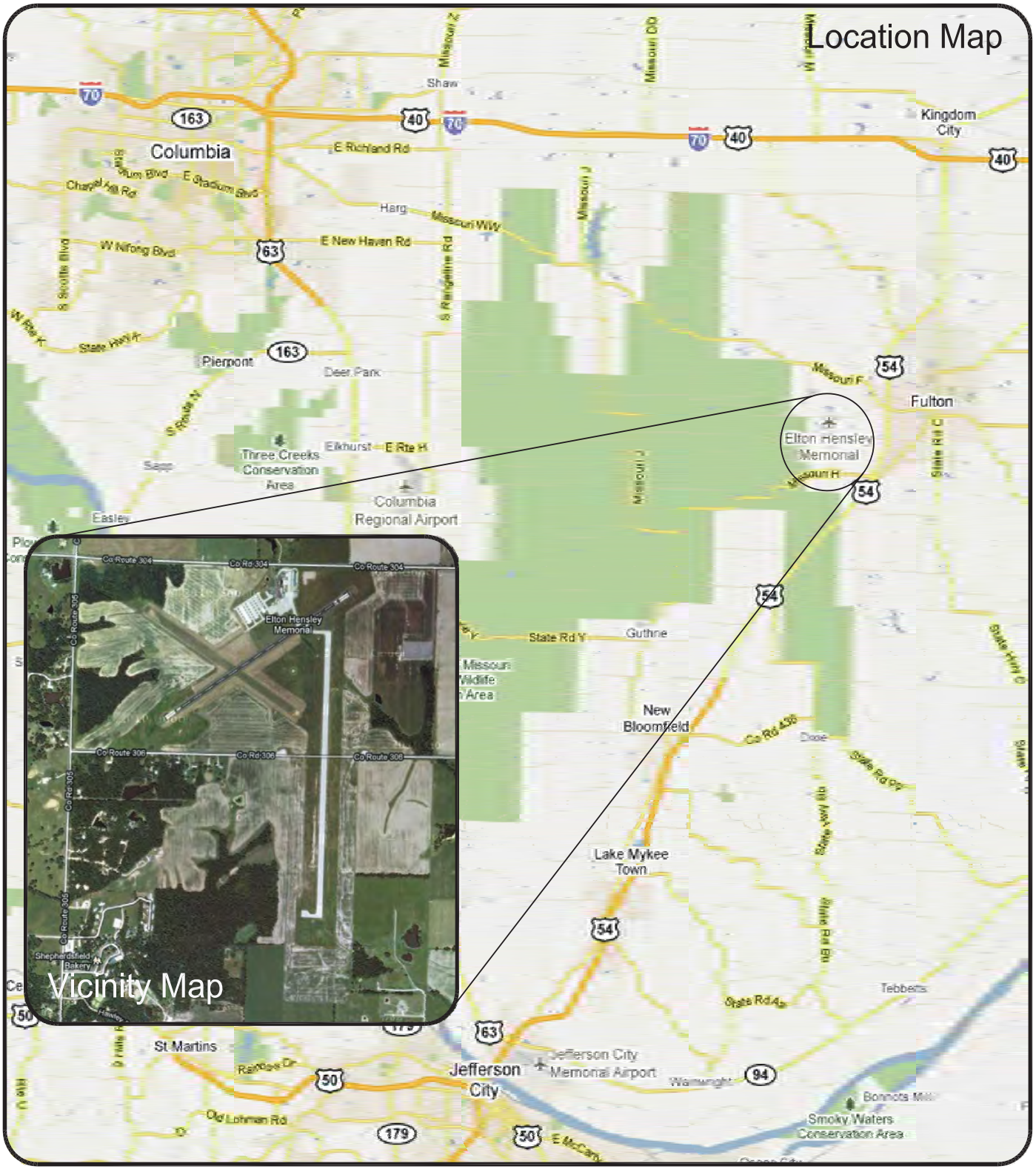
# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 1.1

**Location & Vicinity Maps**




*Source:* www.googlemaps.com

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

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**Airport Role**

FTT is a National Plan of Integrated Airport Systems (NPIAS) airport. FTT is classified within the NPIAS and the Missouri State Airport System Plan (MoSASP) as a General Aviation facility. FTT's current runway length allows the airport to accommodate 100 percent of the general aviation fleet of small aircraft with a maximum takeoff weight of 12,500 pounds or less which is intended to serve a relatively large population base remote from a metropolitan area.

The MoSASP system role of FTT has been identified as one of 35 Business airports in the state. MoSASP Business airports provide aviation access for small business, recreational and personal flying activities throughout the state. These airports help to support the local economy and are located throughout the state to serve local business needs and to provide a direct link with the state's transportation infrastructure. Business airports are also capable of accommodating 100 percent of transient general aviation users typically operating aircraft weighing less than 12,500 pounds.

**Ownership and Management**

FTT is a public owned, public use facility that is owned and operated by the City of Fulton which is governed by a mayor and eight-member council. The city administers the airport through the appointment of a seven-member Airport Advisory Board by the mayor with city council approval. The Airport Board also includes a president and city council liaison. The city employs a full-time airport manager who coordinates and directs administrative and contractual functions including preparation of an annual budget, coordination of capital improvement projects, lease negotiations and agreements as well as public relations.

**On-Airport Businesses**

Currently, there is one business based at FTT that provides aviation-related goods and services and conducts regular operational activity.

*Fulton Flying Service, Inc.*

Fixed based operation (FBO) services at FTT include 100LL fueling service, hangar rental, tie-downs, aircraft rental and charter, basic and advanced fixed-wing flight instruction, pilot supplies, standardized testing center, covered overnight aircraft storage, public telephone and restroom, vending, courtesy car transportation and computer weather/flight planning service. The FBO employs two full-time employees including the airport manager and an assistant who are responsible for line-service, management, airport maintenance and operations. The FBO also employs a third part-time employee who serves the airport in an administrative capacity. In the future, Fulton Flying Service will also concentrate on providing major airframe and powerplant maintenance for piston aircraft, as well as general aviation parts and supplies.

**Services and Operating Conditions**
FTT is attended continuously throughout the year from 8:00 a.m. to dusk. In addition to those already mentioned, services and activities at FTT include air ambulance, transient corporate, state agency and aircraft maintenance flight operations.

**Historic Development**
FTT was constructed during the late 1930s as a Federal Works Progress Administration development project. The original airport consisted of 320 acres and three 2,000' x 300' turf runways including a north-south, northeast-southwest and an east-west runway.

From 1940 to 1949, the airport experienced sustained growth including the improvement of the northeast-southwest runway, designated 6-24, and the southeast-northwest runway, designated 12-30 to 2,600' x 125' and 1,500' x 75', respectively. The third 2,600' x 180' east-west runway was abandoned during this period. Additional improvements that took place during this period included the installation of fuel facilities and hangar development.

The 1960s represented a new era for the airport which included extensive expansion of the facility punctuated by the completion of FTT's first master plan and airport layout plan (ALP) in 1962. The previous year included the construction of three new hangars. From 1963 to 1965 Runway 6-24 was paved and expanded to 3,200' x 47'. Additional improvements during this period included construction of an aircraft parking apron; easement acquisition; taxiway improvements including construction of aircraft turnarounds at each runway end; installation of airfield lighting; installation of an airport beacon and lighted wind cone; and grading and drainage improvements. Then, in 1966, the airport's 960 square foot terminal building was constructed, followed in 1968 by improvements to the aircraft apron, auto parking and airport access road.

The airport experienced measured improvements during the 1970s including installation of perimeter fencing; upgrades to the airfield lighting and rotating bacon; installation of visual approach aids for Runway 6-24; and establishment of instrument approach procedures to the airport.

In 1982-83, the airport's master plan and ALP were updated and an environmental assessment (EA) for continued expansion was completed. In 1987, the city purchased 40 acres of property to accommodate the future construction of a new paved primary north-south runway, later designated 18-36. In 1989, the city also purchased seven acres of avigation easement for land use compatibility to the northeast of the airport.

The 1990s experienced a period of mainly maintenance–based improvements and little capital development. However, in 2001-02 the city purchased nearly 42 acres of property to allow for the imminent construction of Runway 18-36. In 2003, Runway 18-36, measuring

*Runway 18 Threshold (Looking S)*

*Runway 36 Threshold (Looking N)*

*Runway 6 Threshold (Looking NE)*

*Runway 24 Threshold (Looking SW)*

4,000' x 75', was constructed. Finally, in 2006-07, the city purchased an additional 10 acres to the southwest of the airport.

## AIRFIELD FACILITIES

FTT's airfield facilities include runways, taxiways, airfield lighting, weather reporting systems, navigational aids (NAVAIDs), visual approach aids and instrument approach procedures. Exhibit 1.2 illustrates the airfield facilities and layout for FTT.

**Runways**

FTT's airfield layout consists of two paved runways situated in an open-V configuration. The two runways, designated 18-36 and 6-24, are aligned in a north-south and northeast-southwest orientation, respectively. FTT is also served by a turf runway, designated 12-30, situated in a northwest-southeast orientation.

Runway 18-36 is a 4,000' x 75' Portland Cement Concrete (PCC) runway and has a weight bearing capacity of 30,000 pounds to accommodate single wheel gear (SWG) aircraft. Runway 18-36 is equipped with non-precision runway markings and currently accommodates straight-in WAAS-capable(1) RNAV/GPS(2) approaches utilizing LNAV/VNAV(3), LPV(4) procedures to the Runway 18 and 36 thresholds.

Runway 6-24 is a 3,203'x 47' asphalt runway and has a weight bearing capacity of 30,000 pounds to accommodate SWG aircraft. Runway 6-24 is also equipped with non-precision markings and currently accommodates straight-in WAAS-capable RNAV/GPS approaches utilizing LNAV(5) procedures to both thresholds. Lastly, Runway 12-30 is a 2,488' x 100' turf runway equipped with basic turf runway markings.

1. WAAS- Wide Area Augmentation System
2. RNAV- Area Navigation; GPS-Global Positioning System is a space-based global navigation satellite system that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. It is maintained by the United States government and is freely accessible by anyone with a GPS receiver.
3. LNAV/VNAV- Lateral Navigation/Vertical Navigation approaches use lateral guidance from GPS and/or WAAS and vertical guidance provided by either the barometric altimeter or WAAS. Aircraft that don't use WAAS for the vertical guidance portion must have VNAV-capable altimeters, which are typically part of a flight management system (FMS). When the pilot flies an LNAV/VNAV approach lateral and vertical guidance is provided to fly a controlled descent to the runway. The decision altitudes on these approaches are usually 350 feet above the runway.
4. LPV- Localizer Performance with Vertical guidance is similar to LNAV/VNAV (Vertical Navigation) except it is much more precise and enables descent to 200-250 feet above the runway and can only be flown with a WAAS receiver.
5. LNAV- Lateral Navigation; On an LNAV approach, the pilot flies the final approach lateral course, but does not receive vertical guidance for a controlled descent to the runway. Typically, LNAV procedures achieve a minimum descent altitude of 400 feet height above the runway.

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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 1.2

**Airfield Facilities and Airport Layout**


*Source:* Woolpert, Inc., aerial photo.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

**Legend**

Existing Property Line -

Existing Avigation Easement -

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*Runway 18 Access Taxiway/ Runway 6-24 Intersection*

*Runway 18-36 Threshold Lights and REILs*

*Runway 18-36 PAPI-4Ls*

**Taxiways**

FTT's taxiway system consists of a 40 foot wide concrete connector taxiway which provides direct access between the aircraft apron and Runway 6-24. The taxiway system also includes one additional access taxiway at the Runway 18 threshold providing direct access to Runway 6-24 and the aircraft apron. The Runway 36 threshold is also equipped with an aircraft turnaround to accommodate airplanes departing from 36. The Runway 6-24 connector taxiway has a weight bearing capacity of 30,000 pounds SWG while the access taxiway serving 18-36 has a pavement strength of 30,000 pounds to accommodate SWG aircraft.

**Airfield Lighting**

Runways 18-36 and 6-24 are equipped with pilot controlled, white, stake mounted, medium intensity runway lighting (MIRL), red and green omnidirectional threshold lights, as well as runway end indicator lighting (REIL) for rapid identification of the thresholds during night and inclement weather conditions. Lastly, the taxiway system is equipped with blue, stake-mounted, medium intensity taxiway lighting (MITL).

**Weather Reporting System**

FTT is not currently served by an automated weather observing system (AWOS-III) which is a suite of sensors which measure, collect and disseminate weather data to help meteorologists, pilots and flight dispatchers prepare and monitor weather forecasts, plan flight routes, and provide necessary information for aircraft takeoffs and landings. However, the National Weather Service (NWS) Forecast Office located in St. Louis operates the WXL-45 Columbia, MO (Callaway County), weather transmitter broadcast at 162.400 MHz. The NWS facility is located on airport property and situated 730 feet northwest of the terminal building.

**NAVAIDs/Communications**

NAVAIDs are classified as either an en route or terminal area facility. En route NAVAIDs provide point-to-point navigational services within the en route airspace environment while a terminal area NAVAID is one which provides direct navigation to/from an airport. The nearest en route NAVAIDs to FTT are the COLUMBIA VOR-DME([6]) which is located approximately 10 nautical miles (NM) west of the airport, as well as the HALLSVILLE VORTAC([7]) station located approximately 18 NM north-northwest.

6. A VOR-DME and VOR are very high frequency omnidirectional radio range (VOR) facilities with distance measuring equipment (DME) in which the ground-based NAVAID transmits very high frequency (VHF) signals 360 degrees oriented from magnetic north, allowing aircraft to track to and from the facility, located on or near an airport. The VOR-DME's broadcast range is typically 200 nautical miles and is restricted by line-of-sight (VHF signals do not follow the curvature of the earth), and periodically identifies itself by Morse code, while some facilities are equipped with a voice identification feature.
7. A VORTAC is a very high frequency omnidirectional radio range facility with tactical air navigation (TACAN) in which the ground-based NAVAID transmits very high frequency (VHF) signals 360 degrees oriented from magnetic north, allowing aircraft to track to and from the facility, located on or near an airport. The VORTAC broadcast range is typically 200 nautical miles and is restricted by line-of-sight (VHF signals do not follow the curvature of the earth), and periodically identifies itself by Morse code while some facilities are equipped with a voice identification feature.

Another en route and more prevalent terminal area NAVAID is GPS. GPS is a highly accurate worldwide satellite navigational system that is unaffected by weather and provides point-to-point navigation by encoding transmissions from multiple satellites and ground-based datalink stations using an airborne receiver. GPS currently supports the published straight-in RNAV(GPS) instrument approach procedures to Runways 18-36 and 6-24.

### Visual Approach Aids

Visual approach aids assist aircraft on final approach by providing vertical situational awareness in relation to the runway threshold. Runway 18-36 is equipped with the precision approach path indicator (PAPI-4L)([8]) system. Runway 6-24 is equipped with the simplified abbreviated visual approach slope indicator (SAVASI-2L)([9]) system.

### Instrument Approach Procedures (IAP)

Table 1.1 discloses information regarding the published IAPs in place at FTT. IAPs permit operations during instrument meteorological conditions and further increase access, capacity, and overall safety and efficiency of the airport.

Table 1.1
Published IAPs

| Runway End | Approach | Approach Minimums/Category | Minimum Descent Altitude (MDA) |
|---|---|---|---|
| RNAV(GPS) RWY 18 | LPV DA | 1-mile (A, B & C); n/a (D) | 1,155' MSL/274' AGL |
| | LNAV/VNAV DA | 1½-mile (A, B & C); n/a (D) | 1,313' MSL/432' AGL |
| | LNAV MDA | 1-mile (A & B); 1¾-mile (C), n/a (D) | 1,520' MSL/639' AGL |
| | Circling | 1-mile (A & B); 1¾-mile (C), n/a (D) | 1,200' MSL/634' AGL |
| RNAV(GPS) RWY 36 | LPV DA | 1-mile (A, B & C); n/a (D) | 1,155' MSL/274' AGL |
| | LNAV/VNAV DA | 1½-mile (A, B & C); n/a (D) | 1,283' MSL/402' AGL |
| | LNAV MDA | 1-mile (A, B & C); n/a (D) | 1,280' MSL/399' AGL |
| | Circling | 1-mile (A & B); 1½-mile (C), n/a (D) | 1,380' MSL/494' AGL |
| RNAV(GPS) RWY 6 | LNAV MDA | 1-mile (A & B); 1¼-mile (C), n/a (D) | 1,300' MSL/419' AGL |
| | Circling | 1-mile (A & B); 1½-mile (C), n/a (D) | 1,380' MSL/494' AGL |
| RNAV(GPS) RWY 24 | LNAV MDA | 1-mile (A & B); 1¼-mile (C), n/a (D) | 1,320' MSL/439' AGL |
| | Circling | 1-mile (A & B); 1½-mile (C), n/a (D) | 1,380' MSL/494' AGL |
| VOR-A | Circling | 1-mile (A & B), 1¾-mile (C), n/a (D) | 1,520' MSL/634' AGL |

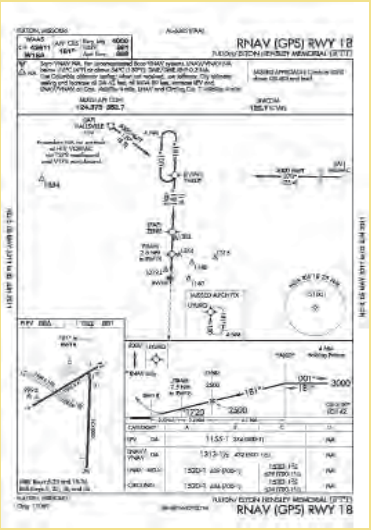
Source: U.S. Terminal Procedures- North Central (NC-3).

*Runway 6-24 SAVASI-2Ls*

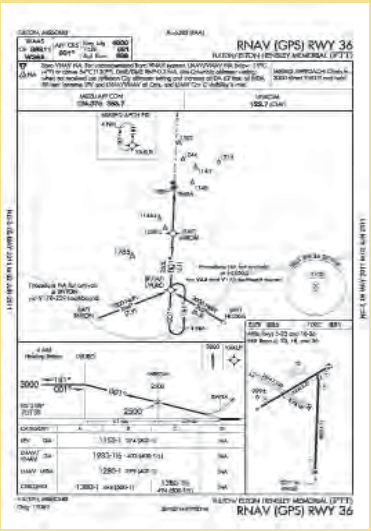

*Runway 6-24 Signage*

*Turf Runway 12-30 (Looking NW from 18-36)*

8. The PAPI-4L is a system of four light boxes located on the side of the runway that provides visual descent guidance information during the approach to a runway. These lights are visible from 3-5 miles during the day and up to 20 miles or more at night. Each set of lights are designed so that when viewing it from above a specific angle, it shows white lights and below that angle red lights. If flight crews see two white and two red indications, then the aircraft is on the glide slope. If each of the four lamps are white, it means the aircraft is too high and four red lights indicates the aircraft is below glidepath.
9. The SAVASI-2 system consists of two light boxes with a single lamp in each box and functions in a similar way that the PAPI system provides approach guidance to the runway. This system is designed for non jet, utility runways and provides descent information under daytime conditions to a distance of 1.5 NM.




*Runway 18 RNAV(GPS) Approach Chart*




*Runway 36 RNAV(GPS) Approach Chart*

## Airfield Facilities Summary

Table 1.2 highlight the pertinent airfield facilities and equipment at FTT.

Table 1.2
Airfield Facilities Summary

| Airfield Item | Physical Description |
|---|---|
| **Runway 18-36** | |
| Runway Dimensions | 4,000 x 75’ |
| Runway Surface | Concrete |
| Pavement Strength | 30,000 lbs. SWG |
| True Runway Bearing | 1.9° true bearing |
| Pavement Markings | Non-Precision |
| Approach Slope Surfaces | 20:1 |
| Runway Lighting | MIRL/Threshold Lighting/REIL |
| Visual Approach Aids | PAPI-4L |
| **Runway 6-24** | |
| Runway Dimensions | 3,203’ x 47’ |
| Runway Surface | Asphalt |
| Pavement Strength | 30,000 lbs. SWG |
| True Runway Bearing | 57.1° true bearing |
| Pavement Markings | Non-Precision |
| Approach Slope Surfaces | 20:1 |
| Runway Lighting | MIRL/Threshold Lighting/REIL |
| Visual Approach Aids | SAVASI-2L |
| **Runway 12-30** | |
| Runway Dimensions | 2,488’ x 100’ |
| Runway Surface | Turf |
| Pavement Strength | N/A |
| True Runway Bearing | 303.6° true bearing |
| Pavement Markings | N/A |
| Approach Slope Surfaces | 20:1 |
| Runway Lighting | None |
| Visual Approach Aids | None |
| **Taxiway System** | |
| Runway 6-24 Connector Taxiway | PCC; MITL; 30,000 lbs. SWG |
| Runway 18 Access Taxiway | PCC; MITL; 30,000 lbs. SWG |
| **Other Airfield Items** | |
| Weather Reporting System | N/A; NWS Transmitter—WXL-45 (162.400MHz) |
| Lighted Wind Cone & Segmented Circle | Located 755 feet SW of Runway 18 Threshold |

Source: Lochner; FTT Site Visit.

## TERMINAL AREA FACILITIES

FTT's terminal area facilities include the terminal building, auto parking, T-hangars, clear span hangars, aircraft apron areas and tie-downs. Exhibit 1.3 illustrates the terminal area facilities and layout.

### Terminal Building

The terminal building consists of a 900 square foot structure located immediately north of and adjacent to the aircraft apron and accommodates local airport patrons, transient pilots and passengers. This 30' x 30' structure provides space for administrative offices, as well as amenities for local and transient users including flight planning facilities, public restrooms and departure lounge area.

### Auto Parking

The auto parking facilities include an 18,100 square foot gravel and asphalt parking area located immediately adjacent to the terminal building and accommodates approximately 24 parking spaces.

### Aircraft Hangars

Table 1.3 identifies FTT's aircraft hangars by size (square footage), type and capacity. Presently, the total available hangar area is estimated to be nearly 66,100 square feet and capable of hosting 49 based aircraft which includes 40 enclosed T-hangar units and six clear span hangars.

Table 1.3
Hangar Facilities Summary

| Hangar Designation | Building Size (Sq. Ft.) | Hangar Type | Ownership |
|---|---|---|---|
| Nos. 1 thru 7 | 7,000 | T-hangar | City |
| No. 8 | 3,800 | Clear Span | Land Lease |
| No. 9 | 3,000 | Clear Span | Land Lease |
| No. 10 | 2,500 | Clear Span | Land Lease |
| Nos. 11 and 12 | 3,400 | Clear Span | Land Lease |
| No. 13 | 2,100 | Clear Span | Land Lease |
| Nos. 14 thru 22 | 13,100 | T-hangar | City |
| No. 23 | 2,400 | Clear Span (Maintenance) | City |
| Nos. 24 thru 35 | 14,400 | T-hangar | City |
| Nos. 36 thru 47 | 14,400 | T-hangar | City |
| Total Hangar Accommodations | 66,100 | | |

Note: Square footage and hangar dimensions are estimated figures based on on-site inspection and measurement and are rounded to the nearest thousand for planning purposes.

Source: Fulton Flying Service; FTT Site Visit.

*Terminal Building (Airside)*

*Leased Hangars (No. 10-13)*

*City-Owned T-Hangars (No. 14-47)*

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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 1.3

**Terminal Area Facilities and Layout**


*Source:* Woolpert, Inc., aerial photo.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

Legend
Existing Property Line -

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### Aircraft Apron

The aircraft apron occupies approximately 4,900 square yards (44,100 square feet) of paved area, is comprised of a concrete surface, hosts seven tie-downs and has a weight bearing capacity of 12,500 lbs. SWG.

*Aircraft Apron (Looking NNE)*

## SUPPORT FACILITIES

The airport's support facilities include the fuel storage and aircraft maintenance service providers.

### Fuel Farm

Fueling operations are conducted via a 24-hour fuel pump/meter and fuel farm facility located on the northwestern portion of the aircraft apron. FTT's fuel storage capability includes a total of 12,000 gallons of 100LL. The airport's fuel storage tank is situated aboveground and equipped with spill containment systems. Table 1.4 identifies the airport's fuel storage capabilities and facilities.

*Fuel Farm, Card Reader and Pump Island*

Table 1.4
Fuel Farm Facilities Summary

| Fuel Type | Storage Capacity (Gal.) | Number of Tanks | Containment |
|---|---|---|---|
| 100LL | 12,000 | One | Aboveground-Contained |
| Total Storage Capacity | 12,000 | | |

Source: FTT Site Visit.

*Maintenance Hangar (No. 23)*

### Aircraft Maintenance

Airframe and powerplant maintenance for single and twin-piston aircraft are currently not offered at FTT. However, the FBO service provider, Fulton Flying Service, intends to provide airframe and powerplant maintenance for piston aircraft and general aviation parts and supplies in the future.

## INTERMODAL ACCESS

The intermodal transportation network in the vicinity of FTT includes local interstates, U.S. highways, state highways, as well as county routes and local roads.

### Interstates

I-70 is located approximately eight miles north of FTT and is the primary east-west interstate route through Missouri and links Fulton with Columbia and Kansas City located 21 miles and 142 mile to the west, respectively, as well as St. Louis located approximately 95 miles to the east.

**U.S. Highways**
U.S. Highway 54 is located approximately 1.75 miles east of the airport and serves as the major north-south access route through Callaway County linking Fulton to Mexico, MO, to the north and Jefferson City to the south.

**State Highways**
Missouri Highway F is located approximately 1.5 miles east of the airport and provides direct access between Fulton and rural communities to the northwest of the city. MO Highway F also links the city to Columbia located within Boone County. Missouri Highway H, located immediately south of the airport, links the city with rural communities to the south and west.

**County Routes and Local Roadways**
FTT is accessed via County Road 304, located immediately north of the airport, which connects the facility with MO Highway F/Martin Luther King, Jr. Blvd. as well as U.S. Highway 54, both situated east of the airport. Additionally, County Road 306 is immediately south of the airport while County Road 305 borders the airport to the west.

## LOCAL AIRPORTS AND AIRSPACE CHARACTERISTICS

The airspace characteristics evaluation for FTT will include an assessment of local area airports, airspace classifications, charted airways and special use airspace.

**Local Airports**
Exhibit 1.4 illustrates the airspace structure surrounding FTT and public airports located within a 25 NM radius of the airport. Private airports located within five NM of Fulton are also identified. Table 1.5 lists local airports including information regarding each facility's physical characteristics and facilities, Federal and state role, as well as distance and direction from the facility. Currently, there are five publicly owned facilities and one privately owned airports located within the airport's 25 NM service area.

**Airspace Classifications([10])**
The airspace above FTT is classified as controlled Class E Airspace. Exhibit 1.5 also depicts the Class E airspace in the vicinity of the airport.

10. Class E airspace extends upward from either the surface or a designated altitude, which in this case is down to the surface five NM from the airport and 700 feet above ground level (AGL) 10 NM from the facility, to the overlying or adjacent controlled airspace (Class G). Class E airspace is also the airspace used by aircraft transitioning to and from the terminal or en route environment normally beginning at 14,500 feet to 18,000 feet. Class E airspace ensures IFR aircraft remain in controlled airspace when approaching airports without Class D airspace or when flying on Victor airways--federal airways that are below 18,000 feet. Class E airspace exists everywhere from 1,200 feet above mean sea level (AMSL) up to 18,000 feet MSL. Aircrew are not required to be in contact with air traffic control (ATC) services and are recommended to follow traffic advisory practices while maintaining an aircraft speed of 250 knots or less when operating below 10,000 feet MSL.

Table 1.5
Local Airports

| Airport Name, Associated City | Primary Runway Characteristics | NPIAS Role | MoSASP Role | Distance / Direction from FTT |
|---|---|---|---|---|
| Elton Hensley Memorial (FTT), Fulton | 18-36: 4,000' x 75' | GA | Business | - |
| Columbia Regional (COU), Columbia | 2-20: 6,501' x 150' | CS | Commercial | 10 WSW |
| Jefferson City Memorial (JEF), Jeff. City | 12-30: 6,001' x 100' | GA | Commercial | 15 SSW |
| Mexico Memorial (MYJ), Mexico | 6-24: 5,501' x 100' | GA | Regional | 21 NNE |
| Linn State Technical College (1H3), Linn | 9-27: 3,400' x 60' | GA | Community | 23 SSE |
| Hermann Municipal (63M), Hermann | 7-25: 3,198' x 50' | N/A | Community | 25 ESE |
| Sky-Go Farms (Private) | 1,800'-Turf | N/A | N/A | 4 NNE |

GA- General Aviation
CS- Commercial Service
NPIAS- National Plan of Integrated Airport Systems; N/A indicates non-NPIAS facility
MoSASP- Missouri State Airport System Plan

Source: NOAA/FAA Kansas City Sectional Aeronautical Chart.

### Charted Airways([11])

Exhibit 1.4 depicts the 155° radial, Victor Airway V175, off the HALLSVILLE VORTAC and the 093° radial, Victor Airway V12, off the COLUMBIA VOR-DME, situated directly above FTT's Class E airspace surfaces from the north and west to the south and east, respectively. The STITH intersection is located approximately two NM south-southeast of the airport. Additionally, the 177° radial, Victor Airway V239, off the HALLSVILLE VORTAC, is situated in a north-south orientation and located approximately seven NM west of the facility.

### Special Use Airspace([12])

As depicted in Exhibit 1.4, FTT is located approximately 30 NM northeast of the TRUMAN MOA complex, in particular the TRUMAN A and B MOA. The TRUMAN MOA is comprised of three sectors, A, B and C. Primarily utilized by Whiteman Air Force Base, located in Knob Noster, the TRUMAN MOA's controlling ATC agency is the Kansas City Air Route Traffic Control Center (ARTCC-ZKC) located in Olathe, Kansas, while WHITEMAN APPROACH typically routes air traffic through and around the MOA.

11. Established air routes, also known as Victor Airways, are charted and published routes linking VOR/VOR-DME/VORTAC stations throughout the contiguous United States. Victor Airways are low level (below 18,000 feet AMSL- Flight Level (FL) 180) Class E airspace corridors which are approximately 10 NM wide and whose airspace begins at 1,200 feet AMSL and extends up to but not including FL 180 (17,999 feet AMSL).
12. A Military Operations Areas (MOA) is established outside of Class A airspace to separate or segregate certain non-hazardous military activities from IFR traffic and to identify VFR traffic where these activities are being conducted.

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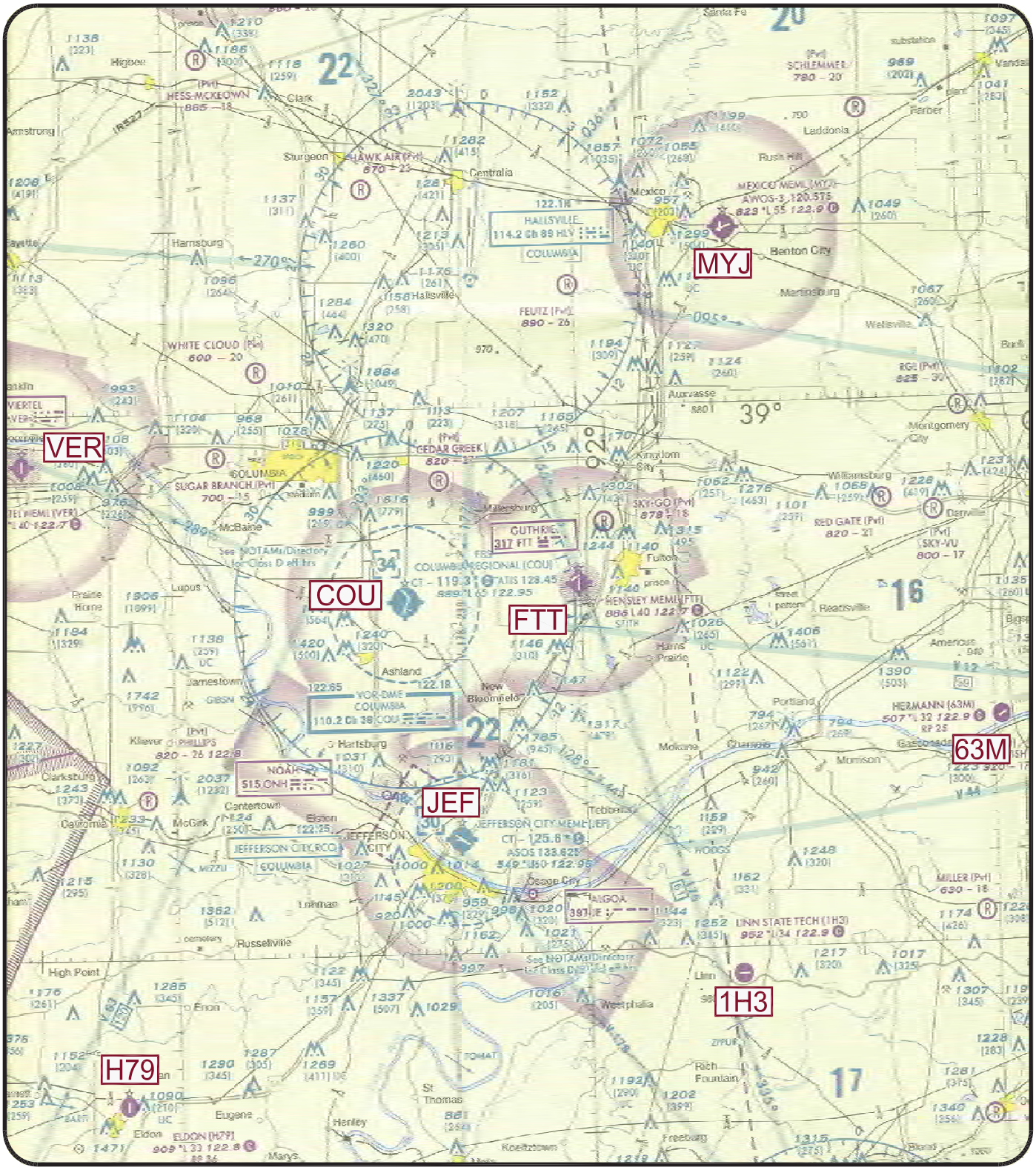
800.748.8276 | www.hwlochner.com

# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 1.4

**Local Airports and Airspace Characteristics**




*Source:* NOAA/FAA Kansas City Sectional Aeronautical Chart.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

## Legend

VORTAC (HALLSVILLE)-
VOR-DME (COLUMBIA)-
Paved Runway (3,200' to 5,999') -
Paved Runway (6,000' to 6,500') -
Private Airport -
Victor Airway - V 123
Class E Airspace -
Class C Airspace -

city of Fulton
Proudly Serving You

## AIRPORT ENVIRONS & LAND USE

This section will address and examine the regional setting of the airport and the land uses that surround it. This task is critical to the future development of the airport given that planning decisions will most likely extend beyond the airport's physical property boundary, while local land use patterns will ultimately affect the potential for expansion and capital improvements.

**County/City/Airport Geography**

Known for its stand against Union Army troops during the U.S. Civil War in October of 1861, "The Kingdom of Callaway," named for Capt. James Callaway, a grandson of famed pioneer Daniel Boone, was founded in 1820 and has a population of approximately 43,700 residents and totals 847 square miles, or 542,080 acres of land.

Founded in 1825 and later incorporated in 1859, the City of Fulton, named for engineer and inventor Robert Fulton and located within the East and West Fulton Townships, has a population of approximately 12,800 residents and covers an area of nearly 11.4 square miles. Elton Hensley Memorial, located inside the West Fulton Township, is located on nearly 424 acres of land consisting of fee simple property and easements and is situated on sections 13, 23, 24 and 25. The township and range for the airport is T47N and R10W, respectively.

**Land Use Ordinances and Zoning**

FTT is not codified as having a specified zoning or land use designation for city planning purposes and is located outside of the city's incorporated limits. Additionally, Callaway County does not have a legislatively enacted land use/zoning ordinance to govern land uses in the rural portions of the county.

**Adjacent Land Use**

Given the limited local and county land use controls, this evaluation will rely heavily on information and observations noted during the airport site visit to determine the existing land uses adjacent to the airport.

The land use to north and east of the airport is almost exclusively agricultural and is defined by open fields and gently rolling hills, and fields containing cropland. Low density residential use exists south of the airfield and north of Missouri Highway H. Residential land use also exists southwest and west of the airport, primarily south of County Road 308 and west of County Road 305, respectively. Land uses such as commercial/industrial, Section 4(f) and/or institutional (i.e. schools, churches and medical care facilities) were not noted and/or not readily apparent.

**Land Uses Affecting Expansion**

Based on this evaluation, future airport expansion is not expected to be adversely affected by local area land uses given the rural setting of the airport coupled with agriculturally-based land uses in the immediate vicinity. Although residential use occurs adjacent to the airport, the number and location of existing residences are not expected to be significantly impacted by potential capital improvements.

With regard to natural terrain and/or man made features in the immediate vicinity affecting potential airport expansion, the alignment of Missouri Highway H and residential use located south of the airport are expected to influence planning considerations with respect to potentially expanding Runway 18-36 to the south. Additionally, terrain located immediately west of Runway 18-36 is not expected to present design and/or potential environmental challenges with respect to constructing a future full-length parallel taxiway to serve 18-36.

## SOCIOECONOMIC CONDITION

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

According to the Fulton Area Development Corporation, local commuting patterns suggest that approximately 31,300 annual trips either originate or terminate within Callaway County from the outlying areas including Audrain, Boone and Cole counties. Additionally, FTT provides air transportation services to and from this region and draws a significant portion of the airport's based aircraft users and airport patrons from these three counties. For these reasons, the socioeconomic condition of the quad-county area will be evaluated and considered as part of the demand forecast element of the master plan update.

**Population**

Callaway, Audrain, Boone and Cole counties are located within the Missouri Department of Economic Development, Missouri Economic Research and Information Center's (MERIC) Central Region. Of the 19 counties that comprise this region, Callaway, Audrain, Boone and Cole counties rank 4th, 8th, 1st and 2nd in terms of population, respectively. Table 1.6 illustrates the population trends for these counties since 1990.

Table 1.6
Historic Population Summary

| Place Name | 1990 | 2000 | Present* | Percent Change 1990-Present | Annual Growth Rate 1990-Present |
|---|---|---|---|---|---|
| Callaway County | 32,809 | 40,766 | 43,727 | 33.2% | 1.5% |
| Audrain County | 23,599 | 25,853 | 25,556 | 8.3% | 0.4% |
| Boone County | 112,379 | 135,454 | 156,377 | 39.1% | 1.8% |
| Cole County | 63,579 | 71,397 | 75,018 | 18.0% | 0.9% |
| State of Missouri | 5,117,073 | 5,595,211 | 5,988,927** | 17.0% | 0.8% |

(*) Reflects 2009 estimates.
(**) Reflects Census 2010. County population estimates based on 2010 census data are not yet available.

Source: MERIC; U.S. Census Bureau; Bureau of Economic Analysis (BEA), U.S. Department of Commerce.

Over the past 19 years, Callaway County's population, currently ranked 23rd in the state, has increased approximately 33 percent, or 10,900 new residents, and experienced an average annual population growth of 1.5 percent. Audrain County's population, currently ranked 41st in the state, has increased slightly more than eight percent since 1990 averaging a nominal population growth of 0.4 percent annually. Boone County's population, currently ranked 8th in the state, has increased nearly 40 percent since 1990 averaging a population growth of nearly 1.8 percent annually. Lastly, Cole County's population, currently ranked 15th in the state, has increased nearly 18 percent since 1990 averaging a population growth of nearly one percent annually. Combined, the counties have averaged nearly 1.3 percent annual population growth totaling nearly 68,300 new residents to the quad-county area.

Table 1.7
Projected Population Summary

| Place Name | Present* | 2015 | 2020 | 2025 | 2030 | Ann. Growth Rate ('09-'30) |
|---|---|---|---|---|---|---|
| Callaway County | 43,700 | 47,400 | 50,100 | 52,800 | 55,100 | 1.2% |
| Audrain County | 25,600 | 26,000 | 26,200 | 26,600 | 27,000 | 0.3% |
| Boone County | 156,400 | 170,800 | 183,100 | 194,500 | 204,300 | 1.3% |
| Cole County | 75,000 | 77,000 | 79,300 | 81,600 | 83,600 | 0.5% |
| State of Missouri | 5,988,900** | 6,184,400 | 6,389,900 | 6,580,900 | 6,746,800 | 0.6% |

Note: Population projects have been rounded to the nearest hundred for planning purposes.
(*) Reflects 2009 estimates.
(**) Reflects Census 2010. County population projections based on 2010 census data are not yet available.

Source: MERIC; Bureau of Economic Analysis (BEA), U.S. Department of Commerce.

As indicated in Table 1.7, moderate population growth within the quad-county area is expected thru 2030 with Callaway County averaging approximately 1.2 percent population growth, or 11,400 new residents. Audrain County is expected to grow by 0.3 percent, or 1,400 residents, over the next two decades while Boone County is anticipated to increase its population by 1.3 percent annually, or 47,900 residents, over the same period. Cole

County is expected to average a half percent annual population growth, or nearly 8,600 new residents. In 2030, the quad-county region is expected to host a total of nearly 370,000 residents while averaging a one percent annual growth over the 20-year period.

**Per Capita and Median Household Income**

Per Capita Income (PCI) and Median Household Income (MHI) are widely used indicators for gauging the economic performance of local economies. PCI serves as an indicator of the economic well-being of a community being defined as the total personal income of all people in an area, divided by the total number of people. MHI, on the other hand, includes the income of the householder and all other persons 15 years and older in the household, whether related to the householder or not, and represents the value in the middle when all incomes in a given geographical area are arranged highest to lowest. Table 1.8 illustrates the PCI and MHI for the state and the quad-county region since 1990.

Table 1.8
Per Capita and Median Household Income Summary

| Place Name | 1990 | 2000 | Present* | Annual Growth Rate 1990-Present |
|---|---|---|---|---|
| Per Capita Income (PCI) | | | | |
| Callaway County | $14,303 | $20,690 | $27,563 | 3.7% |
| Audrain County | $14,946 | $22,322 | $30,612 | 4.1% |
| Boone County | $16,921 | $26,668 | $36,133 | 4.3% |
| Cole County | $17,479 | $27,803 | $38,550 | 4.5% |
| State of Missouri | $12,989 | $19,936 | $24,423 | 3.6% |
| Median Household Income (MHI) | | | | |
| Callaway County | $26,663 | $39,110 | $49,852 | 3.5% |
| Audrain County | $23,424 | $32,057 | $38,944 | 2.9% |
| Boone County | $25,647 | $37,485 | $47,434 | 3.5% |
| Cole County | $30,362 | $42,924 | $55,684 | 3.4% |
| State of Missouri | $26,362 | $37,934 | $46,005 | 3.1% |

(*) Reflects 2008 figures.
Note: County PCI and MHI figures for counties and states based on 2010 census data are not yet available.

Source: MERIC; U.S. Census Bureau.

In 2008, Callaway County's PCI ranked 73th in the state and was 76 percent of the state's PCI levels, while Audrain County's PCI levels ranked 44th in the state and was 84 percent of the state average. Additionally, Boone County's PCI ranked 9th in the state and was 99 percent of the state average while Cole County ranked 6th in the state and was 106 percent of the state's average PCI. Since 1990, Callaway, Audrain, Boone and Cole counties' PCI have averaged an annual growth of nearly 3.7, 4.1, 4.3 and 4.5 percent, respectively. Combined, the quad-county region's PCI level has increased 4.1 percent annually since 1990.

Since 1990, Callaway County's MHI has experienced an annual average growth of 3.5 percent while Audrain, Boone and Cole counties' MHI has risen 2.9, 3.5 and 3.4 percent per year, respectively. Combined, the quad-county region's MHI level has increased nearly 3.3 percent annually throughout the period.

### Labor Force

Table 1.9 illustrates the labor force in terms of unemployment for the quad-county region as of November 2010. Within MERIC's central region, of 19 counties, Callaway and Audrain have the eighth and tenth lowest unemployment rates in the region, respectively. Cole County has the fourth lowest rate in the region while Boone County boasts the most respectable rate in the region of 6.1 percent. The average unemployment rate for the quad-county region is approximately 7.3 percent which is two percentage points lower than the state average and 0.8 percent lower than MERIC's central region average of 8.1 percent.

Table 1.9
Labor Force Summary

| Place Name | Civilian Labor Force | Employed | Unemployed | Unemployment Rate |
|---|---|---|---|---|
| Callaway County | 22,630 | 20,884 | 1,746 | 7.7% |
| Audrain County | 11,808 | 10,784 | 1,024 | 8.7% |
| Boone County | 88,361 | 82,968 | 5,393 | 6.1% |
| Cole County | 40,018 | 47,345 | 2,673 | 6.7% |
| State of Missouri | 2,997,800 | 2,714,700 | 283,100 | 9.4% |

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

### Industry Sectors

According to MERIC, the central Missouri region's three highest growing industries in terms of employment and wages are 1) retail trade; 2) health care; and social assistance and 3) accommodation and food services. These three top industry sectors have experienced a combined average growth of approximately two percent annually in terms of total wages in recent years.

More specifically, Callaway County's highest and fastest industry wage and employment growth include 1) Federal, state and local government which employs nearly 4,400 residents; 2) manufacturing with 34 firms located within the county; and 3) accommodation and food services totaling 61 employers. Combined, these three industries employ nearly 7,000 county residents.

Audrain County's emerging industries in terms of wage and employment growth include 1) Federal, state and local government; 2) manufacturing; and 3) retail trade. These three industries consisting of 203 employers employ 5,900 county residents.

Boone County's primary industries pertaining to wage and employment growth include 1) state government which employs 16,900 residents; 2) retail trade with approximately 11,400 employees; and 3) food services and drinking places which employs nearly 7,400 residents. Combined, these industry sectors employ approximately 35,700 residents within the county.

Lastly, Cole County's primary industries pertaining to wage and employment growth include 1) state government which employs nearly 17,300 residents; 2) accommodation and food services with approximately 3,000 employees; and 3) food services and drinking places which employs nearly 2,600 residents. Combined these industry sectors employ approximately 23,000 residents within the county.

## GENERAL AVIATION ACTIVITY

The FAA recognizes three broad categories of aviation which include general aviation, certificated air carrier and military. General Aviation is defined as all aviation activity except that of air carriers and military aircraft. A tabulation of FTT's historical aviation activity from 1990 to 2010, as provided by the MoDOT, Aviation Section, and the FAA, is presented in Table 1.10. This table presents a summary of activity at the airport including the total annual operations including local versus itinerant operations, as well as number of aircraft based at the facility throughout the period.

**Annual Operations**

Since the early 1990s, FTT's annual operational total has increased from approximately 10,000 operations to near 12,400 takeoffs and landings in 2010. Since 2004, the airport has averaged slightly less than 16,100 annual operations. Local operations over the historic 20-year period have averaged 6,000 annual takeoffs and landings. From 1990-2009, local operations have outpaced the airport's overall operational tempo by exhibiting nearly 2.5 percent annual growth in activity. The sustained pace of local operations by based airplanes is attributed to the high level of flight instruction at the airport in recent years, as well as a high level of business-related and leisure flying taking place at the facility. During the same time, itinerant aircraft activity has remained relatively stable averaging approximately 4,800 transient operations per year.

**Based Aircraft**

The based aircraft activity at FTT has increased from 20 aircraft in 1990 up to 49 airplanes in 2010. This growth has resulted in an annual increase of 4.9 percent over the same period. The based aircraft fleet mix over the past 20 years has consisted primarily of single engine airplanes with an average of three based multi-engine piston airplanes being based at the airport during any given year throughout the period. Turbo-prop and/or business jets have not been based at the airport over the past two decades.

Table 1.10
Operational Activity Summary

| Year | Based Aircraft | Single Engine | Multi Engine | Business Jets | Local Ops. | Itinerant Ops. | Air Taxi Ops. | Total Ops. |
|---|---|---|---|---|---|---|---|---|
| 1990 | 19 | 19 | 0 | 0 | 7,600 | 4,800 | 400 | 12,800 |
| 1991 | 20 | 18 | 2 | 0 | 7,600 | 4,800 | 400 | 12,800 |
| 1992 | 20 | 18 | 2 | 0 | 3,000 | 3,600 | 400 | 7,000 |
| 1993 | 20 | 18 | 2 | 0 | 3,000 | 3,600 | 400 | 7,000 |
| 1994 | Data Not Available | | | | | | | |
| 1995 | 33 | 31 | 2 | 0 | 2,600 | 5,500 | 400 | 8,500 |
| 1996 | 33 | 31 | 2 | 0 | 2,600 | 5,500 | 400 | 8,500 |
| 1997 | 33 | 31 | 2 | 0 | 2,600 | 5,500 | 400 | 8,500 |
| 1998 | 32 | 31 | 1 | 0 | 7,900 | 1,300 | 200 | 9,400 |
| 1999 | 39 | 36 | 3 | 0 | 2,600 | 5,500 | 400 | 8,500 |
| 2000 | 39 | 36 | 3 | 0 | 2,600 | 5,500 | 400 | 8,500 |
| 2001 | 39 | 36 | 3 | 0 | 2,500 | 5,400 | 400 | 8,300 |
| 2002 | 39 | 36 | 3 | 0 | 2,500 | 5,400 | 400 | 8,300 |
| 2003 | 39 | 36 | 3 | 0 | 2,500 | 5,400 | 400 | 8,300 |
| 2004 | 51 | 48 | 3 | 0 | 11,900 | 4,400 | 400 | 16,700 |
| 2005 | 55 | 50 | 5 | 0 | 11,900 | 4,400 | 200 | 16,500 |
| 2006 | 55 | 50 | 5 | 0 | 11,900 | 4,400 | 400 | 16,700 |
| 2007 | 48 | 44 | 4 | 0 | 11,900 | 4,400 | 400 | 16,700 |
| 2008 | 48 | 44 | 4 | 0 | 11,900 | 4,400 | 400 | 16,700 |
| 2009 | 49 | 46 | 3 | 0 | 11,900 | 4,400 | 500 | 16,800 |
| 2010 | 49 | 46 | 3 | 0 | 6,900 | 5,100 | 400 | 12,400 |

Note 1: Figures rounded to the nearest hundred for planning purposes. Extrapolation was used for a few years with no operational and/or based aircraft data.

Note 2: Itinerant operations include fixed-wing and rotorcraft military activity. Military aviation accounts for nearly 400 annual operations. Air taxi operations are also considered itinerant activity.

Note 3: 2010 operational data assumes 250 operations per based aircraft (OPBA). Local versus itinerant activity for 2010 is based on historic share from 1990-2010. 56 percent of operational activity is local while the remaining 44 percent is itinerant in nature. Lastly, 2010 air taxi operations are based on an estimate of current turbine aircraft user activity.

Source: MoDOT, Aviation Section; http://moasm.modot.mo.gov.

### Air Taxi Operations

Regarding charter and corporate flight department—Part 135 and/or Part 91K—operations, the airport currently experiences approximately 400 annual operations by Airplane Design Group (ADG) I and II turbo-prop and business jet aircraft weighing approximately 12,500 pounds with fewer than 10 passenger seats. The airport's on-demand air charter operational activity has historically averaged slightly less than 400 operations per year. Table 1.11 identifies the airport's current roster of turbine users, the user's aircraft type, business interest and location of each business's headquarters.

Table 1.11
Airport Turbine Users

| Company Name | Business Type | Aircraft Type | City |
|---|---|---|---|
| Epps Aviation | Air Charter | Beechcraft King Air 200 | Atlanta, GA |
| Northwind Partners, LLC | Gov't. Contracting | Beechcraft King Air 200 | Nashville, TN |
| Ameren UE | Utility Company | Beechcraft King Air 200 | St. Louis, MO |
| Executive AirShare | Air Charter | Beechcraft King Air C90 | Wichita, KS |
| ChartAire, Inc. | Air Charter | Mitsubishi MU-II | Colesburg, IA |
| Air Methods Corp. | Air Ambulance | Pilatus PC-12 | Englewood, CO |
| Dollar General Corporation | Retail Merchandising | Cessna Citation I SP | Goodlettsville, TN |
| Sutherland Lumber Company | Retail Hardware | Cessna Citation Jet/CJ | Tulsa, OK |
| Sharpe Insurance Agency, LLC | Insurance | Beechcraft Premier I | Lewistown, MO |

Source: Airport management, FAA aircraft registry and user interviews.

Regular corporate turbine users of the airport that operate single and multi-engine turbo-props include six companies which consist of three air charter companies, an air ambulance provider, a utility company and a government contracting agency. It is estimated that these users account for 12 departures per month, or 24 takeoffs and landings monthly, totaling slightly less than 300 operations annually.

Corporations who own business jets and conduct regular operations at the airport include three local businesses whose interests include retail merchandising distribution, retail hardware and insurance. These users fly small jet aircraft weighing approximately 12,500 pounds and accommodate four to six passenger seats. Current operations estimates indicate each of these users perform two operations per month at Fulton, totaling approximately 75 annual jet operations.

Operations by turbine aircraft associated with either William Woods College or Westminster College occur on an infrequent basis and mainly involve personal and/or leisure travel.

**Critical Aircraft**

The critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 itinerant operations (combination of 250 takeoffs and landings) per year at the airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design and safety area standards, as well as structural and equipment needs for the airfield and terminal area facilities. Table 1.12 provides information regarding the existing critical aircraft for FTT.

The King Air 200, or an aircraft with similar operational and physical characteristics, was identified as the airport's critical aircraft due to its prevalence within the general aviation air taxi, corporate flight department and fractional ownership market segments. The King Air 200 is capable of operating from a 4,000 foot runway during extreme (hot) weather

conditions while carrying nearly a full compliment of payload including passengers, baggage and fuel.

Table 1.12
Critical Aircraft-Beechcraft King Air 200

| Characteristic | Specifications and Performance |
|---|---|
| Airport Reference Code (ARC) | B-II |
| Wing Span | 54 ft. 6 in. |
| Length | 43 ft. 9 in. |
| Height | 15 ft. 0 in. |
| Seating (Crew + standard pax/max pax) | 1-2 + 7/9 |
| Maximum Takeoff Weight (MTOW) | 12,500 lbs. |
| Maximum Landing Weight (MLW) | 12,500 lbs. |
| Normal Approach Speed | 98 knots |
| Takeoff Field Length* | 2,600 feet |
| Landing Distance** | 1,800 feet |
| Maximum Range Performance*** | 1,800 NM |

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

Source: Hawker Beechcraft.


**Fuel Flowage**

Fuel flowage estimates can be a useful tool in realizing the overall operational trends of an airport in terms of annual operational activity and fleet mix. During the past five year period (2006-10), the airport has dispensed an annual average of 19,000 gallons of 100LL. The airport does not currently offer Jet A.

## CLIMATIC CONDITIONS

Climatic characteristics are utilized in determining runway dimensional requirements, crosswind runway wind coverage, navigational and lighting aids to accommodate instrument approaches, as well as the necessary snow removal and airport maintenance equipment needed to cope with varying weather occurrences.

The climate analysis for FTT is derived from information provided by the National Oceanic and Atmospheric Administration (NOAA), Midwestern Regional Climate Center (MRCC), and will include a summary of local area temperature, precipitation, snowfall and sunshine data for the Fulton area.

**Temperature**
During winter, the average daily temperature is 31° F with the lowest recorded temperature being -26° F recorded in 1905. During the summer months the average daily temperature is 75° F and the average daily maximum temperature is 89° F during the month of July. The highest recorded temperature of 116° F for Callaway County was recorded in 1954.

**Precipitation**
The total annual precipitation for the Fulton area is approximately 39 inches, of which nearly 23 inches, or 59 per cent of the total county rainfall, falls during the spring and summer months. The heaviest one day rain event occurred in 1993 and totaled nearly 5.5 inches. Thunderstorms occur on nearly 51 days per year in Callaway County.

**Snowfall**
Average seasonal snowfall is approximately 19 inches per year. The greatest recorded snowfall in Fulton was 31 inches occurring in January 1937. On average, approximately 10 days per year, at least one inch of snow cover will blanket the ground.

**Sunshine, Prevailing Wind and Humidity**
The sun shines nearly 70 percent of the time in Callaway County during the summer months and 50 percent during the winter. The prevailing wind throughout the county is from the south and southwest while the average highest wind speed is approximately 12 miles per hour and most often occurs during the spring time. Lastly, the average relative humidity during the mid-afternoon is about 60 percent while, at night and at dawn, the average humidity reaches around 80 percent.

## WIND ANALYSIS

Local wind patterns were collected and analyzed to determine the impacts of all-weather, visual meteorological conditions (VMC) and instrument meteorological conditions (IMC) on

the existing runway configuration. Yearly wind observations were obtained from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), as reported hourly at the Columbia Regional Airport (COU), Columbia, MO, during the period from 2000 to 2009. Combined, the recorded wind data included 83,455 all-weather, 77,422 VMC and 5,340 IMC observations.

For planning standards, the desirable wind coverage is 95 percent for the primary runway, and is computed based on the crosswind component not exceeding 10.5 knots for airport reference code (ARC) A-I and B-I category aircraft, 13.0 knots for ARC A-II to B-II aircraft, and 16.0 knots for ARC A-III, B-III and C-I to D-III general aviation aircraft. By design, a small aircraft (weighing less than 12,500 pounds) is recommended to be able to operate approximately 95 percent of a given period without experiencing a crosswind component greater than 10.5 knots.

**All Weather Wind Conditions**

Table 1.13 illustrates the percent of all-weather wind coverage for the 10.5, 13.0 and 16.0-knot wind velocities. Runway 18-36 provides 90.9 percent wind coverage at 10.5 knots for ARC A-I and B-I aircraft; 95.1 percent wind coverage at 13.0 knots for A-II and B-II aircraft; and 98.5 percent wind coverage for ARC C-I to D-III aircraft at 16.0 knots.

The crosswind Runway 6-24 provides 86.3 percent wind coverage at 10.5-knots for ARC A-I and B-I aircraft; 92.4 percent wind coverage at 13.0 knots for A-II and B-II aircraft; and 97.9 percent wind coverage for large aircraft at 16.0 knots. Turf Runway 12-30 provides 90.3 percent wind coverage at 10.5 knots for small aircraft. Combined, the three runways provide 99.9 percent wind coverage at 10.5 knots for small Category A and B aircraft.

**VMC Wind Conditions**

Table 1.13 also illustrates the percent wind coverage during VMC conditions. Runway 18-36 provides 91.1 percent wind coverage at 10.5 knots for ARC A-I and B-I aircraft; 95.2 percent wind coverage at 13.0 knots for A-II and B-II aircraft; and 95.8 percent wind coverage for ARC C-I to D-III aircraft at 16.0 knots.

The crosswind Runway 6-24 provides 86.3 percent wind coverage at 10.5-knots for ARC A-I and B-I aircraft; 92.4 percent wind coverage at 13.0 knots for A-II and B-II aircraft; and 97.9 percent wind coverage for large aircraft at 16.0 knots. The turf Runway 12-30 provides 90.3 percent wind coverage at 10.5 knots for small aircraft. Combined, the three runways provide 99.9 percent wind coverage at 10.5 knots for small Category A and B aircraft during visual conditions.

Table 1.13
All-Weather, VFR and IFR Wind Coverage

| Runway Alignment (True Bearing) | Crosswind Component Wind Speed & Corresponding ARC | Percent All-Weather Wind Coverage | Percent VMC Wind Coverage | Percent IMC Wind Coverage |
|---|---|---|---|---|
| Runway 18-36 (1.9º True) | 10.5 knots (A-I and B-I)<br>13.0 knots (A-II and B-II)<br>16.0 knots (A-III; B-III, C-I to D-III) | 90.9%<br>95.1%<br>98.5% | 91.1%<br>95.2%<br>95.8% | 87.2%<br>93.4%<br>98.2% |
| Runway 6-24 (57.1º True) | 10.5 knots (A-I and B-I)<br>13.0 knots (A-II and B-II)<br>16.0 knots (A-III; B-III, C-I to D-III) | 86.3%<br>92.4%<br>97.9% | 86.3%<br>92.4%<br>97.9% | 84.0%<br>91.4%<br>97.7% |
| Runway 12-30 (303.6º True) | 10.5 knots (A-I and B-I)<br>13.0 knots (A-II and B-II)<br>16.0 knots (A-III; B-III, C-I to D-III) | 90.3%<br>94.9%<br>98.4% | 90.3%<br>94.9%<br>98.4% | 89.3%<br>94.3%<br>98.4% |
| Runway 18-36, 6-24 & 12-30 Combined | 10.5 knots (A-I and B-I)<br>13.0 knots (A-II and B-II)<br>16.0 knots (A-III; B-III, C-I to D-III) | 99.9%<br>100%<br>100% | 99.9%<br>100%<br>100% | 99.9%<br>100%<br>100% |
| Total Calm and Light Winds (0-10.5 Knots)<br>Total Strong Winds (Greater Than 10.5 Knots) | | 76.1%<br>23.9% | 76.2%<br>23.8% | 71.1%<br>28.9% |

(ARC) Airport Reference Code
Note: Wind coverage figures rounded to the nearest tenth of a percent for planning purposes.

Source: NOAA, NCDC, Asheville, NC; Columbia Regional Airport (COU), Columbia, MO.

### IMC Wind Conditions

Table 1.13 illustrates the percent wind coverage during IMC conditions at FTT as well. Runway 18-36 provides 87.3 and 93.4 percent wind coverage during IMC conditions for Category A and B aircraft at 10.5 and 13.0 knots, respectively. Runway 18-36 also provides 98.2 percent wind coverage for large aircraft at 16.0 knots.

Crosswind Runway 6-24 provides 84.0 and 91.4 percent wind coverage during IMC conditions for Category A and B aircraft at 10.5 and 13.0 knots, respectively. Runway 12-30 provides 89.3 percent wind coverage at 10.5 knots for small aircraft. Combined, the three runways provide 99.9 percent wind coverage at 10.5 knots for small Category A and B aircraft during low-visibility conditions.

### Strong Wind Conditions

Table 1.13 notes strong wind characteristics during all-weather, VMC and IMC conditions at FTT. Approximately 26 percent of recorded wind observations occur as strong winds that exceed 10.5 knots while the remaining 76 percent of wind patterns occur as calm and light winds with velocities of less than 10.5 knots.

Exhibit 1.5 illustrates the airport's wind rose which depicts the predominant wind directions and velocities occurring at FTT during all-weather conditions.

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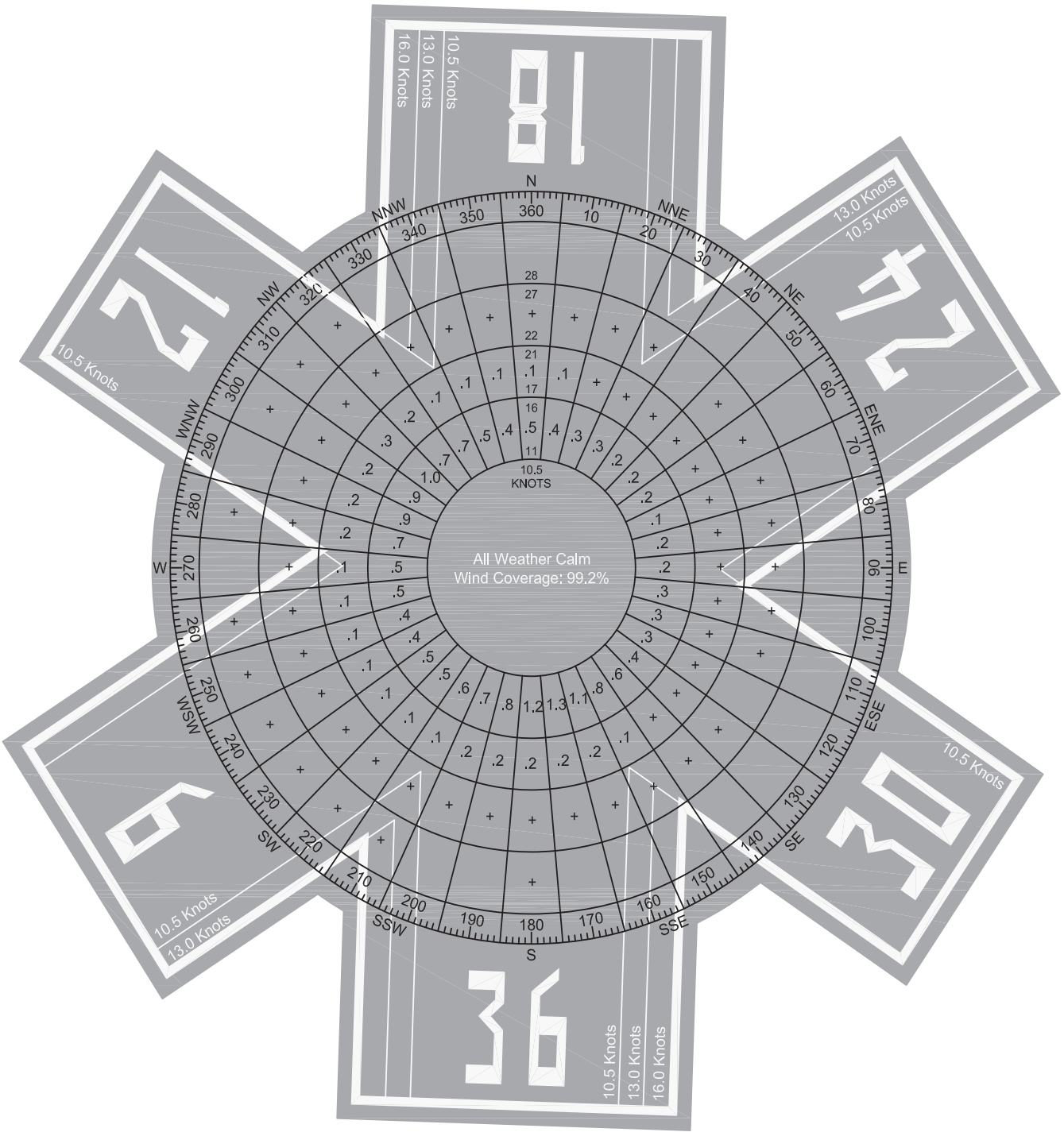
# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 1.5

**All Weather Wind Rose**




*Source:* NOAA, NCDC, Asheville, NC; Columbia Regional Airport (COU), Columbia, MO.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

city of Fulton
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## AIRPORT ECONOMIC BENEFIT

In 2005 the MoDOT, Aviation Section, completed The Economic Benefit of Missouri's Airport System to determine the overall benefits of Missouri's system of public-use airports to the statewide economy. The total economic benefit of aviation activity in Missouri was quantified in terms of employment, payroll and output (economic activity).

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

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

**Employment**
Measures the number of people employed as a result of the operation and maintenance of the airport. This also includes citizens employed in the aviation industry and those jobs that support aviation activity. FTT is responsible for employing approximately 26 citizens.

**Payroll**
Measures the annual wages and benefits paid to employees whose salaries are directly or indirectly attributed to the airport. The total payroll attributed to the operation of the airport is estimated to be approximately $531,500.

**Total Economic Impact**
Measures the dollar value of all aviation and non-aviation-related goods and services that exist within the Fulton and Callaway County area as a direct result of FTT providing general aviation goods and services to local and transient airport users. The total economic benefit is approximately $2,352,500 which is assumed to be the sum of annual gross sales of aviation and non-aviation related activity occurring within the community.

Table 1.14 provides information regarding the economic impacts of FTT to the local economy.

Table 1.14
Airport Economic Benefits Summary

| Total Employment | Total Payroll | FTT's Total Economic Output |
|---|---|---|
| 26 | $531,500 | $2,352,500 |

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

## SUMMARY

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


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2

2


# Demand Forecasts

## INTRODUCTION

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

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

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

## DATA SOURCES

The forecasting process begins by obtaining recorded data pertinent to the operation and administration of the airport. When necessary, this information is supplemented with

historical trends which evolve from a thorough examination of historic data and planning documents related to the airport. Data sources used to generate the demand forecasts include the *FAA Aerospace Forecasts Fiscal Years 2010-2030*; FAA Form 5010-1, *Airport Master Record*; Callaway, Audrain, Boone and Cole County socio-economic and demographic characteristics as provided by the U.S. Census Bureau and the Missouri Economic Research and Information Center (MERIC); FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*; and the Missouri State Airport System Plan (MOSASP).

## FACTORS AFFECTING FUTURE AVIATION DEMAND

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

**FAA Aerospace Forecasts and the General Aviation Market Segment**

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

The U.S. economy has only recently assumed limited growth resulting from the Great Recession of 2008-09. Unemployment has begun to decrease, the U.S. economy has stabilized with increasing, but limited, output and business investment has picked up slightly. As such, aviation demand is expected to experience conservative growth over the long-term while short-term gains are anticipated to be lackluster. Despite national trends indicating slow growth during the short-term, local population, flight activity and economic conditions of Callaway County and the quad-county area indicate the airport is expected to outpace national aviation growth during the short-term period for single-engine airplanes and operations.

Despite measured economic rebound, demand for turbine aircraft—turbo-prop and business jets— is on the rise. New product offerings, increasing popularity of very light jets (VLJ) and increasing foreign demand have bolstered domestic and international activity. Continued safety and security concerns, increased flight delays, cancellations and system wide

**FAA Forecasts & the GA Market Segment**

*The U.S. economy has recently assumed limited growth resulting from the Great Recession of 2008-09. As such, aviation demand is expected to experience conservative growth over the long-term. Despite national trends indicating slow growth during the short-term, local population, flight activity and economic conditions of Callaway County and the quad-county area indicate the airport is expected to outpace national aviation growth during the short-term period for single-engine airplanes and operations.*

*Despite measured economic rebound, demand for turbine aircraft is on the rise. Continued safety and security concerns, increased flight delays, systemwide cancellations and intrusive security screening have continually made GA aircraft travel an attractive option. Turbo-prop and business jet traffic at FTT is expected to increase over the planning period. Throught the intermediate planning periods, turbine operations are expected to remain steady at 400 annual takeoffs and landings.*

disruption of commercial air carriers as well as intrusive security screening at the nation's commercial service airports have continually made GA turbine aircraft travel an attractive option to corporations and wealthy individuals. Turbo-prop and business jet traffic at FTT is expected to increase over the planning period. However, during the short and intermediate planning periods, turbine operations are expected to remain steady at 400 annual takeoffs and landings.

Growth of single-engine airplanes is expected to be largely the result of light sport aircraft (LSA) replacing traditional low-end piston single airplanes. At FTT, a majority of the future based single-engine airplanes is expected to increase in lock-step with the current hangar waiting list, particularly during the 0-5 year planning period. Twin-piston airplanes are expected to decline throughout the planning period due to attrition of the aging fleet. Additional twin-piston airplanes are not expected to be based at FTT and growth will remain flat throughout the planning period. Lastly, systemwide growth of the turbine fleet—turbo-prop and jets—is expected to increase 1.4 and 4.2 percent, respectively.

GA fleet utilization rates (hours flown) are expected to increase for piston singles (1.2 percent), turbo-prop (1.7 percent), business jets (6.1 percent) and LSAs (5.9 percent). Twin piston hours flown is expected to decline by 0.2 percent through 2030. With the exception of LSAs and twin-pistons, increased utilization rates are anticipated to be the result of business usage of GA aircraft expanding at a faster rate than personal/recreational use. Factors such as short-term post-recession recovery, increased size of the overall GA fleet and recovery from recession induced record lows are also expected to contribute to the increase in GA flight activity throughout the planning period. The operational fleet mix at FTT is expected to increase at a similar rate for piston singles, LSAs and turbine airplanes projected by the FAA.

**National and Global Economic Climate**

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

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

**FAA Forecasts & the GA Market Segment (con't.)**

*At FTT, a majority of the future based single-engine airplanes is expected to increase in lock-step with the current hangar waiting list, particularly during the 0-5 year planning period. Additional twin-piston airplanes are not expected to be based at FTT and growth will remain flat. Lastly, systemwide growth of the turbine fleet—turbo-prop and jets—is expected to increase throughtout the planning period.*

*GA fleet utilization rates (hours flown) are expected to increase for piston singles, turbo-prop, business jets and LSAs. Twin piston hours flown is expected to decline through 2030. Increased utilization rates are anticipated to be the result of business usage of GA aircraft expanding at a faster rate than personal/recreational use. The operational fleet mix at FTT is expected to increase at a similar rate for piston singles, LSAs and turbine airplanes projected by the FAA.*

**National/Global Economic Climate**

*Although the demand for GA air transportation has proven to be resilient in the past despite limited recovery from the 2008 recession, there are conditions that remain which have the potential to negatively influence FTT's demand projections. Factors such as doubts about the economic recovery and sustainability of economic growth have the potential to depress the projected activity for FTT.*

**National/Global Economic Climate (con't.)**

*Domestic and international terrorism remains atop the list of security concerns that may influence demand for aviation services on a national scale and at FTT. Also, the uncertainty of oil prices punctuated by potential spikes in oil demand has the ability to depress optimism once economic growth resumes.*

Considering the turmoil of the recent past and despite positive signs of recovery, the FAA remains cautiously optimistic that the current outlook for demand can be achieved over the next two decades, particularly during the short-term (2011-2015) period. Doubts about the economic recovery and the strength and sustainability of economic growth linger and have the potential to depress the projected activity for FTT. The terms of recovery will be heavily influenced by national economic growth, corporate profits and personal wealth.

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

**Local Socioeconomic Conditons**

*General aviation operations and based aircraft are more directly tied to local economic conditions than any other segment of the aviation industry. Population trends also play a role in determining airport activity. Given this fact, the forecast of general aviation demand at FTT will reflect historic socioeconomic trends for the counties of Callaway, Audrain, Boone and Cole.*

*Based aircraft projections are based on analyses which compared and correlated the Fulton/quad-county area's population, PCI and MHI, to based aircraft estimates over the historic 18-year period. The sustained socioeconomic growth within the quad-county area is expected to contribute to the total based aircraft at the facility growing by 2.9 percent annually throughout the 20-year planning period.*

**Local Socioeconomic Conditions**

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Over the past two decades, the combined population of the quad-county area has increased approximately 1.3 percent annually resulting in a total population of nearly 300,700 residents in 2008, up from 232,400 residents in 1990. In addition to population, per capita income (PCI) and median household income (MHI) are widely used indicators for gauging the economic performance of local communities as well. The Fulton/quad-county area PCI levels have increased an impressive 4.2 percent annually ($15,912-$33,215) from 1990-2008. Also, the counties' MHI has increased nearly 3.3 percent annually ($26,524-$47,979) during the same period. Combined, the PCI and MHI for the quad-county area increased, on average, approximately 3.5 percent throughout the historic 18-year period.

Given this information, the total based aircraft projections are based on analyses which compared and correlated the Fulton/quad-county area's population, PCI and MHI, to based aircraft estimates over the historic 18-year period. The sustained socioeconomic growth within the quad-county area is expected to contribute to the total based aircraft at the facility growing by 2.9 percent annually throughout the 20-year planning period.

**Airport Role**

FTT is expected to remain a NPIAS general aviation facility throughout the planning period while at the same time remaining classified as a Business Airport according to the MOSASP. Considering historic and current operational activity, fleet mix and future demand at the facility, the airport is expected to remain capable of accommodating 100 percent of the general aviation (GA) aircraft fleet weighing less than12,500 pounds with less than 10 passenger seats. Additionally, a vast majority of the airport's operations will be generated by single and twin-piston airplanes. Turbine aircraft are expected to contribute a small percentage of the airport's overall activity. The airport's ultimate critical aircraft is expected to be a multi-engine turbo-prop capable of carrying eight to 10 passengers and capable of operating to and from FTT's current runway facilities.

## DEMAND FORECAST APPROACH

The development of forecasts were generated by conducting a series of analytical, statistical and judgmental processes. These processes compare mathematical relationships to analyze historic data and define their relationship to the operational variables (i.e. based aircraft and annual operations) of the airport. The following discussion offers explanations of the methodologies that were used as part of the process to generate operational projections for FTT.

**Single and Multiple Regressions**

The regression model projects the forecast of parameters (dependent variable—i.e. based aircraft and annual operations) on the basis of one or more external factors or indicators (independent variable—i.e. PCI, MHI and population). Historic and forecast values for both are analyzed and compared to determine the degree of correlation between the independent and dependent variables, or a correlation coefficient. The correlation coefficient (Pearson 'r') measures the association between the two variables. If the 'r' value is equal to approximately 0.90 or greater, this indicates a high level or correlation and/or a favorable level of reliability; whereas an 'r' value of less than 0.90 indicates a lower level or predictive reliability and/or correlation. This relationship is then used to forecast the dependent variable based on the selected independent variable.

**Linear Trend Line**

Among the simplest and most familiar forecasting techniques, linear trend analysis is one of the most frequently used models in the industry. Historic data is projected into the future providing an estimate of the aviation demand throughout the planning period. The basic assumption of the linear trend line method is that historic levels of aviation activity will continue to exert a similar influence on future demand levels. As broad and presumptive as this method might be, it is often a reliable benchmark against which other forecasting models may be compared.

**Airport Role**

*FTT is expected to remain a NPIAS general aviation facility throughout the planning period while at the same time remaining classified as a Business Airport according to the MOSASP. Accordingly, considering historic and current operational activity, fleet mix and future demand at the facility, the airport is expected to remain capable of accommodating 100 percent of the general aviation (GA) aircraft fleet weighing less than12,500 pounds with less than 10 passenger seats.*

**Time Series Analysis**
This method is one of the oldest and in some cases still the most used method of forecasting aviation demand. Time-series methodologies show the dependent variable (time) and is utilized quite frequently where both time and data are limited such as forecasting a single variable where historical data is obtained for that particular variable.

**FAA Aerospace Forecast Growth Rates**
Although not a statistical or analytical forecast methodology, relying on FAA forecasts to project based aircraft and operational demand as part of the planning process is an important tool. FAA projected average annual growth of a particular fleet of aircraft (i.e. piston, turbine or jet) can be applied to the local forecasts to project future based aircraft at the facility. Likewise, by applying FAA projected aircraft utilization rates (i.e. flight hours) to the demand forecasts, a reasonable expectation of future annual operational activity (total operations) can be determined for based aircraft and transient users. Additionally, future aircraft utilization projections provided by the FAA can be a valuable tool in estimating an airport's ultimate annual operational fleet mix (i.e. annual operations by a particular aircraft category).

**Smoothing**
This method of forecasting is a statistical technique applied to historic data giving greater weight to latest trends and conditions at an airport and can be effective in generating and checking short-term forecasts. For FTT, smoothing was utilized primarily as a tool for checking short-term regressions and linear trend forecasts for purposes of projecting based aircraft at the airport during the short-term (0-5 year) planning period. Smoothing was not utilized nor was it intended to serve as a long-term based aircraft planning tool for this project.

**Judgment and Professional Experience**
Following the completion of the forecasts, judgment and/or professional experience is applied to the forecast projections. Intangible factors such as specific information regarding the airport, operating environment, industry trends or local area economic or socio-economic information generally are taken into account when formulating a judgmental or professional opinion in arriving at a preferred forecast.

## GENERAL AVIATION FORECASTS

As discussed in the existing conditions chapter, the FAA recognizes three broad categories of aviation which include general aviation, certificated air carrier and military. General Aviation is defined as all aviation activity except that of air carrier and military aircraft operations.

The following sections will concentrate on the activity generated by the airport's total based aircraft fleet including annual operations, local versus itinerant operational activity, air taxi and annual instrument approach (AIA) flight activity, and operational fleet mix estimates. The airport's future critical aircraft will also be identified and discussed.

## FORECAST OF BASED AIRCRAFT

Table 2.1 illustrates the forecast of based aircraft for FTT resulting from the methodologies employed to project aviation demand throughout the 20-year planning period, 2011-2031.

The single regression analysis, in comparing population, PCI and MHI to future based aircraft, netted an increase of 38 to 43 additional based aircraft over the 20-year planning period. The average of these three regressions totaled 41 additional based airplanes totaling 90 units in 2031. This methodology yielded a correlation of the socioeconomic condition of quad-county area to based aircraft ranging from 0.93 to 0.94 which indicated a high level of correlation.

Table 2.1
Forecast of Based Aircraft Summary, 2011-2031

| Forecast Methodology | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Single Regression Analysis (Based Aircraft*) | | | | |
| vs. Quad County Pop.** (Pearson 'r'=0.94) | 49 | 63 | 71 | 87 |
| vs. Quad County PCI** (Pearson 'r'=0.93) | 49 | 65 | 72 | 92 |
| vs. Quad County MHI** (Pearson 'r'=0.93) | 49 | 66 | 74 | 92 |
| Average of Single Regression Analyses | 49 | 65 | 72 | 90 |
| Multiple Regression Analysis (Based Aircraft*) | | | | |
| vs. Quad County PCI & MHI** (Pearson 'r'=0.99) | 49 | 66 | 83 | 92 |
| vs. Quad County Pop. & PCI** (Pearson 'r'=0.99) | 49 | 61 | 71 | 84 |
| vs. Quad County Pop. & MHI** (Pearson 'r'=0.99) | 49 | 61 | 69 | 83 |
| Average of Multiple Regression Analyses | 49 | 63 | 74 | 86 |
| Linear Trend Line Analysis | 49 | 66 | 75 | 99 |
| Time Series Analysis | 49 | 82 | 106 | 179 |
| FAA Growth Rate Analysis*** | 49 | 54 | 59 | 72 |
| MOSASP | 49 | 58 | 66 | - |
| 1995 Master Plan Update | 49 | 51 | 55 | 60 |

Note: Each independent variable includes socioeconomic data from the quad-county region including Callaway, Audrain, Boone and Cole Counties.
Note: Bold text indicates the selected, or preferred, based aircraft forecasts.
(*) Dependent Variable(s)
(**) Independent Variable(s)
(***) The FAA growth rates consider fleet growth for traditional single-engine piston aircraft and LSAs.

Source: Lochner.

**Forecasts of Based Aircraft**

*The multiple regression analysis compared the quad-county socio-economic condition to the future based fleet and yielded an additional 34 to 43 aircraft during the planning period to total between 83 and 92 units in 2031. Comparing the quad-county's population, PCI and MHI resulted in a high level of correlation, or 0.99. The three multiple regression analyses were averaged together and yielded a total of 86 based airplanes in 20 years. Accordingly, this methodology and corresponding projections were selected as the preferred based aircraft forecast for the airport.*

The multiple regression analysis compared the quad-county socioeconomic condition to the future based fleet and yielded an additional 34 to 43 aircraft during the planning period to total between 83 and 92 units in 2031. Comparing the quad-county's population, PCI and MHI resulted in a high level of correlation, or 0.99. The three multiple regression analyses were averaged together and yielded a total of 86 based airplanes in 20 years. Accordingly, this methodology and corresponding projections were selected as the preferred based aircraft forecasts for the airport.

The linear trend line and time series analyses yielded a growth of approximately 50 and 130 future based aircraft, respectively, totaling between 99 and 179 units. The FAA growth rates for the general aviation fleet, given the conservative growth trends in fleet size on a national scale, resulted in 72 based airplanes at FTT at the conclusion of the planning period.

Lastly, the Missouri State Airport System Plan (MOSASP) and the 1998 master plan projections were used as a comparison tool to the current master plan's projections. MOSASP's forecasts forecasted 17 additional based airplanes to total 66 aircraft at the airport in 2022, while the previous master plan estimated 60 aircraft during the long-term planning period. The FAA and MOSASP's forecasts were similar in that they both considered state and national trends of fleet growth which usually are more conservative estimates than what is predicted by the master plan. This is due to the master plan considering conditions, settings and economics of the local area and evaluating how these conditions influence based aircraft and operational growth, as well as potential airport expansion.

## PREFERRED BASED AIRCRAFT DEMAND AND FLEET MIX

**Preferred Based Aircraft Forecasts**

*The preferred based aircraft estimates are expected to increase three percent annually and result in the addition of 37 aircraft to total 86 piston and turbine powered airplanes based at the airport in 2031.*

Based on the principle that shows based general aviation aircraft are directly tied to local economic conditions, the projected based aircraft will coincide with historic and future Fulton/quad-county population, PCI and MHI levels. The airport's historic based aircraft mix and FAA fleet growth estimates were also taken into account to arrive at a preferred based aircraft forecast to accommodate long-term demand. The preferred based aircraft estimates are expected to increase three percent annually and result in the addition of 37 aircraft to total 86 piston and turbine powered airplanes based at the airport in 2031. Table 2.2 and Exhibit 2.1 summarize the airport's preferred forecast of based aircraft.

The single engine fleet is expected to increase from 46 existing units to 82 units totaling an additional 36 traditional single engine, experimental and light sport aircraft in 2031. It should be noted the short-term aircraft estimates consisting of traditional piston singles are expected to include local airplane owners on the airport's hangar waiting list. This assumption is based on the likelihood that additional T-hangars and clear span hangars are constructed during the 0-5 year period. Coincidentally, the short-term based aircraft gains also coincide with historic and projected socioeconomic condition of the local area. Finally, the multi-engine piston fleet is expected to remain steady at three units throughout the planning period.

Table 2.2
Preferred Based Aircraft and Fleet Mix Summary, 2011-2031

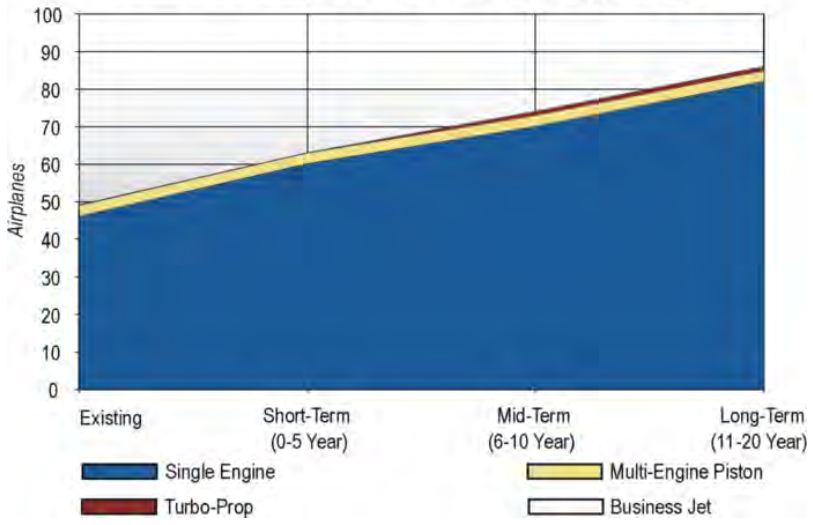
| Aircraft Category | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Single-Engine | 46 (94%) | 60 (95%) | 70 (95%) | 82 (95%) |
| Multi Engine Piston | 3 (6%) | 3 (5%) | 3 (4%) | 3 (4%) |
| Turbo-Prop | 0 (0%) | 0 (0%) | 1 (1%) | 1 (1%) |
| Business Jet | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Total Based Aircraft | 49 (100%) | 63 (100%) | 74 (100%) | 86 (100%) |

Note: Fleet mix percentages rounded to the nearest whole number.

Source: Lochner.

In 2031, the airport is expected to host one based single or multi-engine turbo-prop. This scenario would be the result of a locally based business upgrading its traditional, high-performance single engine aircraft and/or twin-piston airplane to a six seat TBM-700/850, a single-engine turbo-prop Pilatus PC-12 or the 10 passenger Beechcraft King Air 200/250.

Exhibit 2.1- Preferred Based Aircraft Demand, 2011-2031




Considering historic activity, current demand, projected turbine utilization rates, air transportation needs of the Fulton area and existing airfield facilities, the airport is not expected to host a based business jet during the short, intermediate and/or long term timeframe. Although the airport currently experiences charter and private business jet operations to and from Fulton on a monthly basis, and is continued to do so throughout the planning period, regional and/or national corporations with local business interests are not anticipated to move their flight operations to FTT. Locally based companies have also not indicated an inclination to purchase, operate and/or base a jet at FTT during the planning period.

Table 2.2 also summarizes the forecast based aircraft fleet mix for FTT though the end of the long-term planning period. Fleet mix is the relative percentage of a particular category of the based aircraft population and is dependent on specific operational and physical characteristics.

## OPERATIONAL DEMAND

Generally, there is a direct relationship between based aircraft and annual operations. Because based aircraft and annual operations have historically followed similar trends and growth rates, this analysis will compare the two and draw conclusions as to the potential estimated activity at the facility. The relationship between the two, known as operations per based aircraft (OPBA), will be examined whereby the estimated increase in activity—total aircraft operations—will be calculated and established. Table 2.3 and Exhibit 2.2 summarize the forecast of annual operations for FTT throughout the 20-year master planning period.

Table 2.3
Annual Operational Summary, 2011-2031

| Operations | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Local Operations (56%) | 6,900 | 10,000 | 11,700 | 13,600 |
| Itinerant Operations (44%) | 5,500 | 7,900 | 9,300 | 10,800 |
| Total Operations (100%) | 12,400 | 17,900 | 21,000 | 24,400 |
| Operational Projections from Previous Studies | | | | |
| 1998 Master Plan | 20,000 | 21,300 | 23,300 | - |
| MOSASP | 18,400 (2007) | 20,900 | 25,700 | - |
| Note: Figures rounded to the nearest hundred for planning purposes. | | | | |

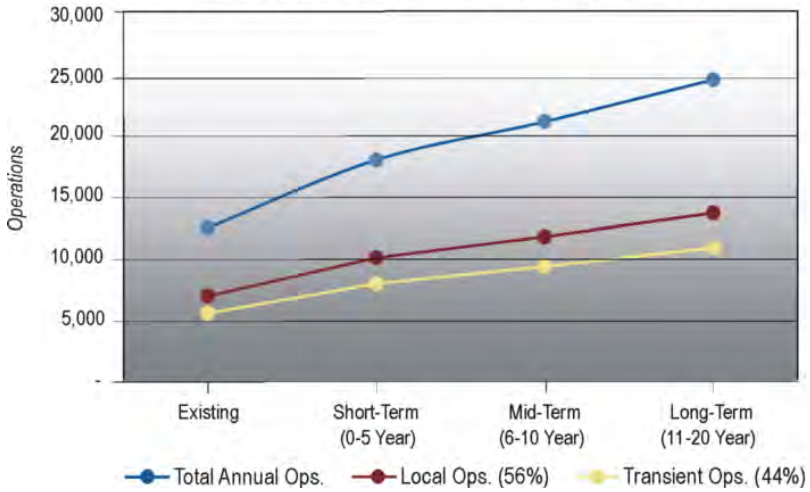
Source: Lochner.

**Operational Demand**

*For purposes of forecasting annual operations throughout the planning period, 284 OPBA was viewed as a reasonable expectation of long-range demand. Utilizing 284 OPBA to forecast operational activity yields an average annual growth of 3.4 percent. This OPBA figures is expected to include an additional 12,000 operations per year to total 24,400 annual takeoffs and landings in 2031.*

From 1990-2010, in comparing high and low OPBA estimates over that period, FTT's based aircraft fleet has averaged 318 OPBA. Also, FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) was considered in forecasting the airport's annual flight activity. For non-towered airports, Order 5090.3C recommends that 250 OPBA be used for small general aviation airports. In comparing the two estimates, an average of 284 OPBA was calculated. Accordingly, for purposes of forecasting annual operations throughout the planning period, 284 OPBA was viewed as a reasonable expectation of long-range demand. Utilizing 284 OPBA to forecast operational activity yields an average annual growth of 3.4 percent. More notably, in comparing the existing demand projections to the 1998 master plan and the MOSASP, the current forecasts closely correlate with past studies. The 1998 master plan projected 23,300 annual operations at the end of the forecast period while the MOSASP indicated an estimated 25,700 annual takeoffs and landings in the future.

Exhibit 2.2- Annual Operational Summary, 2011-2031




FTT's higher than average utilization rate of the based aircraft fleet can be attributed to the frequent use of personal and corporate owned piston aircraft for business purposes in addition to transient piston and turbine airplanes traveling to/from the airport on a regular basis. The Kingdom Pilots Association also has an active membership between 50 and 100 pilots who regularly conduct business and leisure-related activity at the airport. Basic and advanced flight training by the FBO, Fulton Flying Service, also contributes heavily to the high operational tempo for the facility.

### Local versus Itinerant Operations

Over the past 20 years, the relationship between local versus itinerant operations for the airport was approximately 56 percent local and 44 percent itinerant in nature. The relationship of local versus itinerant operations is expected to be maintained throughout the planning period. Local operations are expected to increase at an average annual rate of 3.5 percent while itinerant operations are expected to grow at a similar rate. These figures coincide with the airport's overall increase in operational activity. Table 2.3 and Exhibit 2.2 also summarize the share of local versus itinerant operations expected to be conducted at FTT.

### Air Taxi Operations

Air taxi operations are those that are conducted by local and/or transient single or twin-engine turbo-props and/or business jets generally weighing approximately 12,500 pounds with greater than six passenger seats. Air charter operations, also known as air taxi, are governed by FAR Part 135 while private individuals operating their own turbine airplane can operate under FAR Part 91. Corporate flight departments typically operate under FAR Part 91K. Table 2.4 and Exhibit 2.3 summarize the total projected FAR Part 135, 91 and/or 91K turbine operations expected to be conducted at FTT throughout the planning period.

**Operational Demand (con't.)**

*FTT's higher than average utilization rate of the based aircraft fleet can be attributed to the frequent use of personal and corporate owned piston aircraft for business purposes in addition to transient piston and turbine airplanes traveling to/from the airport on a regular basis. The Kingdom Pilots Association also has an active membership between 50 and 100 pilots who regularly conduct business and leisure-related activity at the airport. Basic and advanced flight training by the FBO, Fulton Flying Service, also contributes heavily to the high operational tempo for the facility.*

Table 2.4
Air Taxi Operational Summary, 2011-2031

| Operations | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Single/Multi-Engine Turbo-Prop | 300 | 300 | 400 | 400 |
| Business Jet | 100 | 100 | 100 | 300 |
| Total Air Taxi Operations | 400 | 400 | 500 | 700 |

Note: Figures rounded to the nearest hundred for planning purposes.
Note: FAA utilization rates and local/transient operational demand, combined, result in an annual operational growth of approximately three percent.

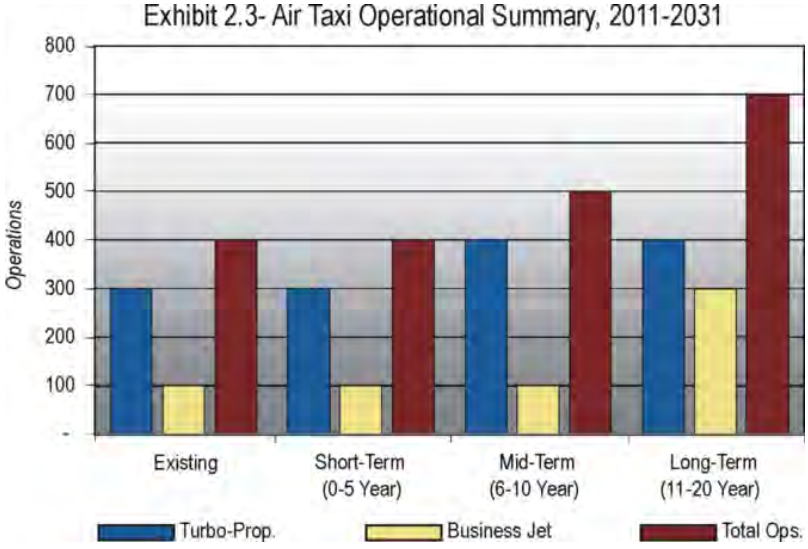
Source: Lochner.

**Air Taxi Activity**

*Operational activity by turbo-prop aircraft is expected to increase at a relatively slow pace resulting in an additional 100 operations by turbo-prop aircraft to total 400 annual operations at the conclusion of the planning period. Estimated demand is anticipated to be reflective of FAA utilization estimates for the turbo-prop market segment throughout. Ultimately, turbo-props using the airport are expected to consist mainly of business-owned and charter aircraft with six to 10 passenger seats weighing approximately 7,000 to 12,500 pounds.*

Operational activity by turbo-prop aircraft is expected to increase at a relatively slow pace, or approximately two percent annually, resulting in an additional 100 operations by turbo-prop aircraft to total 400 annual operations at the conclusion of the planning period. Estimated demand is anticipated to be reflective of FAA utilization estimates for the turbo-prop market segment throughout the planning period which yields an annual estimated growth of 1.7 percent. Increased operational demand at FTT during the mid-term planning period coincides with the potential upgrade by a local business from its current aircraft to a based single or twin turbine airplane. Ultimately, the turbo-props using the airport are expected to consist mainly of business-owned and charter aircraft with six to 10 passenger seats weighing approximately 7,000 to 12,500 pounds.

Exhibit 2.3- Air Taxi Operational Summary, 2011-2031




Although forecasted to increase in lock-step with FAA utilization estimates of nearly six percent throughout the planning period, operations by business jets at FTT are not expected to increase beyond 250 to 300 annual operations by the end of the planning period. The prime factor attributed to the airport's projected limited jet operations is the close proximity

of Columbia Regional (COU) and Jefferson City Memorial (JEF), both commercial service airports, to Fulton. These two airports have the airfield and terminal area facilities to readily accommodate the operation and storage of business jets by local, regional and national corporations with business interests in the Fulton/quad-county area. Ultimately, the business jets using the airport are expected to continue to consist of aircraft with four to six passenger seats weighing approximately 10,000 to 15,000 pounds. The increase in jet operations, albeit conservative, is expected to be the result of corporations increased usage of their airplanes for business purposes as they slowly recover from the recent recession.

### Operational Fleet Mix

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

Projected operational mix by a certain aircraft category can be determined by highlighting a category's share of the existing based aircraft fleet and apply that figure/percentage to the future operations for each aircraft category. For example, the single engine fleet, from 1990 to 2010, averaged 91 to 93 percent of the overall based aircraft. Given the parallel trends of operations versus based aircraft, it can be assumed that the same percentage of annual activity, or nearly 11,300 operations in 2010, is contributed by single engine airplanes. During the same period, the twin piston fleet averaged around six percent of the fleet which translates, in 2010, to 700 annual operations. Accordingly, this method was utilized to project the single and twin-piston operational mix at FTT throughout the planning period as indicated in Table 2.5. The operational mix for turbo-prop and jet aircraft was determined by taking into account FAA's annual turbine utilization estimates and applying them to the airport's annual operational fleet mix projections.

Table 2.5
Operational Fleet Mix Summary, 2011-2031

| Aircraft Category | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Single-Engine | 11,300 | 16,400 | 19,200 | 22,200 |
| Multi Engine Piston | 700 | 1,100 | 1,300 | 1,500 |
| Turbo-Prop | 300 | 300 | 400 | 400 |
| Business Jet | 100 | 100 | 100 | 300 |
| Total Annual Operations | 12,400 | 17,900 | 21,000 | 24,400 |

Note: Figures were rounded to the nearest hundred for planning purposes.

Source: Lochner.

Ultimately, single engine aircraft are expected to contribute approximately 22,200 total operations or nearly 91 percent of the annual activity at the airport. Multi-engine piston aircraft

### Air Taxi Activity (con't.)

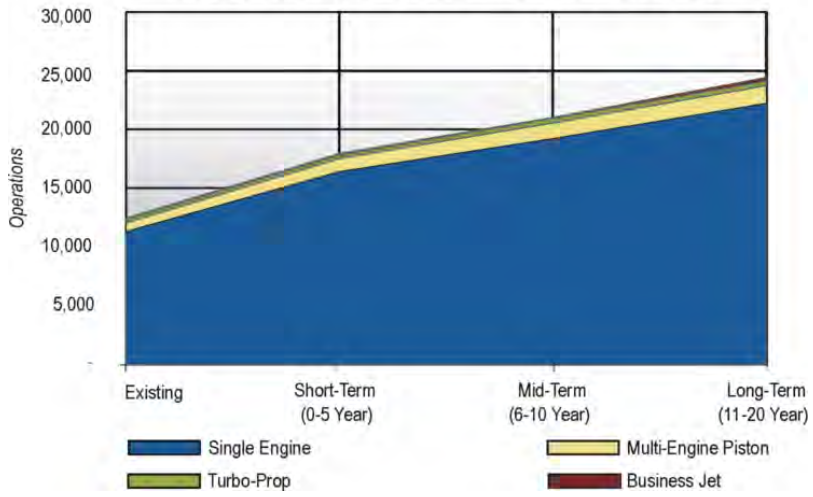
*Although forecasted to increase in lock-step with FAA utilization estimates of nearly six percent, operations by business jets are not expected to increase beyond 250 to 300 annual operations by the end of the planning period. The prime factor attributed to the airport's projected limited jet operations is the close proximity of Columbia Regional (COU) and Jefferson City Memorial (JEF), both commercial service airports, to Fulton. These two airports have the airfield and terminal area facilities to readily accommodate the operation and storage of business jets by local, regional and national corporations with business interests in the Fulton/quad-county area.*

### Operational Fleet Mix

*Ultimately, single engine aircraft are expected to contribute approximately 22,200 total operations or nearly 91 percent of the annual activity at the airport. Multi-engine pistons will potentially contribute approximately six percent of the airport's activity, or 1,500 annual operations. Single and multi-engine turbine airplanes are anticipated to conduct 400 operations accounting for nearly two percent of the yearly activity. Business jets, while conducting nearly 300 annual operations at the conclusion of the planning period, will account for one percent of the annual activity at FTT in 2031.*

are expected to contribute approximately six percent of the operational activity, or 1,500 annual operations, while single and multi-engine turbine airplanes are anticipated to conduct approximately 400 operations and account for approximately two percent of the yearly activity. Business jets, while conducting nearly 300 annual operations at the conclusion of the planning period, will account for one percent of the annual activity at FTT in 2031.

Exhibit 2.4- Operational Fleet Mix Summary, 2011-2031




**Military Operations**

Military operations at FTT average approximately 400 operations annually. Although future military operational levels at the airport may fluctuate slightly, it is expected that the current type and frequency of fixed and rotor wing activity will continue throughout the planning period.

## ANNUAL INSTRUMENT APPROACH DEMAND

**Annual Instrument Approaches**

*Of the approximate 1,000 annual IMC arrivals and departures projected in 2031, nearly 250 of those are estimated to be conducted by turbine powered airplanes. Ultimately, turbine aircraft are expected to conduct approximately 125 AIAs.*

Forecasts of annual instrument approaches (AIA) are generated to provide guidance in determining requirements for installation of NAVAID equipment and/or establishment of instrument approach procedures. Based on the volume of 1) approaches conducted in instrument conditions (AIAs) and 2) operations (approaches and departures) conducted during instrument meteorological conditions (IMC), the type and timing of future NAVAIDs can be determined. Technological and equipment improvements (airborne as well as ground based) will also affect NAVAID installation and published instrument approaches. Table 2.6 summarizes the forecast of annual instrument approaches for the airport throughout the 20-year planning period.

Table 2.6
Annual Instrument Approach Summary, 2011-2031

| Operational Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Total Itinerant Operations* | 5,500 | 7,900 | 9,300 | 10,800 |
| Percent IFR Rated Pilots | 55.0% | 55.6% | 56.2% | 56.5% |
| Percent IMC Conditions** | 9.0% | 9.0% | 9.0% | 9.0% |
| Total IMC Operations*** | 500 | 700 | 900 | 1,000 |
| Total AIAs | 250 | 350 | 450 | 500 |

Note: IMC operations estimates were rounded to the nearest hundred for planning purposes.
(*) Total itinerant operations include air taxi, military and transient activity.
(**) Total IMC operations include arrivals and departures in instrument weather conditions.
(***) Total AIAs represents the projected number of annual approaches in instrument weather conditions.

Source: Lochner.

The AIA forecast considers the existing and projected total IMC operations at the airport compared to the percentage of instrument rated pilots, as well as percent of instrument flight conditions in the area. This analysis will determine a projected annual instrument approach estimate for FTT. Currently, the airport experiences nearly 300 annual instrument approaches. Ultimately, these operations are expected to top 500 AIAs and are anticipated to be conducted by piston singles and twins, as well as civilian and military turbine airplanes and rotorcraft. According to the National Business Aircraft Association (NBAA), approximately 25 percent of all AIAs are conducted by air taxi and/or itinerant turbine aircraft operating in accordance with Part 91/91K and/or Part 135 regulations. Of the approximate 500 annual IMC arrivals and departures projected in 2031, nearly 125 of those are estimated to be conducted by turbine powered aircraft.

## ULTIMATE CRITICAL AIRCAFT

The critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 itinerant operations (combination of 250 takeoffs and landings) per year at an airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design and safety area standards, as well as structural and equipment needs for the airfield and terminal area facilities. Table 2.7 provides information regarding the ultimate critical aircraft.

The next generation Beechcraft King Air 250, or an aircraft with similar operational and physical characteristics, was chosen as the aircraft around which future terminal area and runway safety area parameters will be based. Due to its operational capabilities, passenger capacity, range, and continued production, the King Air represents a cross-section of a family of turbo-props that are anticipated to conduct regular operations at FTT throughout the planning period. The King Air, or a similar turbine aircraft, has the potential to be based

at the airport during the intermediate planning period (6-10 year) and is prevalent within the private, air charter, corporate and fractional ownership general aviation market segments.

Table 2.7
Ultimate Critical Aircraft-Beechcraft King Air 250

| Characteristic | Specifications and Performance |
|---|---|
| Airport Reference Code (ARC) | B-II |
| Wing Span | 57 ft. 11 in. |
| Length | 43 ft. 10 in. |
| Height | 14 ft. 10 in. |
| Seating (Crew + standard pax/max pax) | 1+ 8/10 |
| Maximum Takeoff Weight (MTOW) | 12,500 lb. |
| Maximum Landing Weight (MLW) | 12,500 lb. |
| Normal Approach Speed | 105 knots |
| Takeoff Field Length* | 2,111 feet |
| Landing Distance** | 2,845 feet |
| Maximum Range Performance*** | 1,582 NM |

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

Source: Hawker Beechcraft.

## SUMMARY

Table 2.8 summarizes the forecasts of projected aviation activity at Elton Hensley Memorial throughout the 20-year planning period.

FTT is expected to witness an increase in the based fleet by 37 aircraft and average 2.9 percent annual fleet growth throughout the planning period. The ultimate based fleet mix includes 82 single engine, three twin engine pistons and one turbo-prop.

Table 2.8
Demand Forecast Summary, 2011-2031

| Forecast Element | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Preferred Based Aircraft Demand | | | | |
| Single-Engine | 46 | 60 | 70 | 82 |
| Multi Engine Piston | 3 | 3 | 3 | 3 |
| Turbo-Prop | 0 | 0 | 1 | 1 |
| Business Jet | 0 | 0 | 0 | 0 |
| Total Based Aircraft | 49 | 63 | 74 | 86 |
| Annual Operational Demand | | | | |
| Local Operations | 6,900 | 10,000 | 11,700 | 13,600 |
| Itinerant Operations | 5,500 | 7,900 | 9,300 | 10,800 |
| Total Operations | 12,400 | 17,900 | 21,000 | 24,400 |
| Operational Fleet Mix | | | | |
| Single-Engine | 11,300 | 16,400 | 19,200 | 22,200 |
| Multi Engine Piston | 700 | 1,100 | 1,300 | 1,500 |
| Turbo-Prop | 300 | 300 | 400 | 400 |
| Business Jet | 100 | 100 | 100 | 300 |
| Total Annual Operations | 12,400 | 17,900 | 21,000 | 24,400 |
| Instrument Approach Demand | | | | |
| Total IMC Operations | 500 | 700 | 900 | 1,000 |
| Total AIAs | 250 | 350 | 450 | 500 |

Source: Lochner.

Annual operations are anticipated to experience an overall increase in operational activity by 12,000 takeoffs and landings to total approximately 24,400 annual operations. Local operations will comprise 56 percent of the overall 2031 activity and increase at a rate of approximately 3.5 percent annually totaling approximately 13,600 annual takeoffs and landings. At the conclusion of the 20-year planning period, transient operations are expected to total nearly 46 percent of the overall activity at the facility equaling nearly 10,800 annual operations. Air taxi operations conducted by turbo-prop and business jets are anticipated to increase from 400 operations per year to 700 operations in 2031. Lastly, at the conclusion of the master planning period, FTT is expected to experience approximately 1,000 IMC operations and nearly 500 AIAs per year.

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

3

3

# Facility Requirements

## INTRODUCTION

This chapter identifies the long-range airfield and terminal area facilities needed to satisfy the 20-year forecast of aviation demand for Elton Hensley Memorial. Facility needs have been identified based on the existing conditions of the airport, projected aviation demand and peak period aircraft and passenger activity. The identification of facility needs does not constitute a requirement, but options to improve and/or resolve operational or safety conditions, or complete capital improvements to the airside or landside components as demand warrants.

## PEAKING CHARACTERISTICS

The traffic demands imposed on an airport exhibit variations based on an annual, monthly, daily and hourly basis. These fluctuations result in periods of activity, known as peaks, which place the greatest demand on airfield and terminal area facilities to accommodate aircraft and passengers. As the need for aviation services increases so, too, does the demand for individual facilities to accommodate peak periods of activity. Peak periods must be considered when determining future facilities so that airfield and terminal area components are effectively utilized in order to accommodate projected demand.

The airport's peaking characteristics analysis will forecast peak period demand for aircraft operations, as well as passenger activity. This peaking analysis takes into account normal periods of airport activity. Lastly, evaluation of FTT's peak periods is organized into peak month/average day and peak hour passenger estimates for the short, intermediate and long-term (11-20 year) phases throughout the 20-year master plan period.

### Peak Month/Average Day (PMAD) Demand

Historic operational activity was evaluated to identify trends of the average day of the peak month. Typically, peak operations at general aviation airports such as FTT occur during the months of July or August. Some airports, like FTT, may have peak hour operations as high as 12 to 20 percent of daily total operations. Due to regular operation by locally based piston and transient turbo-prop airplanes as well as limited jet aircraft activity, it is assumed that approximately 2,000 operations, or nearly 16 percent of the total activity, occur during the peak months. This peak hour operational trend is expected to continue throughout the 20-year planning period.

To arrive at the average day of peak month (Design Day) operational total, the PMAD activity was divided by the number of days in the peak month (30). Peak Hour operational projections are the result of the Design Day compared to the ratio of activity occurring during the peak month (16 percent). Table 3.1 summarizes the peak operational estimates for the airport.

Table 3.1
PMAD Operational Demand Summary

| Forecast Methodology | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Annual Operational Demand | 12,400 | 17,900 | 21,000 | 24,400 |
| Peak Month (PMAD) Operations | 2,000 | 2,900 | 3,400 | 3,900 |
| Design Day (PMAD) Operations | 67 | 97 | 113 | 130 |
| Peak Hour Operations | 11 | 16 | 18 | 21 |

Note: Figures rounded to the nearest hundred for planning purposes.

Source: Lochner; FTT Demand Forecasts.

### Peak Operational Demand

*Currently, the airport is estimated to experience approximately 67 design day operations. This activity level translates into 11 operations during peak hour periods. Long-term, the airport is expected to experience as many as 130 design day operations and 21 peak hour operations totaling approximately 10 departures per peak hour.*

Peak month operations are projected to increase from approximately 2,000 to nearly 4,000 monthly operations at the conclusion of the 20-year planning period. Currently, the airport is estimated to experience approximately 67 design day operations. This activity level translates into 11 operations during peak hour periods. Long-term, the airport is expected to experience as many as 130 design day operations and 21 peak hour operations totaling approximately 10 departures per peak hour. Ultimately, operational peaking characteristics will have the most influence on apron area needs and the number of tie-down spaces to accommodate peak hourly demand at the facility.

### Peak Hourly Passenger Activity

Planning for the proper space allowances needed for terminal building facilities and passenger circulation requires hourly volumes of activity consistent with the average daily baseline of activity at an airport. Peak hourly passenger activity forecasts are generated by determining peak monthly passenger activity based on enplanement estimates. In the case of FTT, assumptions were made as to what the reasonable level of passenger traffic

would be during peak periods of operational activity. Table 3.2 summarizes the peak hour passenger activity estimates throughout the planning period.

Table 3.2
Peak Hour Passenger Demand Summary

| Forecast Methodology | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Annual Operational Demand | 12,400 | 17,900 | 21,000 | 24,400 |
| Peak Month Demand | 2,000 | 2,900 | 3,400 | 3,900 |
| Design Day Demand | 67 | 97 | 113 | 130 |
| Peak Hour Passengers | 11 | 16 | 18 | 21 |

Note: Figures rounded to the nearest hundred for planning purposes.

Source: Lochner; FTT Demand Forecasts.

To determine the peak hourly demand, it was assumed that peak passenger activity would be similar to that of the operational peaking activity, or approximately 16 percent of average day activity. In terms of passenger and operational activity, as airport activity increases, the peak of activity tends to spread out throughout the day. This fact shows that as aircraft operations increase so, too, does the level of passenger traffic. Absent historic passenger activity, the projected peak hour passenger totals are expected to reflect design day or peak operational trends. Currently, the airport is estimated to experience approximately 11 peak hour passengers. Ultimately, 21 peak hour passengers are anticipated to access the terminal building under normal operating conditions.

**Peak Passenger Demand**

*Currently, the airport is estimated to experience approximately 11 peak hour passengers. Ultimately, 21 peak hour passengers are anticipated to access the terminal building under normal operating conditions.*

## AIRFIELD AND AIRSPACE REQUIREMENTS

The determination of airfield and airspace requirements includes 1) an assessment of the airport's ability to accommodate projected activity levels, 2) evaluation of its compliance with FAA safety standards and recommended design guidelines, and 3) a determination of design standards for new facilities and/or the improvement of existing facilities.

Airfield components include runway requirements such as dimensional criteria, length, width and pavement strength, as well as taxiway requirements, airfield marking and lighting needs. Airspace needs include approach surface slope, approach type and approach minimums to the runway environment.

### Runway Requirements

Existing and future runway needs will be examined with respect to dimensional criteria, orientation, length, width, and pavement strength. Ultimate runway requirements were prepared pursuant to FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, Change 13 and FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

**Safety Area Criteria**

*The ultimate safety dimensional criteria for the airport, and Runway 18-36, in particular, is recommended to be capable of accommodating 100 percent of the GA aircraft fleet weighing less than 12,500 pounds and capable of carrying less than 10 passengers.*

*Safety Area Criteria*

Table 3.3 illustrates the dimensional standards for Runways 18-36, 6-24, and 12-30. Considering the existing primary runway length and safety area dimensions, the airport's existing Airport Reference Code (ARC) is B-II. This ARC is expected to accommodate 100 percent of the GA aircraft fleet weighing less than 12,500 pounds with less than 10 passenger seats. The existing and ultimate critical aircraft for FTT has been identified as the Beechcraft King Air 250 (ARC B-II). Accordingly, the ultimate safety dimensional criteria for the airport, and Runway 18-36, in particular, is recommended to be capable of accommodating 100 percent of the GA aircraft fleet weighing less than 12,500 pounds and capable of carrying less than 10 passengers.

The crosswind Runway 6-24, an ARC B-I runway, has been designed for use by small single and twin-piston aircraft. Therefore, Runway 6-24 is recommended to remain capable of accommodating 95 percent of small aircraft weighing less than 12,500 pounds with fewer than 10 passenger seats, or ARC B-I.

The turf crosswind Runway 12-30, an ARC A-I runway, has been designed exclusively for use by small single engine aircraft. Runway 12-30 is recommended to remain capable of accommodating small single-engine aircraft throughout the planning period.

**Runway Orientation**

*The alignment of the primary and crosswind runway is sufficient to satisfy FAA recommended wind coverage needs of the airport.*

*Due to the wind coverage offered by primary and crosswind runways, the turf Runway 12-30 is not needed to satisfy FAA recommendations pertaining to crosswind conditions.*

*Orientation*

The desirable wind coverage is 95 percent for the primary runway and is computed based on the crosswind component not exceeding 10.5 knots for small ARC A-I/B-I aircraft. Small aircraft are recommended to be able to operate approximately 95 percent of a given period without experiencing a crosswind component greater than 10.5 knots.

As indicated in Chapter 1, *Wind Analysis*, the runway system at FTT provides adequate wind coverage for small aircraft at 10.5 knots of crosswind. In particular, the paved Runways 18-36 and 6-24 provide 95.6 percent wind coverage for 10.5 knot crosswinds during all-weather wind conditions. Therefore, the alignment of the primary and crosswind runway is sufficient to satisfy FAA recommended wind coverage needs of the airport.

Due to the wind coverage offered by primary and crosswind runways, the turf Runway 12-30 is not needed to satisfy FAA recommendations pertaining to crosswind conditions. However, given the high utilization of the runway, as well as the city's desire to keep the runway open for local and transient pilots, 12-30 is recommended to remain open throughout the planning period.

Table 3.3
Existing and Ultimate Runway Safety Area Dimensions

| Runway Item | Runway 18-36 (E/U) Standards (Ft.) ARC B-II | Runway 6-24 (E/U) Standards (Ft.) ARC B-I | Turf Rwy 12-30 (E/U) Standards (Ft.) ARC A-I |
|---|---|---|---|
| Runway Width | 75 | 47 (E)/ 60 (U) | 100 (E)/120 (U) |
| Runway Safety Area (RSA): | | | |
| RSA Width | 150 | 120 | 120 |
| RSA length beyond runway end | 300 | 240 | n/a |
| Object Free Area (OFA): | | | |
| OFA Width | 500 | 400 | 250 |
| OFA length beyond runway end | 300 | 240 | n/a |
| Obstacle Free Zone (ROFZ): | | | |
| ROFZ Width | 400 | 250 | 250 |
| ROFZ length beyond runway end | 200 | 200 | n/a |
| Runway Protection Zone (RPZ): Primary Runway End | | | |
| Inner Width | 500 | 500 | 250 |
| Outer width | 700 | 700 | 450 |
| Length | 1,000 | 1,000 | 1,000 |
| Runway Protection Zone (RPZ): Other Runway End | | | |
| Inner Width | 500 | 500 | 250 |
| Outer width | 700 | 700 | 450 |
| Length | 1,000 | 1,000 | 1,000 |
| Runway to Parallel Taxiway CL | 240 | 225 | n/a |
| Runway CL to Aircraft Parking | 250 | 200 | 125 |
| Runway to Taxiway Hold Line | 200 | 200 | n/a |

Runway Safety Area (RSA): The RSA is a two-dimensional 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.
Object Free Area (OFA): The OFA is a two-dimensional area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for those that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.
Runway Obstacle Free Zone (ROFZ): The OFZ is the airspace below 150 feet above the a established airport elevation and centered on the runway centerline that is required to be clear of all objects, except for frangible visual post mounted NAVAIDS expressly located in the OFZ by function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches.
Runway Protection Zone (RPZ): The purpose of the RPZ is to enhance the protection of people and property on the ground, and to prevent obstructions to aircraft. The RPZ is a two-dimensional trapezoid area beginning 200 feet beyond the paved runway end, and extends along the runway centerline. The RPZ size is determined by the aircraft approach category of airplanes expected to utilize the airport, as well as the type of instrument approach or minimum visibility to the runway ends. The FAA recommends that airport sponsor own the RPZ property in fee simple, and that the RPZ be clear of any non-aeronautical structure of public assembly or object that would interfere with the arrival and departure of aircraft.

Source: FAA AC 150/5300-13, *Airport Design*, Change 13.

**Runway Length**

*Considering the airport's future critical aircraft, which is expected to be an ARC B-II turbo-prop aircraft, the usable length of Runway 18-36 is recommended to remain 4,000 feet. Based on projected demand and FAA crosswind runway recommendations, Runway 6-24 is recommended to be extended from 3,203 feet to a future length of 3,400 feet. Lastly, the turf Runway 12-30 is recommended to be 1,800 feet in length, which is 688 feet less than its current dimension of 2,488 feet.*

*Length*

The determination of runway length requirements for general aviation airports was derived from FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Runway lengths for small aircraft (less than 12,500 lbs.) consider performance curves of propeller and some turbo-prop aircraft including maximum takeoff and landing weights; headwind component; optimal flap settings for normal operations; elevation above mean sea level; and mean maximum daily temperature for the airport. The recommended runway length for small piston aircraft should accommodate 95 percent of the small GA aircraft fleet with less than 10 passenger seats. Additionally, the recommended runway length for turbo-prop aircraft conducting operations at FTT, and aircraft similar to the type identified as the airport's existing and future critical aircraft, should accommodate 100 percent of the GA fleet with less than 10 passenger seats. Table 3.4 illustrates the airport's length requirements for each runway taking into consideration varying operational variables.

Ultimately, considering the airport's future critical aircraft, which is expected to be an ARC B-II turbo-prop aircraft, the usable length of Runway 18-36 is recommended to remain 4,000 feet. Based on projected demand and FAA crosswind runway recommendations, Runway 6-24 is recommended to be extended from 3,203 feet to a future length of 3,400 feet. Lastly, the turf Runway 12-30 is recommended to be 1,800 feet in length, which is 688 feet less than its current dimension of 2,488 feet.

Table 3.4
Runway Length Requirements Summary

| Airport and Runway Data | Variable |
|---|---|
| Airport elevation (mean sea level- MSL) | 886 feet |
| Mean daily maximum temperature of the hottest month | 89° F |
| Ultimate Critical Aircraft (ARC B-II) | Beechcraft King Air 250 |
| **Runway Lengths for Small Airplanes w/ MTOW of 12,500 lbs. or Less (100% of GA Fleet)** | **Length (Feet)** |
| Runway 18-36 Existing Length | 4,000 |
| Runway 18-36 Recommended Length | 4,000 |
| **Runway Lengths for Small Airplanes w/ MTOW of 12,500 lbs. or Less (95% of GA Fleet)** | **Length (Feet)** |
| Runway 6-24 Existing Length | 3,203 |
| Runway 6-24 Recommended Length | 3,400 |
| **Runway Lengths for Turf Runways** | **Length (Feet)** |
| Runway 12-30 Existing Length | 2,488 |
| Runway 12-30 Recommended Length* | 1,800 |

MTOW- Maximum Takeoff Weight
(*) Length requirements considers maximum takeoff weight of a 2,300 pound tricycle gear aircraft; zero wind; dry, grass runway; and flaps up. Operation on a dry, grass runway, included increasing the "ground roll" by 15 percent. Recommended runway length also considers total distance to clear a 50 foot obstacle.

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

Chapter 2, *Demand Forecasts*, projected limited operational activity by charter and privately owned turbo-prop and business jets throughout the planning period considering historic activity; projected turbine utilization rates; air transportation needs of the Fulton area; and existing airfield facilities. Lack of additional business jet operations and/or a locally based jet was attributed to corporations with local business interests not having any firm plans to move their flight operations to FTT. Locally based companies had also not indicated an inclination to purchase, operate and/or base a jet at the airport during the planning period. Another factor attributed to the airport's limited jet operations is the close proximity of Columbia Regional (COU) and Jefferson City Memorial (JEF), both commercial service airports, to Fulton. These airports have the facilities to readily serve a wide variety of business jets flying to and from the Fulton/quad-county area.

Although the demand forecasts project business jet activity less than what is necessary to justify extending the primary runway, it is always feasible to plan for additional runway length to accommodate business jets beyond forecasted levels should the demand arise. Table 3.5 illustrates the recommended length requirements for Runway 18-36 in the event the airport experiences greater than 500 transient jet operations or hosts a based business jet at some point during the planning period.

Table 3.5
Runway 18-36 Expansion Scenario

| Airport and Runway Data | Variable |
|---|---|
| Airport elevation (mean sea level- MSL) | 886 feet |
| Mean daily maximum temperature of the hottest month | 89° F |
| Ultimate Critical Aircraft (ARC B-II) | Cessna Citation Encore |
| Maximum difference in runway centerline elevation | 0 feet |
| Percent of Fleet/Useful Load (%) | 75/60 |
| **Runway Lengths for Airplanes w/ MTOW of ≥12,500 lbs. up to 60,000 lbs.** | **Length (Feet)** |
| Runway 18-36 Existing length | 4,000 |
| Runway 18-36 Recommended Length (75% of GA Fleet at 60% Useful Load) | 4,800 |
| Runway 18-36 (Runway Gradient-0.0%) | 4,800 |
| Runway 18-36 (Wet Pavement Condition)* | 5,500* |

MTOW- Maximum Takeoff Weight
(*) Runway length requirements for jet powered airplanes obtained from the 60 percent useful load curves are increased by 15 percent or up to 5,500 feet, whichever is less.

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

Runway lengths for large aircraft (12,500 lbs. up to 60,000 lbs.) consider performance curves derived from FAA-approved flight manuals for turbo-prop and business jet aircraft developed in accordance with provisions of Federal Aviation Regulation (FAR) Part 25, *Airworthiness Standards: Transport Category Airplanes and Part 91, General Operating and Flight Rules*. Landing and takeoff operational adjustments such as load factor, runway gradient and pavement conditions are those variables which have the most influence on runway length requirements for large airplanes.

To accommodate regular activity by transient and/or locally based business jets, the usable length of Runway 18-36 would be recommended to be 4,800 feet. This length is less than the 5,500 foot length FAA recommends for wet pavement conditions. The 4,800 foot length considers the annual rainfall in the area as well as the economic, operational and environmental feasibility of runway expansion. The costs of expanding the runway beyond the recommended length would potentially outweigh the benefits considering monthly and annual rainfall compared to potential jet operational activity occurring during inclement weather conditions.

The critical aircraft chosen to determine runway length requirements for the 18-36 expansion scenario is the Cessna Citation 'Encore'. The Citation Encore is a seven passenger aircraft with a maximum takeoff weight of nearly 17,000 pounds capable of a maximum range of nearly 1,800 nautical miles. The Citation Encore, or a business jet aircraft with similar operational and physical characteristics, was chosen for its sophistication, operational capabilities, passenger capacity and range. The Encore is also highly prevalent within the private, air taxi and fractional ownership general aviation market segments and represents a cross-section of jet aircraft that conduct operations to and from airports similar to FTT on a regular basis.

**Runway Width**

*The current width of 75-foot for Runway 18-36 will be sufficient to accommodate projected demand and is recommended to remain unchanged throughout the planning period. Runway 6-24 is recommended to be widened from its current width of 47 feet to 60 feet. Additionally, the turf Runway 12-30 is recommended to be widened from 100 feet to 120 feet.*

*Width*

The recommended runway width is a function of approach visibility minimums and the facility's airport reference code. The ARC is a combination of the critical airplane's approach category (approach speed) and airplane design group (wingspan). The current width of 75-foot for Runway 18-36 will be sufficient to accommodate projected demand and is recommended to remain unchanged throughout the planning period. Runway 6-24 is recommended to be widened from its current width of 47 feet to 60 feet. Additionally, the turf Runway 12-30 is recommended to be widened from 100 feet out to 120 feet. Based on FAA design guidelines for turf runways, the width of the runway corresponds to the runway's safety area width, which is also recommended to be 120 feet, as indicated in Table 3.3.

**Pavement Strength**

*For Runway 18-36, the current weight bearing capacity of 30,000 pounds for single wheel gear (SWG) is sufficient to accommodate projected demand throughout the planning period. Runway 6-24's current weight bearing capacity is also sufficient to accommodate projected demand.*

*Pavement Strength*

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

FTT's ultimate critical aircraft, the King Air 250, has a maximum takeoff weight of 12,500 pounds. For Runway 18-36, the current weight bearing capacity of 30,000 pounds for single wheel gear (SWG) is sufficient to accommodate projected demand throughout the planning period. Runway 6-24's current weight bearing capacity is also sufficient to accommodate projected demand.

**Taxiway Requirements**

The taxiway system exists to serve as a defined area to accommodate the movement of aircraft to and from the runway, as well as to serve as a transit system between the airside and terminal area. This section will evaluate the capability of the airport's present and future taxiway system to accommodate aircraft demand.

FTT's taxiway system was previously described in Chapter 1, Table 1.2 and depicted on Exhibits 1.2 and 1.3. Considering current and projected demand, and according to FAA-recommended taxiway design guidelines, Runway 18-36 is recommended to be served by a 35-foot wide full-length parallel taxiway to serve small and large aircraft. Ultimately, the runway centerline to taxiway centerline separation distance is recommended to be 240 feet. All connector and access taxiways associated with the parallel taxiway are recommended to be 35 feet wide as well.

Runway 6-24 is recommended to be served by 25-foot wide partial parallel taxiway with a runway to taxiway centerline separation distance of 225 feet. As with the parallel taxiway, future access and connector taxiways associated with 6-24 are recommended to be 25 feet wide.

Lastly, The weight bearing capacity for the airport's taxiway system is recommended to accommodate, at minimum, 12,500 pounds for single wheel gear aircraft.

**Marking and Lighting Requirements**

The airport's airfield markings and lighting systems were described in Chapter 1, *Airfield Facilities*, Table 1.2. This section will offer recommendations regarding airfield markings as well as lighting systems to be utilized at the airport.

*Airfield Markings*

Ultimately, Runway 18-36 is recommended to remain marked as a non-precision runway given existing and future (RNAV) GPS and LPV instrument approach procedures to the airport. Runway 6-24 is recommended to remain marked as a non-precision runway as well. Additionally, FTT's current and future taxiway system is recommended to be marked in accordance with FAA AC 150/5340-1J, *Standards for Airport Markings*.

*Runway and Taxiway Lighting*

Runway 18-36 is recommended to be continually equipped with pilot-controlled, stake mounted, medium intensity runway lighting (MIRL), as well as the red and green omni-directional threshold lights. Runway 6-24 is also recommended to remain equipped with pilot-controlled MIRL and threshold lighting.

Ultimately, Runway 18-36's taxiway system is recommended to be equipped with medium

**Taxiway Needs**

*Runway 18-36 is recommended to be served by a 35-foot wide full-length parallel taxiway to serve small and large aircraft. All connector and access taxiways associated with the parallel taxiway are recommended to be 35 feet wide as well.*

*Runway 6-24 is recommended to be served by 25-foot wide partial parallel taxiway with a runway to taxiway centerline separation distance of 225 feet.*

**Airfield Markings**

*Runway 18-36 is recommended to remain marked as a non-precision runway. Runway 6-24 is recommended to remain marked as a non-precision runway as well.*

**Airfield Lighting**

*Runways 18-36 and 6-24 are recommended to be continually equipped with pilot-controlled, medium intensity runway lighting (MIRL), omni-directional threshold lights and REILs. The taxiway system serving both runways is recommended to be equipped with medium intensity taxiway lighting (MITL).*

intensity taxiway lighting (MITL). Runway 6-24's taxiway system is also recommended to be equipped with MITL in the future.

*Runway End Indicator Lights (REIL)*

REILs include high intensity, photo strobe lights used for rapid identification of the thresholds during night and inclement weather conditions. Ultimately, both Runway 18-36 and 6-24 are recommended to retain the REILs servicing the runways' thresholds throughout the planning period.

*Visual Approach Aids*

Precision Approach Path Indicators (PAPI) emit a sequence of colored light beams providing continuous visual descent guidance information along the desired final approach descent path (normally at 3 degrees for 3 nautical miles during daytime, and up to 5 nautical miles at night) to the runway touchdown point. Runway 18-36 is recommended to be continuously served by a four box PAPI-4L system throughout the planning period.

**Visual Approach Aids**

*Runway 18-36 is recommended to be continuously served by a four box PAPI-4L system throughout the planning period. Runway 6-24 is also recommended to be served by a two-box PAPI system in the future.*

The simplified abbreviated visual approach slope indicator (SAVASI-2L) serving Runway 6-24 is recommended to be upgraded during the planning period with a two box PAPI system. The SAVASI-2L consists of two light boxes with a single lamp in each box and functions in a similar way that the PAPI system provides approach guidance to the runway. The SAVASI is designed for nonjet, utility runways and provides descent information under daytime conditions to a distance of 1.5 nautical miles.

**Airspace Requirements**

Exhibit 3.1 depicts FAR Part 77 imaginary airspace surfaces which include the primary, horizontal, transitional, approach, and conical surfaces. Most importantly, the approach surface is a three-dimensional trapezoidal-shaped imaginary surface beyond each runway end and has a defined slope. The three slopes for an approach are 20:1, 34:1 and 50:1. The purpose of the approach surface is to provide proper clearance over structures and objects beyond the runway threshold for the safe approach and landing of aircraft based on a specified approach path.

**Airspace Needs**

*Given the operational characteristics of the future critical aircraft, coupled with projected aircraft demand throughout the planning period, the 34:1 non-precision approaches to Runway 18-36 are recommended to remain in place throughout the planning period. Runway 6-24 is also recommended to retain its non-precision approach capabilities into the future.*

FTT's published instrument approach procedures were described in Chapter 1, Table 1.1. Currently, Runway 18-36 has published 34:1 straight-in, non-precision RNAV(GPS) and LPV approaches to both thresholds utilizing Wide Area Augmentation System (WAAS) technology([1]). Runway 6-24 also has published 20:1 non-precision RNAV(GPS) approaches to both thresholds.

1. WAAS—Emerging technologies including WAAS, as well as Local Area Augmentation System (LAAS), are expected to replace the ILS as the primary means of establishing precision instrument approaches. LAAS is an augmentation to GPS signals that is focused on a 20 to 30 mile radius around an airport with LAAS capabilities. LAAS is broadcast via a VHF radio data link from a ground based transmitter yielding highly accurate information to accommodate ½-mile visibility minimum instrument approaches. WAAS utilizes the same technology as that of LAAS but affords an even larger operational area providing enhanced GPS services to airports within a 200 to 300 mile area.

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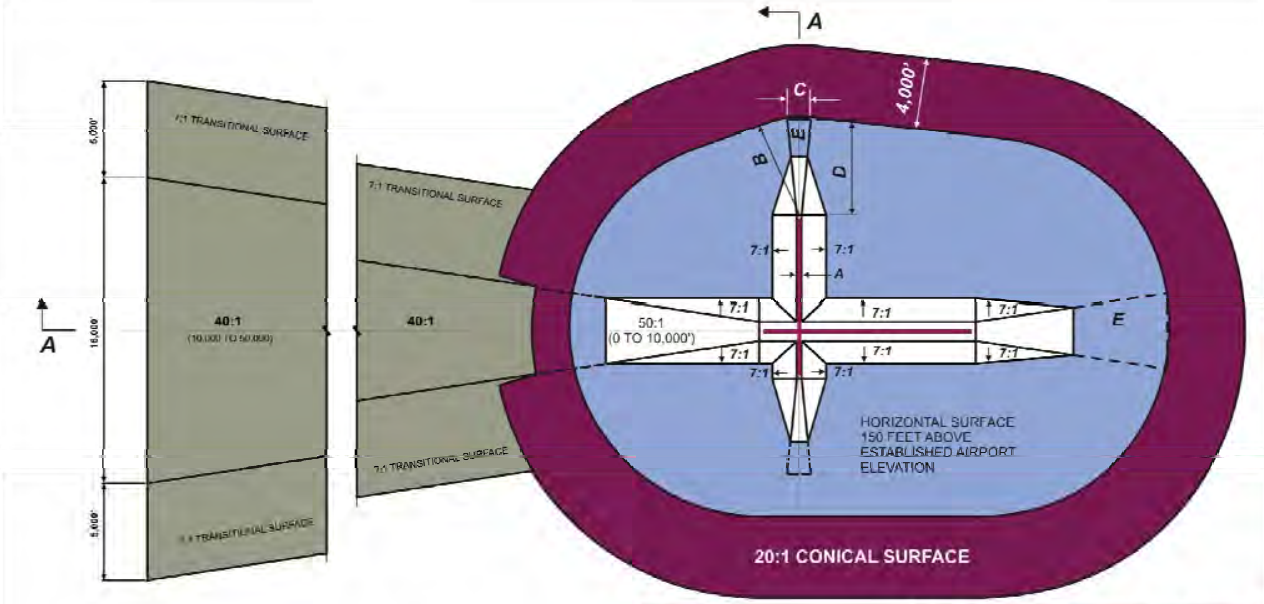
# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 3.1

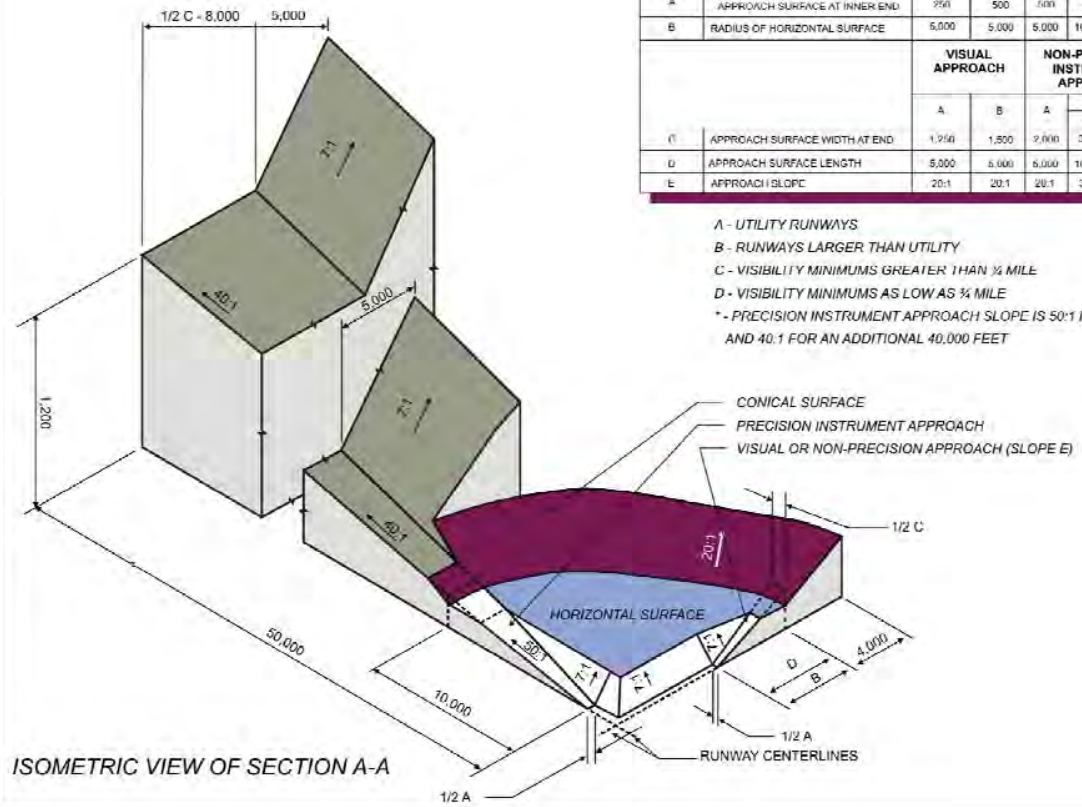
**Part 77 Imaginary Airspace Surfaces**




PLAN VIEW

| DIM | ITEM | DIMENSIONAL STANDARDS (FEET) | | | | | |
|---|---|---|---|---|---|---|---|
| | | VISUAL APPROACH | | NON-PRECISION INSTRUMENT APPROACH | | | PRECISION INSTRUMENT RUNWAY |
| | | A | B | A | B | | |
| | | | | | C | D | |
| A | WIDTH OF PRIMARY SURFACE & APPROACH SURFACE 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 RUNWAY |
| | | 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 ¾ MILE*
*D - VISIBILITY MINIMUMS AS LOW AS ¾ 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:* FAR Part 77, *Objects Affecting Navigable Airspace*.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

city of Fulton
Proudly Serving You

Lastly, turf Runway 12-30 has 20:1 visual approach slopes to both thresholds. Given the operational characteristics of the future critical aircraft, coupled with projected aircraft demand throughout the planning period, the 34:1 non-precision approaches to Runway 18-36 are recommended to remain in place throughout the planning period. Runway 6-24 is also recommended to retain its non-precision approach capabilities into the future.

## OTHER AIRFIELD REQUIREMENTS

This section provides brief planning recommendations for FTT's airport beacon and weather reporting system.

**Airport Beacon**

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

**Weather Reporting System**

An Automated Weather Observation System (AWOS) is a suite of sensors which measures, collects and disseminates weather data on a minute-to-minute basis to assist pilots with monitoring weather conditions and flight planning. An AWOS measures weather parameters such as airport identifier, time of observation, wind speed and direction, temperature and dew point, visibility, cloud ceilings and types, precipitation, and barometric pressure. Ultimately, FTT is recommended to be served by an AWOS-III system. The AWOS is also recommended to be located within the airfield operations area and sited approximately 500 feet from the centerline of Runway 18-36 and within 1,000 feet from either runway threshold.

## AIRFIELD AND AIRSPACE FACILITY REQUIREMENTS SUMMARY

Table 3.6 summarizes the airfield/airspace facility requirements for FTT throughout the planning period. Items identified within Table 3.6 are those that require either maintaining current facilities and/or upgrade and expansion according to design criteria and are based on projected aviation demand.

Table 3.6
Airfield and Airspace Facility Requirements Summary

| Facility Type | Recommendations |
|---|---|
| **Airfield Dimensional Criteria** | |
| Runway 18-36 | Maintain ARC B-II design standards |
| Runway 6-24 | Maintain ARC B-I standards |
| Runway 12-30 | Maintain ARC A-I (small aircraft only) standards |
| **Runway Dimensions (Length and Width)** | |
| Runway 18-36 | Maintain 4,000' x 75' dimensions |
| Runway 6-24 | Extend from 3,203 to 3,400 feet; widen from 47 to 60 feet |
| Runway 12-30 | Shorten to 1,800; widen to 120 feet |
| **Pavement Design Strength (All Paved Surfaces)** | |
| Runway 18-36 | Maintain current pavement strength of 30,000 SWG |
| Runway 6-24 | Maintain current pavement strength of 30,000 SWG |
| Runway 12-30 | n/a |
| **Taxiway System** | |
| Runway 18-36 | Construct full-length parallel taxiway; 35-foot width; and 240 foot runway to taxiway centerline distance; install MITL |
| Runway 6-24 | Construct partial parallel taxiway; 25-foot width; and 225 foot runway to taxiway centerline distance; install MITL |
| Runway 12-30 | n/a |
| **Airfield Markings** | |
| Runway 18-36 | Maintain NP markings |
| Runway 6-24 | Maintain NP markings |
| Runway 12-30 | n/a |
| **Runway Lighting** | |
| Runway 18-36 | Maintain MIRL, threshold lights and REILs; maintain PAPI-4L |
| Runway 6-24 | Maintain MIRL, threshold lights and REILs; upgrade SAVASI-2L to PAPI-2L |
| Runway 12-30 | n/a |
| **Airspace Requirements** | |
| Runway 18-36 | Maintain 34:1 NP approach surfaces |
| Runway 6-24 | Maintain 20:1 NP approach surfaces |
| Runway 12-30 | Maintain 20:1 visual approach surfaces |
| **Other Airfield Requirements** | |
| Airport Beacon | Maintain in current location and upgrade when necessary |
| AWOS | Install AWOS-III within the airfield operations area |

SWG-Single Wheel Gear
NP-Non-Precision
MIRL-Medium Intensity Runway Lighting
MITL-Medium Intensity Taxiway Lighting
REIL-Runway End Indicator Lights
PAPI-Precision Approach Path Indicator
SAVASI- Simplified Abbreviated Visual Approach Slope Indicator

Source: Lochner.

# TERMINAL AREA REQUIREMENTS

The airport's terminal area facilities include the passenger terminal building, auto parking area, aircraft hangars, aircraft parking apron, as well as support facilities including fuel storage capabilities, snow removal, and equipment (SRE) structures and aircraft maintenance.

**Terminal Building Needs**

*From a spatial standpoint, the terminal building is not considered conducive to supporting necessary administrative and passenger processes including accommodations such as flight planning, pilot lounge and passenger circulation areas due to its overall size and layout. Accordingly, construction of a new 3,200 square foot terminal building is recommended during the 20-year planning period.*

## Passenger Terminal Building

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

The passenger terminal building was discussed in Chapter 1, *Terminal Area Facilities*. The recommended terminal functional areas including square footage and parking facilities were determined by referring to FAA AC 150/5360-13, *Planning and Design for Airport Terminal Facilities*, as well as FAA AC 150/5390-9, *Planning and Design of Terminal Facilities at Non-Hub Locations*. Table 3.7 summarizes the terminal building spatial needs throughout the 20-year master plan period.

Table 3.7
Terminal Building Needs Summary

| Operational Activity/Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Annual Operational Demand (Operations) | 12,400 | 17,900 | 21,000 | 24,400 |
| Peak Month (PMAD) Operations | 2,000 | 2,900 | 3,400 | 3,900 |
| Design Day Operations | 67 | 97 | 113 | 130 |
| Peak Hour Passengers | 11 | 16 | 18 | 21 |
| Square Feet/Peak Hour Passenger | 150 sq. ft. | | | |
| Terminal Bldg. Spatial Needs (sq. ft.) | 1,700 | 2,400 | 2,700 | 3,200 |
| Existing Passenger Terminal Space Available | 900 sq. ft. | | | |
| Terminal Building Space (Deficit) (sq. ft.) | (800) | (1,500) | (1,800) | (2,300) |

Note: Figures rounded to the nearest hundred for planning purposes.
Note: Peak month and peak hour passenger activity is assumed to be 16 percent of the annual activity for FTT.

Source: FAA AC 150/5360-13 and FAA AC 150/5390-9; Lochner.

The existing terminal building is expected to have a 2,300 square foot deficit of floor space at the conclusion of the planning period. Currently, the terminal building has a deficit of

approximately 800 square feet of floor space. From a spatial standpoint, the terminal building is not considered conducive to supporting necessary administrative and passenger processes including accommodations such as flight planning, pilot lounge and passenger circulation areas due to its overall size and layout. Construction of a new 3,200 square foot terminal building is recommended during the 20-year planning period. The terminal building is expected to have a deficit of 1,500 square feet during the short-term period; 1,800 square feet during the mid-term; and 2,300 square feet during the 11-20 year timeframe. Design and construction of a new facility is recommended to commence during the 0-5 year timeframe.

### Auto Parking

The existing public auto parking facilities at FTT are described in Chapter 1, *Terminal Area Facilities*. Auto parking requirements will consider parking spaces and maneuvering area needed for local and transient airport users. Additionally, auto parking space requirements are based on FAA AC 150/5360-13. In determining the future public auto parking needs, 1.5 spaces are allotted per peak hour passenger while 400 square feet per parking space, including maneuvering area, is provided. Table 3.8 summarizes the ultimate auto parking needs during normal airport operating conditions.

Table 3.8
Auto Parking Needs Summary

| Operational Activity/Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Peak Hour Passengers | 11 | 16 | 18 | 21 |
| Parking Spaces/Peak Hour Passenger | 1.5 parking spaces | | | |
| Total Parking Demand (Spaces) | 17 | 24 | 27 | 32 |
| Square Footage/Parking Space | 400 square feet | | | |
| Total Parking Area Demand (sq. ft.) | 6,800 | 9,600 | 10,800 | 12,800 |
| Existing Auto Parking Facilities | 24 parking spaces/18,100 square feet | | | |
| Parking Space Surplus/(Deficit) (Spaces) | 7 | - | (3) | (8) |
| Parking Area Surplus/(Deficit) (sq. ft.) | 11,300 | 8,500 | 7,300 | 5,300 |

Note: Figures rounded to the nearest hundred for planning purposes.

Source: FAA AC 150/5360-13; Lochner.

Currently, the terminal building auto parking facilities have a surplus of approximately 11,000 square feet of parking area and seven parking stalls. Ultimately, the airport's auto parking facilities are expected to have a surplus of approximately 5,300 square feet of parking area and a deficit of eight parking stalls at the conclusion of the 20-year planning period. This evaluation indicates the existing parking area will exhibit a shortage of marked parking stalls rather than maneuvering area. In order to accommodate future demand, the parking area is recommended to be remarked to accommodate 27 to 32 parking stalls during the intermediate (6-10 year) planning period.

**Auto Parking Needs**

*The existing parking area exhibits a shortage of marked parking stalls rather than maneuvering area. In order to accommodate future demand, the parking area is recommended to be remarked to accommodate 27 to 32 parking stalls during the intermediate (6-10 year) planning period.*

## Hangars

Existing hangar facilities and corresponding square footage estimates were discussed in Chapter 1, Table 1.3. Hangar storage requirements will include a determination of recommended number of future hangar spaces and spatial requirements for T-hangars and clear span or box hangars. FTT's demand forecasts project 86 total based aircraft including 82 single engine, three twin-piston and one multi-engine turbo-prop at the conclusion of the 20-year planning period.

*T-Hangars*

In determining T-hangar storage requirements, it was assumed that 95 percent of the based single and multi-engine piston aircraft would be provided enclosed T-hangar space in the future. However, this assumption may differ from future hangar arrangements. Single and twin-piston engine aircraft generally require approximately 1,250 square feet of storage space. Table 3.9 summarizes the T-hangar storage requirements for FTT throughout the planning period.

Table 3.9
T-Hangar Needs Summary

| Operational Activity/Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Based Aircraft* | 49 | 63 | 73 | 85 |
| Square Footage/Aircraft | 1,250 square feet | | | |
| T-Hangar Demand (Spaces)** | 47 | 60 | 69 | 81 |
| T-Hangar Area Demand (sq. ft.) | 58,800 | 75,000 | 86,300 | 101,300 |
| Existing T-Hangar Facilities | 40 T-hangar units/48,900 square feet | | | |
| T-Hangar Space (Deficit) | (7) | (20) | (29) | (41) |
| T-Hangar Area (Deficit) (sq. ft.) | (9,900) | (26,100) | (37,400) | (52,400) |

Note: Figures rounded to the nearest hundred for planning purposes.
(*) Includes single and multi–engine piston aircraft and excludes multi-engine turbine aircraft and business jets as they will most likely be stored in clear span or box hangars.
(**) Indicates 95 percent of local single and multi-engine piston based aircraft. Three to four piston powered aircraft per planning phase will likely be stored on the apron.

Source: Lochner.

**T-Hangar Needs**

*The airport is expected to accommodate approximately 80 total T-hangar storage spaces totaling nearly 101,000 square feet of space. Development of four additional 10-unit T-hangar structures totaling approximately 50,000 square feet of space will be needed to accommodate projected single and twin-piston based aircraft demand.*

Ultimately, the airport is expected to accommodate approximately 80 total T-hangar storage spaces totaling nearly 101,000 square feet of space. To meet this demand, development of four additional 10-unit T-hangar structures totaling approximately 50,000 square feet of space will be needed to accommodate projected single and twin-piston based aircraft demand. These new facilities are also expected to accommodate based aircraft demand beyond projected levels.

*Clear Span Hangars*

FTT's clear span hangars and corresponding square footage estimates were discussed in Chapter 1, Table 1.3. Considering current square footage, overall size and door height, the existing clear span hangars, with the exception of the Hangar No. 8 located to the northeast of the aircraft apron, are more suited to accommodate single and twin-piston airplanes rather than multi-engine turbine airplanes. Therefore, it is assumed that these hangars will continue to be occupied by piston aircraft throughout the planning period. Accordingly, this analysis will specifically evaluate the recommended square footage needs for future based turbine aircraft not associated with an existing tenant as these aircraft will most likely require new land leased hangar space.

In determining ultimate clear span storage requirements, it was assumed that the future based turbo-prop aircraft would be stored in a privately-owned, land leased clear span hangar. However, this assumption may differ from future hangar arrangements. A generously equipped clear span hangar totals approximately 5,000 square feet of space and/or measuring 71' x 71'. Table 3.10 summarizes the clear span hangar storage requirements for the airport throughout the planning period.

**Clear Span Hangar Needs**

*Ultimately, it is expected that one clear span hangar totaling 5,000 square feet will be needed to accommodate projected local based turbine demand.*

Table 3.10
Clear Span Hangar Needs Summary

| Operational Activity/Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Turbine Aircraft Demand* | - | - | 1 | 1 |
| Square Footage/Aircraft and/or Hangar | 5,000 square feet | | | |
| Clear Span Hangar Demand (Spaces) | - | - | 1 | 1 |
| Clear Span Hangar Demand (sq. ft.) | - | - | 5,000 | 5,000 |
| Existing Clear Span Hangar Facilities** | Hangar No. 8/3,800 square feet | | | |
| Clear Span Hangar Surplus/(Deficit) | - | - | (1) | (1) |
| Clear Span Hangar Area Surplus/(Deficit) (sq. ft.) | - | - | (5,000) | (5,000) |

Note: Figures rounded to the nearest hundred for planning purposes.
Note: Analysis also does not include the 2,400 square foot hangar no. 23 as this hangar is the airport's piston airplane maintenance hangar as is expected to remain so throughout the planning period.
(*) Based on demand projections indicating one turbo-prop, not associated with an existing tenant, which will require future land leased hangar space.
(**) Does not include privately occupied land lease hangars (i.e. hangar nos. 9, 10 thru 13, and 23) as these hangars are too small to accommodate turbine airplanes and/or currently house privately owned aircraft.

Source: Lochner.

Ultimately, it is expected that one clear span hangar totaling 5,000 square feet will be needed to accommodate projected local based turbine demand. The aircraft is expected to be a single or twin turbo-prop not associated with existing tenants. This recommendation includes constructing the new hangar in addition to the six clear span hangars currently located at the airport.

### Apron & Tie-Down Needs

*Future apron area and tie-down needs for local and transient aircraft is expected to consist of approximately 11,000 square yards and will include 12 small and two large aircraft tie-downs. Accordingly, expansion of the apron area is recommended to commence at the conclusion of the short-term (0-5 year) planning period. The airport's apron is expected to increase by nearly one and a half times its current size while the number of tie-downs is expected to double in order to accommodate anticipated demand.*

## Apron Areas and Tie-Downs

Apron facilities and corresponding square yardage estimates for the airport were discussed in Chapter 1, *Terminal Area Facilities*. The apron and tie-down requirements include spatial needs for based aircraft, as well as apron areas and parking spaces utilized by transient aircraft. Table 3.11 summarizes the airport's based aircraft apron area requirements.

Table 3.11
Apron Area/Tie-Down Needs Summary

| Operational Activity/Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Based Aircraft Apron Area/Tie-Down Demand | | | | |
| Total Based Piston Powered Aircraft | 49 | 63 | 73 | 85 |
| 5% of Total Based Piston Powered Aircraft | 2 | 3 | 4 | 4 |
| Square Yardage/Aircraft | 755 square yards | | | |
| Based Aircraft Tie-Down Demand (Spaces) | 2 | 3 | 4 | 4 |
| Based Aircraft Apron Area Demand (sq. yd.) | 1,500 | 2,300 | 3,000 | 3,000 |
| Transient Aircraft Apron Area/Tie-Down Demand | | | | |
| Annual Transient Demand (Operations) | 5,500 | 7,900 | 9,300 | 10,800 |
| Peak Month Transient Operations* | 600 | 900 | 1,000 | 1,200 |
| Design Day (PMAD) Operations | 20 | 30 | 33 | 40 |
| Peak Day Arrivals | 10 | 15 | 17 | 20 |
| Peak Hour Transient Demand (Tie-Downs)** | 5 | 8 | 9 | 10 |
| Transient Apron Area Demand (sq. yds.) | 4,100 | 6,400 | 7,100 | 7,900 |
| Transient ADG I (wingspan up to but not including 49 feet) Apron/Tie-Down Demand | | | | |
| ADG I Tie-Down Demand (Spaces) | 4 | 7 | 8 | 9 |
| Square Yardage/Aircraft | 755 square yards | | | |
| ADG I Apron Area Demand (sq. yd.) | 3,000 | 5,300 | 6,000 | 6,800 |
| Transient ADG II (wingspan of 49 feet up to but not including 79 feet) Apron/Tie-Down Demand | | | | |
| ADG II Tie-Down Demand (Spaces) | 1 | 1 | 1 | 1 |
| Square Yardage/Aircraft | 1,055 square yards | | | |
| ADG II Apron Area Demand (sq. yd.) | 1,100 | 1,100 | 1,100 | 1,100 |
| Existing Tie-Down Facilities (Spaces) | Seven (7) tie-downs | | | |
| Existing Apron Facilities (sq. yd.) | 4,900 | | | |
| Tie-Down Space Surplus/(Deficit) (Spaces) | - | (4) | (6) | (7) |
| Apron Area Surplus/(Deficit) (sq. yd.) | (700) | (3,800) | (5,200) | (6,000) |

Note: Facility demand estimates rounded to the nearest hundred for planning purposes.
(*) 1.3 multiplier utilized to determine operations for peak month activity.
(**) Demand during approximate hours of airport operation, or 12 hours per day.

Source: Lochner; FTT Peaking Characteristics.

Spatial requirements for based single and multi-engine piston aircraft require approximately 755 square yards of apron area considering taxilane dimensions for Airplane Design Group (ADG) I aircraft (wingspan up to but not including 49 feet) and 10 feet clearance between wingtips. Additionally, per planning guidelines, approximately five percent of the based ADG

I aircraft will be provided with apron space for storage equaling approximately 755 square yards of apron area per ADG I aircraft tie-down space.

Transient aircraft apron and tie-down demands were calculated by relying on the airport's historic and projected Design Day operational activity. For single and multi-engine ADG I aircraft (wingspan up to but not including 49 feet), 755 square yards of apron will be provided. Multi-engine turbo-prop and business jet ADG II aircraft (wingspan of 49 feet up to but not including 79 feet) will be provided approximately 1,055 square yards of apron space per aircraft plus 10 feet of clearance between wingtips. Table 3.11 also summarizes the transient aircraft apron calculations for FTT throughout the planning period.

Future apron area and tie-down needs for local and transient aircraft is expected to consist of approximately 11,000 square yards and will include 12 small and two large aircraft tie-downs. With its current facilities, the airport will have a deficit of approximately 6,000 square yards of apron area and seven tie-downs at the conclusion of the 20-year planning period. Accordingly, expansion of the apron area is recommended to commence at the conclusion of the short-term (0-5 year) planning period. Ultimately, the airport's apron is expected to increase by nearly one and a half times its current size while the number of tie-downs is expected to double in order to accommodate anticipated demand. Also, it is recommended that the future apron have a single wheel gear pavement strength of 30,000 pounds to match the weight bearing capacity of the runway and taxiway system.

## TERMINAL AREA FACILITY REQUIREMENTS SUMMARY

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

Table 3.12
Terminal Area Facility Requirements Summary

| Facility | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Peaking Characteristics | | | | |
| Annual Operational Demand | 12,400 | 17,900 | 21,000 | 24,400 |
| Peak Month Operations | 2,000 | 2,900 | 3,400 | 3,900 |
| Design Day Operations | 67 | 97 | 113 | 130 |
| Peak Hour Operational/Passenger Activity | 11 | 16 | 18 | 21 |
| Terminal Building Spatial Requirements | | | | |
| Spatial Needs (sq. ft.) | 1,700 | 2,400 | 2,700 | 3,200 |
| Parking Requirements | | | | |
| Auto Parking Space Demand | 17 | 24 | 27 | 32 |
| Auto Parking Area Needs (sq. ft.) | 6,800 | 9,600 | 10,800 | 12,800 |
| T-Hangar Requirements | | | | |
| T-Hangar Demand (Units) | 47 | 60 | 69 | 81 |
| T-Hangar Spatial Needs (sq. ft.) | 58,800 | 75,000 | 86,300 | 101,300 |
| Clear Span Hangar Requirements | | | | |
| Clear Span Hangar Demand (Spaces) | - | - | 1 | 1 |
| Clear Span Hangar Area Needs (sq. ft.) | - | - | 5,000 | 5,000 |
| Apron Area/Tie-Down Requirements | | | | |
| Based Aircraft Tie-Down Demand (Spaces) | 2 | 3 | 4 | 4 |
| Based Aircraft Apron Area Demand (sq. yd.) | 1,500 | 2,300 | 3,000 | 3,000 |
| Peak Hour Transient Demand (Tie-Downs) | 5 | 8 | 9 | 10 |
| Transient Apron Area Demand (sq. yd.) | 4,100 | 6,400 | 7,100 | 7,900 |
| Total Tie-Down Demand (Spaces) | 7 | 11 | 13 | 14 |
| Total Apron Area Demand (sq. yd.) | 5,600 | 8,700 | 10,100 | 10,900 |

Note: Figures rounded to the nearest hundred for planning purposes.

Source: Lochner.

## SUPPORT AND OTHER FACILITY REQUIREMENTS

Support facilities at FTT include fueling facilities, aviation maintenance facilities, as well as snow removal and equipment (SRE) storage facilities. Other facility requirements are those associated with recommended land acquisition needs.

**Fuel Storage**

The airport currently dispenses an average of approximately 19,000 gallons of 100LL fuel

annually. The airport does not currently offer Jet A fuel. Table 3.13 summarizes peak fueling levels for 100LL and recommended fuel reserves throughout the planning period. Future peak fueling demand for Jet A is also evaluated within Table 3.13.

Projected fuel flowage and recommended reserves for 100LL were determined by applying anticipated growth rates in annual activity for piston aircraft to the base case fuel flowage figures. The operational fleet mix projections developed as part of the demand forecasts indicated that the single and twin piston fleet currently conducts nearly 12,000 annual operations at FTT. Ultimately, the piston powered fleet is expected to conduct approximately 23,000 annual takeoffs and landings. 100LL fuel demand is expected to increase at a rate of approximately 3.5 percent annually throughout the period which is reflective of overall piston aircraft operational estimates.

Table 3.13
Fuel Storage Needs Summary

| Fuel Demand Factors | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| 100LL Fueling Operations | | | | |
| Annual Fueling Demand-100LL (Gal.) | 19,000 | 23,000 | 26,900 | 36,800 |
| Peak Monthly Fueling Demand-100LL (Gal.) | 3,000 | 3,700 | 4,300 | 5,900 |
| Peak Day 100LL Flowage (Gal.) | 100 | 100 | 100 | 200 |
| 100LL Demand + Reserves (Gal.)* | 400 | 400 | 400 | 800 |
| Existing 100LL Storage Capacity | 12,000 gallons | | | |
| Jet A Fueling Operations | | | | |
| Annual Fueling Demand-Jet A (Gal.) | - | - | 10,000 | 13,200 |
| Peak Monthly Fueling Demand-Jet A (Gal.) | - | - | 1,600 | 2,100 |
| Peak Day Jet A Flowage (Gal.) | - | - | 100 | 100 |
| Jet A Demand + Reserves (Gal.)* | - | - | 400 | 400 |
| Existing Jet A Storage Capacity | - | | | |

Note: Figures rounded to the nearest hundred for planning purposes.
Note: Peak month fueling demand is assumed to be 16 percent of the annual fueling activity.
Note: Peak day fueling operations consider the peak month activity and divides that figure by 30 days.
(*) Recommended fuel reserves equal Peak Day plus three days.

Source: FBO Fuel Flow Estimates; Lochner.

Jet A fuel demand was projected to be 10,000 gallons annually during the mid-term planning period. This demand coincides with projected transient turbo-prop and business jet activity as well as the likelihood of a turbo-prop being based at the airport during the same period. Future Jet A fuel flowage is expected to increase at a rate slightly less than three percent annually, which is reflective of FTT's anticipated operational growth by turbine aircraft.

As a result of the fuel storage needs analysis, the airport is recommended to have no less than 400 gallons of 100LL on hand to accommodate existing peak day operational activity.

**Fuel Storage Needs**

*As a result of the fuel storage needs analysis, the airport is recommended to have no less than 400 gallons of 100LL on hand to accommodate existing peak day operational activity.*

*Ultimately, the airport is recommended to have no less than 800 gallons of 100LL on hand to accommodate projected peak activity. Additionally, during the intermediate and long-term phases of development, the airport is recommended to have no less than 400 gallons of Jet A fuel on hand to accommodate projected peak activity. Ideally, the city and/or FBO would purchase a 500-1,000 gallon capacity fuel truck to dispense fuel to locally based and transient turbine aircraft.*

Ultimately, the airport is recommended to have no less than 800 gallons of 100LL on hand to accommodate projected peak activity. Taking into account fuel storage and peak month fueling activity throughout the planning period, the existing 100LL fuel capacity is adequate to meet long-term fueling demands. Additionally, during the intermediate and long-term phases of development, the airport is recommended to have no less than 400 gallons of Jet A fuel on hand to accommodate projected peak activity. Ideally, the city and/or FBO would purchase a 500-1,000 gallon capacity fuel truck to dispense fuel to locally based and transient turbine aircraft. The fuel truck's capacity is also expected to accommodate demand beyond estimated peak period turbine activity.

**Fuel Truck Parking Area/Spill Containment Berm**

As part of any future Spill Prevention Control and Countermeasure Plan (SPCC) for the airport, a fuel spill containment berm is recommended to be developed around future fuel truck parking area to protect local groundwater sources from potential contamination arising from a fuel spill or leakage.

**Fuel Truck Parking Needs**

*A concrete/gravel fuel truck parking area totaling approximately 500 to 1,000 square feet is recommended to accommodate future fuel truck operations. Additionally, construction of an earthen berm around the perimeter of the parking area for fuel truck storage is recommended.*

A concrete/gravel fuel truck parking area totaling approximately 500 to 1,000 square feet is recommended to accommodate future fuel truck operations. Additionally, construction of an earthen berm around the perimeter of the parking area for fuel truck storage is recommended. Lastly, the fuel truck parking area is recommended to be located immediately adjacent to the parking apron. This berm would be approximately eight inches in height with a bentonite clay core. The berm would be also constructed on the down gradient side of the aircraft apron in order to ensure that any fuel spills would be directed to the berm and prevent petroleum products from contaminating groundwater or soils in the area.

**Aircraft Maintenance**

Airframe and powerplant maintenance for piston aircraft are currently not offered at FTT. However, Hangar 23, a 2,400 square foot clear span hangar, has supported piston aircraft maintenance operations in the past. Based on its size and physical condition, Hangar 23 is sufficient to accommodate maintenance activities for based and transient piston aircraft throughout the planning period. However, should the opportunity and/or demand arise, a 5,000 to 10,000 square foot clear span hangar would be recommended for major and/or minor airframe and power plant maintenance for piston and turbine airplanes.

**Maintenance Hangar Needs**

*Should the opportunity and/or demand arise, a 5,000 to 10,000 square foot clear span hangar would be recommended for major and/or minor airframe and power plant maintenance for piston and turbine airplanes.*

**Snow Removal and Equipment (SRE) Facilities**

The airport does not currently have any SRE facilities located at the facility. FAA AC 150/5220-20, *Airport Snow and Ice Control Equipment*, identifies the minimum SRE equipment standards for non-commercial service airports experiencing, on average, greater than 10,000 annual operations and receiving approximately 15 to 20 inches of snow per year. For FTT, one high-speed rotary snow plow supported by two displacement plows

of equal capacity is recommended for snow removal operations throughout the planning period.

FAA AC 150/5220-18, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*, identifies the necessary square footage requirements to store and maintain snow and ice control equipment and material. Ultimately, should the need and/or demand arise, a back-in design storage structure capable of accommodating 1,800 square feet for parking area and an additional 400 square feet to store abrasives, deicers and salt is recommended.

Table 3.14 summarizes the support facility requirements for the airport throughout the planning period.

Table 3.14
Support Facility Needs Summary

| Facility | Existing | Short-Term (0-5 Year) | Mid-Term (6-10 Year) | Long-Term (11-20 Year) |
|---|---|---|---|---|
| Fuel Storage Requirements | | | | |
| 100LL Peak Day Demand (Gal.) | 100 | 100 | 100 | 200 |
| 100LL Peak Day + Reserves (Gal.) | 400 | 400 | 400 | 800 |
| Jet A Peak Day Demand (Gal.) | - | - | 100 | 100 |
| Jet A Peak Day + Reserves (Gal.) | - | - | 400 | 400 |
| Total Peak Day Demand (Gal.) | 100 | 100 | 200 | 300 |
| Total Peak Day + Reserves (Gal.) | 400 | 400 | 800 | 1,200 |
| Aircraft Maintenance Facility Requirements | | | | |
| Maintenance Hangar Needs | 5,000 to 10,000 square foot clear span hangar | | | |
| Snow Removal and Equipment (SRE) Facility Requirements | | | | |
| Equipment Needs | (1) Rotary snow plow; (2) Displacement plows | | | |
| Note: Figures rounded to the nearest hundred for planning purposes. | | | | |

Source: Lochner.

### Land Acquisition

FTT's property consists of 12 tracts totaling approximately 412 acres held as fee simple ownership and an additional two tracts totaling 11.5 acres in avigation easements.

Nearly half of the Runway 24 RPZ is controlled by the city through an avigation easement. In accordance with FAA guidelines pertaining to land use within RPZs, the city is recommended to acquire nearly seven acres north of County Road 304 in fee simple ownership. According to the FAA, RPZs are to be free and clear of any structure, property or places of public assembly.

**Land Acquisition Needs**

*Nearly half of the Runway 24 RPZ is controlled by the city through an avigation easement. In accordance with FAA guidelines pertaining to land use within RPZs, the city is recommended to acquire nearly seven acres north of County Road 304 in fee simple ownership.*

## FACILITY EXPANSION TRIGGER POINTS

The timing and need for particular improvements projects are dependent on projections of future aviation demand or 'trigger points,' rather than years. Table 3.15 summarizes the trigger points that will most likely dictate initiation of capital improvements throughout the planning period. As the operational environment of the airport fluctuates the triggers which encourage development might also change. Therefore, it is crucial that the airport sponsor monitor actual conditions and demand activity levels on a regular basis.

Table 3.15
Facility Expansion Trigger Point Summary

| Facility Type | Trigger | Trigger Point (As Demand Warrants) |
|---|---|---|
| Airfield/Airspace Facilities | | |
| Widen Runway 6-24 to 60 feet | Existing Conditions/Activity | Short-Term (0-5 Year) |
| Extend Runway 6-24 to 3,400 feet | Existing Conditions/Activity | Mid-Term (6-10 Year) |
| Shorten and Widen Runway 12-30 | Existing Conditions/Activity | Mid-Term (6-10 Year) |
| Construct Full Parallel Taxiway (18-36)* | Existing Conditions/Activity | Short-Term (0-5 Year) |
| Construct Partial Parallel Taxiway (6-24)* | Existing Conditions/Activity | Mid-Term (6-10 Year) |
| Install New Visual Approach Aids (6-24)** | Existing Conditions/Activity | Short-Term (0-5 Year) |
| Install AWOS | Existing Conditions/Activity | Short-Term (0-5 Year) |
| Terminal Area Facilities | | |
| Terminal Building Expansion | Existing Conditions/Activity | Short-Term (0-5 Year) |
| Remark Auto Parking Area | 18 Peak Hour Passengers | Mid-Term (6-10 Year) |
| T-Hangar Development | Existing Conditions/Activity | Short thru Long-Term (0-20 Year) |
| Clear Span Hangar Development | One (1) Based Turbine Aircraft | Mid-Term (6-10 Year) |
| Apron Expansion | Existing Conditions/Activity | Short-Term (0-5 Year) |
| Support and Other Facilities | | |
| Acquire Fuel Truck and Offer Jet A Fuel | One (1) Based Turbine Aircraft | Mid-Term (6-10 Year) |
| Fuel Truck Parking Area | Acquisition of Fuel Truck | Mid-Term (6-10 Year) |
| Maintenance Hangar Expansion | One (1) Based Turbine Aircraft | Mid-Term (6-10 Year) |
| SRE Facility Development | As Needed | Long-Term (11-20 Year) |
| Land Acquisition (Runway 24 RPZ) | Existing Conditions/Activity | Mid-Term (6-10 Year) |

(*) Includes installation of medium intensity taxiway lighting (MITL).
(**) Includes upgrading 6-24's simplified abbreviated visual approach slope indicator (SAVASI) to the precision approach path indicators (PAPI).
AWOS- Automated Weather Observing System
SRE-Snow Removal and Equipment
RPZ- Runway Protection Zone

Source: Lochner; FTT Facility Requirements.

The airport's facility needs evaluation is recommended to be periodically revisited to confirm trigger points and operational demand in an attempt to accurately gauge the appropriate

timing of facility improvements. Capital development and facility expansion is recommended only when actual demand justifies improvements which are environmentally sound as well as operationally and financially feasible.

The trigger points contained within Table 3.15 are suggested to be coordinated with Table 3.6-*Airfield and Airspace Facility Requirements Summary*, Table 3.12-*Terminal Area Facility Requirements Summary* and Table 3.14-*Support Facility Needs Summary* when determining appropriate timing and development of recommended airfield and terminal area improvements at FTT.

Expansion of airfield facilities associated with the primary Runway 18-36 accommodate existing activity levels to warrant development during the 0-5 year planning period including the construction of a full-length parallel taxiway. Also, given the instrument approach procedures in place for both paved runways, installation of an AWOS would be recommended for the short-term time frame as well. Runway 6-24, given its level of utilization and approach procedures, should be widened to 60 feet and its visual approach aids upgraded during the 0-5 year period. Extension of 6-24, construction of a partial parallel taxiway to serve the runway, acquisition of land within the Runway 24 RPZ, as well as the shortening and widening of the turf Runway 12-30, taking into account financial and funding consideration, would be justified during the intermediate (6-10 year) period.

Considering current peak hour aircraft and passenger activity, the airport's terminal building and aircraft apron should be expanded during the short-term planning period. T-hangars, due to existing and projected hangar demand, should be developed continuously throughout the 20-year period. Auto parking improvements and clear span hangar construction would be triggered during the 6-10 year plan period based on anticipated based and transient aircraft activity.

Support facilities including Jet A fuel, purchase of a jet fuel truck, construction of a fuel truck parking area, and maintenance hangar expansion are expected be triggered during the 6-10 planning period in anticipation of a based turbo-prop aircraft.

## SUMMARY

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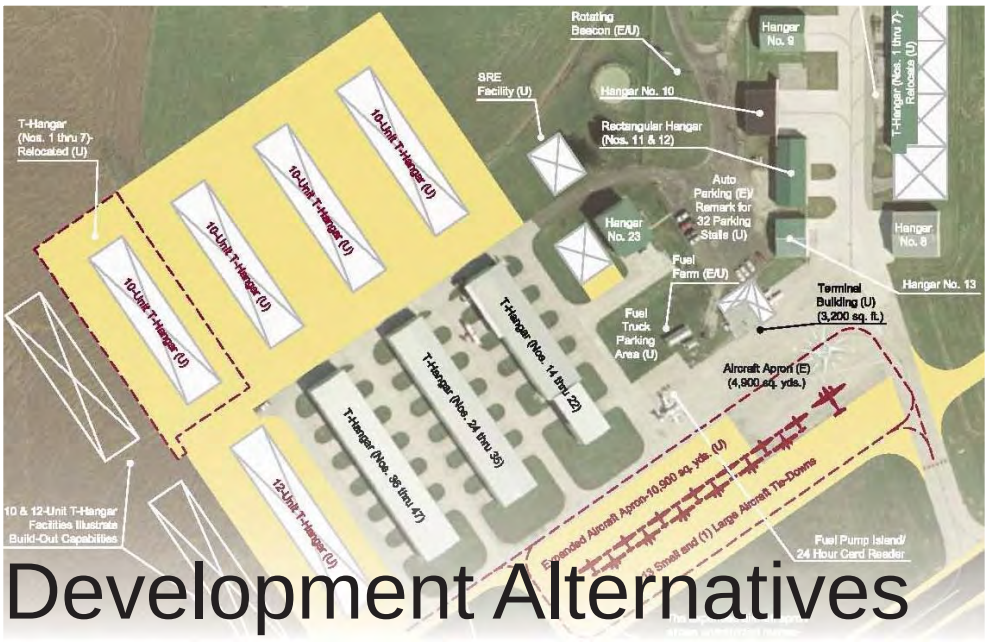


# Development Alternatives

## INTRODUCTION

The previous chapter of the master plan, *Facility Requirements*, determined the potential airside, landside, and support facility needs of the airport throughout the 20-year master plan period. This chapter will identify development alternatives that will allow the airport to accommodate projected aviation demand. The focus of this chapter is to evaluate the merits and deficiencies of potential capital development for airfield and terminal area alternatives proposed for the airport. The airport's development alternatives analysis will examine two conceptual improvement options including 1) a 'no action' alternative and 2) expansion of the existing site.

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

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

## GOALS AND OBJECTIVES FOR FUTURE DEVELOPMENT

Goals for future airport expansion are established to serve as an understanding and guide for the future development of the Elton Hensley Memorial Airport. These goals and objec-

**Introduction**

*This chapter will identify development alternatives that will allow the airport to accommodate projected aviation demand. The focus of this chapter is to evaluate the merits and deficiencies of potential capital development for airfield and terminal area alternatives proposed for the airport.*

*The development alternatives are intended to serve as the formulation of a development concept rather than the presentation of a final design recommendation.*

*Lastly, the preferred development alternatives should be those having the greatest potential for implementation.*

tives take into account the projected 20-year aviation demand, public interest and awareness, as well as operational conditions specific to the airport.

- Provide an effective course of action, considering conditions specific to the airport, to implement recommended improvements through the preparation of a long-term capital improvement program (CIP) that is capable of being implemented in an orderly and feasible fashion.

- The city intends to acquire property to the northeast of the airport, when available, that is required per FAA planning guidelines, in an effort to ensure compatible land use in the vicinity of the airport.

- In order to maintain a safe and efficient public-use airport, the city intends to mitigate any known non-standard airfield and/or terminal area conditions that might exist.

- The proposed development alternatives recognize the importance of the airport's role within the Callaway County and east-central Missouri region. Preferred airfield and terminal area improvement projects will be those that best fit the needs of the city and airport users.

- Runway 18-36 is recommended to be maintained to accommodate 100 percent of the general aviation fleet weighing less than 12,500 pounds. This development proposal includes the development of a 35 foot wide full length parallel taxiway to serve 18-36.

- Runway 6-24 is recommended to be maintained to accommodate 95 percent of the general aviation fleet weighing less than 12,500 pounds. This proposal includes widening the runway to 60 feet and development of a 25 foot wide partial parallel taxiway to serve the runway and access the terminal area.

- An AWOS-III weather reporting system is intended to be installed to provide for enhanced instrument approach visibility minimums to the airport.

- Expansion of the terminal area complex is expected to involve the new development of numerous T-hangars and clear span hangars as well as the expansion and reconfiguration of the aircraft apron. Additional improvements include expansion of the airport's terminal building and auto parking area.

## DEVELOPMENT CONCEPTS

The development alternatives for FTT resulted from examining the demand forecasts and facility requirements to accommodate projected aviation activity throughout the planning period. Goals and objectives of the city pertaining to airfield improvements, future land acquisition and expansion of the terminal area were also considered.

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

**'No Action' Alternative**

The No Action Alternative involves maintaining the airport in its current condition while not developing plans for future improvements based on project demand. This alternative would result in the inability of the airport to provide increased safety and operational improvements to based aircraft owners and transient airport users throughout the next two decades.

Since the early 1990s, Callaway County and the outlying region have experienced sustained population and socioeconomic growth, particularly per capita income and median household income. The demand forecasts indicate this trend is likely to continue throughout the planning period. These positive trends are expected to influence the aviation activity at FTT including additional based aircraft and increased operational activity to and from the airport.

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

Terminal area needs throughout the planning period are expected to include significant hangar development, reconfigured aircraft apron and tie-downs and expansion of the terminal building to serve anticipated passenger activity. These improvements are based on estimated facility demands which show a need to expand the airport's terminal area to accommodate both existing and future demand.

Given these reasons, and the clear intent of the city to invest in expanding the airport's airfield and terminal area infrastructure, the No Action Alternative is not considered a reasonable and/or prudent option for FTT.

**'No Action' Alternative**

*Given the clear intent of the city to invest in expanding the airport's airfield and terminal area infrastructure, the No Action Alternative is not considered a reasonable and/or prudent option.*

**Expand the Existing Airport Site**

Airport expansion involves continued investment in the facility's airfield and terminal area components needed to accommodate the operational and based aircraft demand discussed in Chapter 2, *Demand Forecasts*. Furthermore, airfield and terminal expansion are recommended to coincide with the needs identified in the Facility Requirements chapter.

**Expand The Existing Site**

*Airport expansion involves continued investment in the facility's airfield and terminal area components needed to accommodate the 20-year operational and based aircraft demand.*

*The airfield and terminal development alternatives are those that are viewed as the most feasible to serve the future demand for services at the airport.*

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

Pertinent airfield expansion considerations are as follows:

- Maintain ARC B-II planning standards for Runway 18-36 including runway length and width, safety areas and taxiway dimensional requirements;
- Maintain ARC B-I planning standards for Runway 6-24 including runway length and width, safety areas and taxiway requirements;
- Improve and expand the airport's taxiway system which is intended to serve both Runway 18-36 and 6-24;
- Shorten and widen the turf Runway 12-30 in order to more efficiently accommodate single engine aircraft demand;
- Acquisition of land in fee simple to the north-northeast of the airport to ensure land use compatibility with the RPZ for Runway 24; and
- Installation of an AWOS-III weather reporting system within the airport operations area (AOA).

Pertinent terminal area development considerations include the following:

- Construction of a new and/or expansion of the airport's terminal building;
- Development of additional T-hangars;
- Development of additional clear span hangars; and
- Reconfiguration of the aircraft parking apron and tie-downs.

## AIRFIELD EXPANSION ALTERNATIVES

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

**Alternative 'A'**

Alternative A involved improvements to Runway 18-36. It included maintaining the runway's

dimensions of 4,000' x 75' throughout the planning period. However, Alternative A proposed the development of a 35 foot wide full length parallel taxiway situated to the west of the runway. Additional improvements proposed as part of Alternative A included the installation of an AWOS-III facility 500 feet from the runway's centerline. The AWOS would be located approximately 850 feet southwest of the Runway 18 threshold and adjacent to the airport's wind cone and segmented circle. Land acquisition was not proposed as part of Alternative A as both RPZs are located within the airport's property boundaries.

The city elected to adopt Alternative A as the recommended development concept for Runway 18-36 to accommodate piston and turbine demand throughout the long-term planning period.

**Alternative 'A'**

*The city elected to adopt Alternative A as the recommended development concept for Runway 18-36 to accommodate piston and turbine demand throughout the long-term planning period.*

**Alternative 'A2'**

Alternative A2 illustrated a long range development scenario in which Runway 18-36 is extended 800 feet to the south to an ultimate length of 4,800 feet. The runway's 75-foot width would be maintained as part of Alternative A2. This scenario depicted the recommended length requirement in the event the airport experiences greater than 500 annual transient jet operations and/or hosts a based business jet at some point during the planning period. Due to the proposed extension of 18-36 and the RPZ associated with the Runway 36 threshold, acquisition of approximately 18 acres to the south of the airport would be recommended. Land acquisition would be expected to include relocation of at least one structure, and possibly more. Lastly, Alternative A2 also depicted the development of a 4,800 foot long full parallel taxiway situated to the west of the runway, as well as the installation of an AWOS-III near the 18 threshold.

The city elected not to adopt Alternative A2 as the preferred development concept for 18-36. However, the city elected to include Alternative A2 as part of the master plan to identify a development concept that would potentially accommodate aviation demand beyond the 20-year forecast period. In the event the airport experiences 500 annual operations by large turbine aircraft and/or hosts a based business jet, consideration of implementing Alternative A2 would be recommended.

**Alternative 'A2'**

*The city elected not to adopt Alternative A2 as the preferred development concept for 18-36. However, the city elected to include Alternative A2 as part of the master plan to identify a development concept that would potentially accommodate aviation demand beyond the 20-year forecast period. In the event the airport experiences 500 annual operations by large turbine aircraft and/or hosts a based business jet, consideration of implementing Alternative A2 would be recommended.*

**Alternative 'B'**

Alternative B proposed improvements to the turf crosswind Runway 12-30 to more efficiently accommodate single engine aircraft demand. The runway was recommended to be modified from its current dimensions of 2,488' x 100'. This included widening the runway to 120 feet while reducing the usable length to 1,800 feet. The Runway 12 threshold would be relocated approximately 300 feet to the southeast while the Runway 30 threshold was recommended to be relocated nearly 390 feet to the northwest. Land acquisition was not proposed as part of Alternative B as both RPZs are located within the airport's property boundaries.

**Alternative 'B'**

*The city elected to adopt Alternative B as the recommended development concept for the turf Runway 12-30 to exclusively accommodate small single engine piston airplanes.*

The city elected to adopt Alternative B as the recommended development concept for the turf Runway 12-30 to exclusively accommodate small single engine piston airplanes.

**Alternative 'C'**

Alternative C involved improvements to the airport's paved crosswind Runway 6-24. It included the proposed extension of the runway to the southwest to 3,400 feet and widening it from 47 to 60 feet. Development of a partial parallel accessing the Runway 24 threshold and aircraft apron was also proposed. Alternative C also recommended land acquisition within the Runway 24 RPZ located to the north of the airport. Finally, upgrade of the runway's visual approach aids was proposed as well.

**Alternative 'C'**

*The city elected to pursue the widening of the runway, development of the partial parallel taxiway, visual approach aid upgrade and proposd land acquisition. However, due to terrain conditions and runway safety area limitations at the Runway 6 threshold, coupled with the potential operational, environmental and financial considerations associated with runway expansion, the city decided against extending the runway.*

The city elected to pursue the widening of the runway, development of the partial parallel taxiway, visual approach aid upgrade and land acquisition proposed as part of Alternative C. However, due to terrain conditions and runway safety area limitations at the Runway 6 threshold, coupled with the potential operational, environmental and financial considerations associated with runway expansion, the city decided against extending the runway.

**Preferred Airfield Alternatives**

The proposed long-term airport expansion option and recommended ultimate airfield layout, designated Exhibit 4.1- *Preferred Airfield Alternative*, involves expanding the taxiway system as well as further increasing the airport's property interests to the north of the facility.

The following items are attributes of FTT's preferred airfield development alternative:

- Construct a 4,000 foot full length parallel taxiway to serve Runway 18-36. The parallel taxiway will be 35 feet wide, situated 240 feet from the centerline of the runway and have a weight bearing capacity for 30,000 pound single wheel gear aircraft.

- Install an AWOS-III weather reporting system 500 feet from the runway's centerline and approximately 850 feet southwest of the Runway 18 threshold and adjacent to the airport's wind cone and segmented circle.

- Relocate the existing windcone and segmented circle outside of the proposed AWOS 100 foot radius critical area.

- Widen the paved crosswind Runway 6-24 to 60 feet and maintain the runway's existing 3,203 foot length.

- Construct an 800 foot partial parallel taxiway to access the Runway 24 threshold and an aircraft turnaround at the Runway 6 approach end. The

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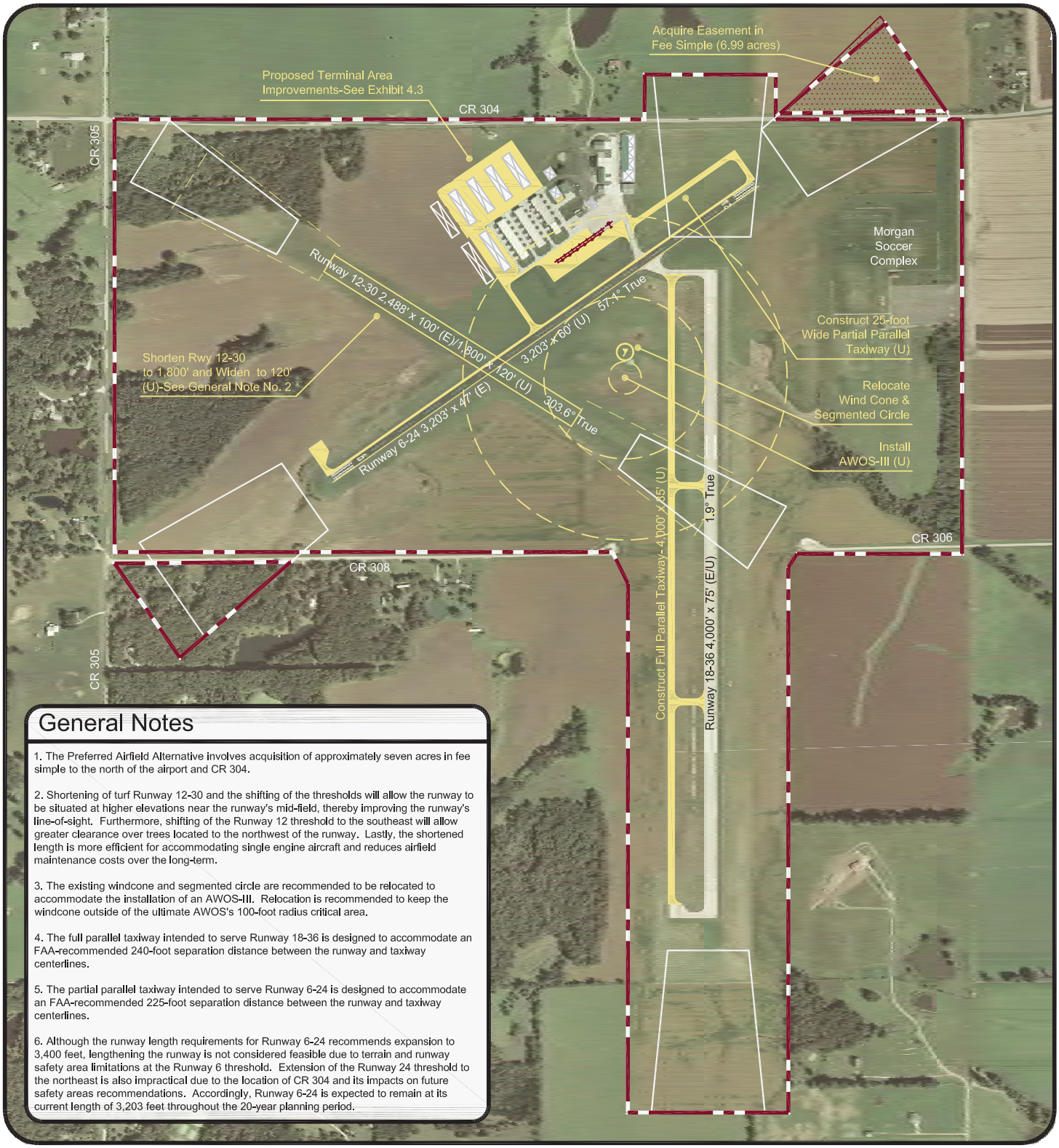
# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 4.1

**Preferred Airfield Development Alternative**




## General Notes

1. The Preferred Airfield Alternative involves acquisition of approximately seven acres in fee simple to the north of the airport and CR 304.

2. Shortening of turf Runway 12-30 and the shifting of the thresholds will allow the runway to be situated at higher elevations near the runway's mid-field, thereby improving the runway's line-of-sight. Furthermore, shifting of the Runway 12 threshold to the southeast will allow greater clearance over trees located to the northwest of the runway. Lastly, the shortened length is more efficient for accommodating single engine aircraft and reduces airfield maintenance costs over the long-term.

3. The existing windcone and segmented circle are recommended to be relocated to accommodate the installation of an AWOS-III. Relocation is recommended to keep the windcone outside of the ultimate AWOS's 100-foot radius critical area.

4. The full parallel taxiway intended to serve Runway 18-36 is designed to accommodate an FAA-recommended 240-foot separation distance between the runway and taxiway centerlines.

5. The partial parallel taxiway intended to serve Runway 6-24 is designed to accommodate an FAA-recommended 225-foot separation distance between the runway and taxiway centerlines.

6. Although the runway length requirements for Runway 6-24 recommends expansion to 3,400 feet, lengthening the runway is not considered feasible due to terrain and runway safety area limitations at the Runway 6 threshold. Extension of the Runway 24 threshold to the northeast is also impractical due to the location of CR 304 and its impacts on future safety areas recommendations. Accordingly, Runway 6-24 is expected to remain at its current length of 3,203 feet throughout the 20-year planning period.

*Source:* Woolpert, Inc., aerial photo.

N

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taxiway will be 25 feet wide, situated 225 feet from the runway centerline and have a weight bearing capacity for 12,500 pound single wheel gear aircraft.

- Acquire approximately seven acres in fee simple to the north of the airport and CR 304.

- Widen the turf crosswind Runway12-30 to 120 feet and shorten the runway's length to 1,800 feet. This includes relocating the Runway 12 threshold approximately 300 to the southeast and the Runway 30 threshold 390 feet to the northwest.

**Long-Range Development Alternative**

The long-range development concept, designated Exhibit 4.2- *Long Range Airfield Development Scenario*, includes Runway 18-36 being extended 800 feet to the south to an ultimate length of 4,800 feet. This alternative also involves land acquisition and structure relocation to the south of the airport.

The long range development scenario involves similar improvements to the airfield proposed as part of the preferred alternative. In particular, the improvements to both Runways 6-24 and 12-30; installation of the AWOS facility; and land acquisition to the north of the airport are proposed as part of both airfield alternatives. However, Exhibit 4.2 illustrates the runway being extended to 4,800 feet to accommodate 75 percent of the general aviation aircraft fleet at 60 percent useful load for aircraft weighing from 12,500 up to 60,000 pounds.

The following items are attributes of FTT's long range development concept:

- Extend Runway 18-36 800 feet to the south to a length of 4,800' x 75'.

- Construct a 4,800 foot full length parallel taxiway to serve Runway 18-36. The parallel taxiway will be 35 feet wide, situated 240 feet from the centerline of the runway and have a weight bearing capacity for 30,000 pound single wheel gear aircraft.

- Acquire approximately 18 acres located to the south of the airport to accommodate the future Runway 36 RPZ. Land acquisition is expected to include the relocation of at least one structure and possibly two or three additional buildings.

**Additional Considerations**

As previously indicated, the long range development scenario illustrates the recommended length requirement for Runway 18-36 in the event the airport experiences greater than 500

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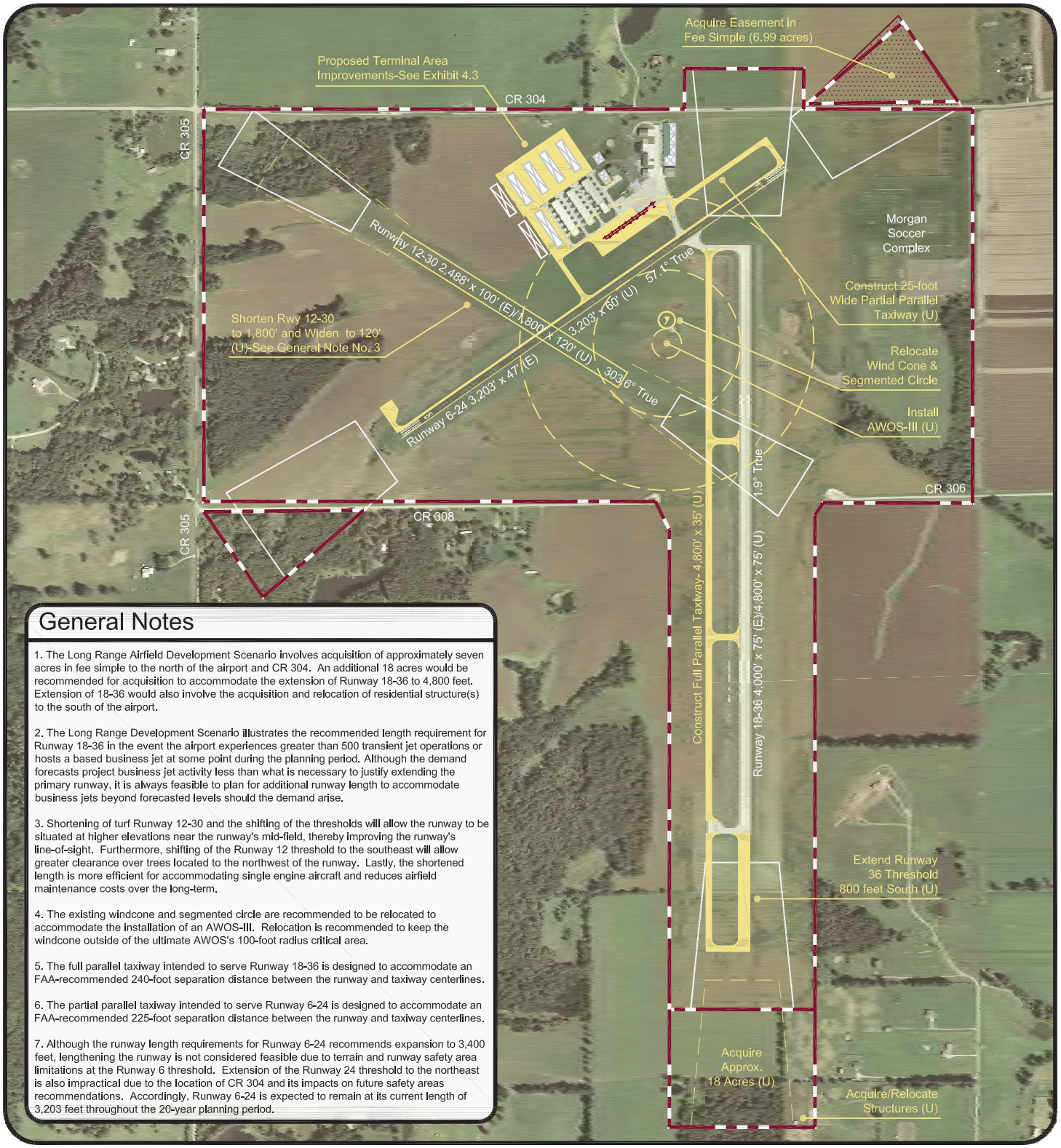
# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

City of Fulton, Missouri

## Exhibit 4.2

### Long-Range Airfield Development Scenario




## General Notes

1. The Long Range Airfield Development Scenario involves acquisition of approximately seven acres in fee simple to the north of the airport and CR 304. An additional 18 acres would be recommended for acquisition to accommodate the extension of Runway 18-36 to 4,800 feet. Extension of 18-36 would also involve the acquisition and relocation of residential structure(s) to the south of the airport.

2. The Long Range Development Scenario illustrates the recommended length requirement for Runway 18-36 in the event the airport experiences greater than 500 transient jet operations or hosts a based business jet at some point during the planning period. Although the demand forecasts project business jet activity less than what is necessary to justify extending the primary runway, it is always feasible to plan for additional runway length to accommodate business jets beyond forecasted levels should the demand arise.

3. Shortening of turf Runway 12-30 and the shifting of the thresholds will allow the runway to be situated at higher elevations near the runway's mid-field, thereby improving the runway's line-of-sight. Furthermore, shifting of the Runway 12 threshold to the southeast will allow greater clearance over trees located to the northwest of the runway. Lastly, the shortened length is more efficient for accommodating single engine aircraft and reduces airfield maintenance costs over the long-term.

4. The existing windcone and segmented circle are recommended to be relocated to accommodate the installation of an AWOS-III. Relocation is recommended to keep the windcone outside of the ultimate AWOS's 100-foot radius critical area.

5. The full parallel taxiway intended to serve Runway 18-36 is designed to accommodate an FAA-recommended 240-foot separation distance between the runway and taxiway centerlines.

6. The partial parallel taxiway intended to serve Runway 6-24 is designed to accommodate an FAA-recommended 225-foot separation distance between the runway and taxiway centerlines.

7. Although the runway length requirements for Runway 6-24 recommends expansion to 3,400 feet, lengthening the runway is not considered feasible due to terrain and runway safety area limitations at the Runway 6 threshold. Extension of the Runway 24 threshold to the northeast is also impractical due to the location of CR 304 and its impacts on future safety areas recommendations. Accordingly, Runway 6-24 is expected to remain at its current length of 3,203 feet throughout the 20-year planning period.

*Source:* Woolpert, Inc., aerial photo.

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transient jet operations or hosts a based business jet at some point during the planning period. Although the demand forecasts project business jet activity less than what is necessary to justify extending the primary runway, it's feasible to plan for additional runway length to accommodate business jets beyond forecasted levels should the demand arise.

## TERMINAL AREA EXPANSION ALTERNATIVES

The proposed terminal area development options include each of the capital improvement considerations and were presented to the city for evaluation. The following discussion highlights the pertinent elements of the terminal area development option submitted to the city during the alternative analysis.

Given the configuration or the existing terminal area, the limited space in which to develop additional hangar facilities and the relatively close proximity of Runway 6-24 to the existing apron, only one development alternative was generated for consideration. However, the alternative presented to the city provided for all critical landside facility needs including 1) the construction of a new terminal building and/or expansion the existing terminal facility, 2) development of additional T-hangars, 3) development of additional clear span hangars, 4) reconfiguration of the aircraft parking apron and tie-downs, 5) development of a fuel truck parking area and 6) construction of a maintenance hangar capable of accommodating turboprop and/or jet aircraft.

Accordingly, the city considered multiple operational, financial and airport user factors and selected Exhibit 4.3- *Preferred Terminal Area Development Alternative* as the long-term development option to accommodate passenger and aircraft demand throughout the planning period. The following description provides the essential elements associated with the implementation of the preferred terminal area alternative.

**Preferred Terminal Area Alternative**

The proposed long-term landside expansion option and recommended layout and siting plan involves significant T-hangar and clear span hangar development and apron improvements.

The following items are characteristics of FTT's preferred terminal area improvement alternative:

- Construct a new 3,200 square foot terminal building or expand the existing terminal building by approximately 2,300 square feet.

- Remark the existing auto parking area to accommodate 32 parking stalls.

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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

City of Fulton, Missouri

## Exhibit 4.3

### Preferred Terminal Area Development Alternative


## General Notes

1. T-Hangar Nos. 1 thru 7 are recommended to be relocated to the western T-hangar development area. This is due to the northern clear span hangar area being readily capable of accommodating ground maneuvering by large turbine and jet aircraft as well as the hangars that would serve these aircraft, including maintenance hangars and facilities with land leases.

2. The western hangar development area was designed and planned to serve primarily small single and twin-piston airplanes.

*Source:* Woolpert, Inc., aerial photo.

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- Construct one (1) 12-unit and three (3) additional 10-unit T-hangar structures, totaling approximately 52,000 square feet, to accommodate small single and twin-piston airplanes. One additional 10-unit T-hangar building totaling approximately 12,500 square feet is proposed to accommodate demand beyond projected levels.

- Construct one 5,000 square foot clear span hangar to accommodate a potential based turbine aircraft. Three (3) additional large clear span hangars are proposed in an effort to accommodate demand beyond projected levels and to illustrate clear span hangar build-out capabilities within the northeastern terminal area.

- Expand the aircraft parking apron by approximately 6,000 to 7,900 square yards and reconfigure the aircraft parking area to accommodate 13 small and one (1) large aircraft tie-downs.

- Should the demand and/or need arise, construct a 500 to 1,000 square foot fuel truck parking area/spill containment berm adjacent to the fuel farm.

- Should the demand and/or need arise, construct a 2,200 square foot SRE facility northwest of Hangar No. 23 and/or to the northeast of the proposed T-hangar development area.

- Should the demand and/or need arise, development of a 5,000 to 10,000 square foot clear span hangar to accommodate primarily turbine airplane maintenance would be recommended within the northeastern terminal area.

**Additional Considerations**

T-hangars 1 thru 7, located within the northeastern terminal area, are recommended to be removed and relocated to the western T-hangar development area. In addition to the age of the T-hangar building, this is also due to the northern clear span hangar area being readily capable of accommodating ground maneuvering by large turbine and jet aircraft. Additionally, this portion of the terminal area complex is ideal to accommodate large hangar development that would serve large turbine aircraft including maintenance hangars and clear span hangar facilities with land leases.

The western T-hangar development area was designed and planned to serve primarily small single and twin-piston Airplane Design Group (ADG) I airplanes, or those aircraft with wingspans less than 49 feet.

## SUMMARY

The following chapter of the master plan, *Environmental Overview*, will be conducted in accordance with the *National Environmental Protection Act* (NEPA). Both the airfield and terminal area development options will be evaluated from an environmental standpoint by coordinating with Federal and state resource agencies to determine potential significant impacts posed by the preferred alternatives. Environmental coordination will also ascertain compliance and permitting requirements for capital improvements taking place at the airport throughout the planning period.


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# Environmental Overview

## INTRODUCTION

This overview has been prepared pursuant to Section 102 (2) of the *National Environmental Policy Act of 1969* (NEPA), as amended, as well as Title V of the *Airport and Airway Improvement Act of 1982*, as amended. In addition, the subject matter discussed within this chapter is carried out in accordance with Federal Aviation Administration (FAA) Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, and FAA Order 1050.1E, *Environmental Impact: Policies and Procedures*.

## IMPACT CATEGORIES

The intent of the environmental overview is to evaluate potential significant environmental impacts posed by future airfield and terminal area improvements. This overview will examine 20 environmental consequences as they pertain to the facility's capital improvements and highlight potential permitting and regulatory requirements associated with each impact category.

**Noise**

Noise can be broadly defined as any sound that is unwanted. Accurately identifying particular noise that is unwanted or intrusive is difficult due to the subjective nature of judgment on the part of the listener. It may also be just as difficult to measure the intrusiveness of the sound effects. In most cases, individual attitudes regarding airports are more important in determining reactions to airport noise rather that actual noise exposure. Aircraft arrivals and departures are generally considered intrusive and unwanted noise in the opinion of the listener. These facts alone constitute aircraft and airport sound emissions as the most notable environmental impact to the local community.

**Noise**

*Based on FAA and EPA guidelines, and considering the estimated long-term operational activity, the preferred airfield alternative is not expected to create negative cumulative noise impacts within the immediate vicinity of the airport.*

For purposes of determining noise exposure at FTT, the demand forecasts were utilized to generate a baseline of activity of approximately 24,400 annual operations for the year 2031. This includes 22,200 operations by piston airplanes, 1,500 twin-piston operations, 400 turboprop operations and 300 jet operations. According to the forecasted projections, as well as FAA and Environmental Protection Agency (EPA) guidelines, the anticipated operational activity at FTT is well below the threshold of 90,000 annual piston operations and/or 700 annual jet operations requiring the need to create a Noise Exposure Map (NEM). Accordingly, based upon the estimated long-term operational activity, the preferred airfield alternative is not expected to create negative cumulative noise impacts within the immediate vicinity of the airport.

**Compatible Land Use**

*Based on projected aviation demand, coupled with existing and proposed land uses in the area, FTT is expected to be compatible with current and future land uses from a noise compatibility standpoint. Additionally, those parcels of land recommended for acquisition to the north of the airport are expected to remain compatible with airport operation.*

### Compatible Land Use

Existing and planned land uses in and around FTT were discussed in Chapter 1, *Airport Environs and Land Use*. The land use to the north and east of the airport is primarily agricultural in nature. Low density residential use exists south and west of the airfield, as well as immediately south of the airport and north of Highway H. Land uses including commercial/industrial and/or institutional (i.e. schools, churches and medical facilities) are not located adjacent to the airport. The Morgan Soccer Complex, a Section 4(f) resource which will be discussed later in this chapter, is located on airport property and situated to the east-northeast of the airfield.

Based on projected aviation demand, coupled with existing and proposed land uses in the area, FTT is expected to be compatible with current and future land uses from a noise compatibility standpoint. Additionally, those parcels of land recommended for acquisition to the north of the airport are expected to remain compatible with airport operation.

Ultimately, the City of Fulton and Callaway County are recommended to enact height and hazard regulations to preserve the airport's existing and future airspace infrastructure. Height and hazard regulations would not only regulate the height of objects within the immediate vicinity of the airport, but would ensure airspace compatibility adjacent to the facility as well.

**Social Impacts**

*Because FTT's future airfield development alternative will include no residential acquisition and acquisition of cropland, significant social impacts are not anticipated. This assessment is further supported by the fact that the airfield expansion plan is not expected to include any road closures or realignments nor is it expected to disrupt or alter established residential or commercial developments.*

### Social Impacts

Examination of potential social impacts related to airport expansion generally include acquisition of property; relocation of residences or businesses; alteration of surface transportation routes; disruption to established communities; and alteration of planned development.

The preferred airfield development alternative involves acquisition of approximately seven acres in fee simple to the north of the airport. The land to be acquired consists primarily of open fields and contains low yield cropland. Given that land is expected to be acquired with state and/or federal funding grants, the city is recommended to abide by provisions of the

*Uniform Relocation Assistance and Real Property Acquisition Policies Act*, as well as FAA Order 5100.37B, *Land Acquisition and Relocation Assistance for Airport Projects*.

Because FTT's future airfield development alternative will include no residential acquisition and acquisition of cropland, significant social impacts are not anticipated. This assessment is further supported by the fact that FTT's airfield expansion plan is not expected to include any road closures or realignments nor is it expected to disrupt or alter established residential or commercial developments.

**Induced Socioeconomic Impacts**

Induced socioeconomic impacts address those effects on surrounding communities that relate to the preferred airport development alternatives including overall population increases or fluctuations and increased public service demands. Induced socioeconomic impacts also involve changes to the local business, political, or economic conditions to the extent brought about by airport expansion.

The preferred airfield and terminal area development alternatives, although expected to potentially pose minor social impacts during construction, is not expected to produce significant fluctuations in population trends or growth. The preferred alternatives are also not expected to place undue burden on public service demands or overly influence changes in business or political conditions. It is generally believed that induced social impacts will normally not be significant except where there are also significant impacts in other categories, especially noise, land use, or direct social impacts. However, these assumptions are recommended to be confirmed by an Environmental Assessment (EA) completed during the 20-year master plan period.

**Induced Socioeconomic Impacts**

*The preferred airfield and terminal area development alternatives, although expected to potentially pose minor social impacts during construction, is not expected to produce significant fluctuations in population trends or growth. The preferred alternatives are also not expected to place undue burden on public service demands or overly influence changes in business or political conditions.*

**Air Quality**

The *Clean Air Act of 1970* (CAA) was enacted to protect the nation's air quality, as well as the public health. Amendments in 1970, 1977, and 1990 established federal standards to control air pollution emissions and to delegate the implementation of such standards to the states. The CAA Amendments of 1977 stated that any federally-funded project shall conform to State Implementation Plan (SIP) criteria in order to assure that airport development projects conform to mandates for controlling potential air pollution impacts by meeting federal air quality standards.

According to FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, as well as FAA Handbook entitled, Air Quality Procedures for Civilian Airports and Air Force Bases, Report No. FAA EE 82-21, no air quality analysis is required for general aviation airports if the level of forecasted operational demand is less than 180,000 annual operations. The forecast of aviation demand for FTT is well below the required annual operational activity to warrant an air quality analysis. Therefore, it is expected that no potential for significant air quality impacts will exist in the future.

**Air Quality**

*The forecast of aviation demand for FTT is well below the annual operational activity to warrant an air quality analysis. Therefore, it is expected that no potential for significant air quality impacts will exist in the future.*

In regards to the preferred development alternatives, the Missouri Department of Natural Resources (DNR) recommends that if any commercial buildings are demolished or renovated, the city must ensure compliance with National Emissions Standards for Hazardous Air Pollutants (NESHAPs) and state standards addressing asbestos mitigation and disposal. Secondly, if any open air burning operations are conducted, DNR recommends the city contact DNR's Northeast Regional Office in Macon to ensure permitting compliance.

**Water Quality**

The *Federal Water Pollution Control Act of 1972* (FWPCA) sought to restore the nation's navigable waterways and lakes so that they provide safe conditions to humans and wildlife. The FWPCA, as amended by the *Clean Water Act of 1977* (CWA), provided for the establishment of water quality standards, control of discharges into surface and subsurface waters, development of waste treatment management plans and practices, as well as issuance of permits for discharges and for dredged or fill material.

**Water Quality**

*During the construction of the preferred development alternatives, the city will be required to complete a NPDES Permit, as well as a SPCC Program. These permits are intended to demonstrate that state, federal and local permit requirements can be met by the city. Additionally, in preventing storm water runoff and soil erosion during construction activities, exercise of Best Management Practices (BMP) are encouraged.*

Coordination with the U.S. Army Corps of Engineers (USACE), the Environmental Protection Agency (EPA) and DNR is recommended prior to the construction of the preferred airfield and terminal area improvements to evaluate their potential impact on groundwater aquifers and jurisdictional waters of the United States, including wetlands as well as tributaries, creeks or streams with national significance. Coordination with the DNR to address any state water quality issues prior to and during implementation of the preferred alternatives is recommended.

During the construction of the preferred development alternatives, the city will be required to complete a National Pollutant Discharge Elimination System (NPDES) Permit, as well as a Spill Prevention Control, and Countermeasure (SPCC) Program. These permits are intended to demonstrate that state, federal and local permit requirements can be met by the city. Additionally, in preventing storm water runoff and soil erosion during construction of the preferred development alternatives, exercise of Best Management Practices (BMP) are encouraged. BMPs reduce erosion, minimize sedimentation, and control non-storm water discharges in order to maintain water quality on and off the airport premises. Also, because the preferred development alternatives will involve disturbance of greater than one acre, a land disturbance permit from the DNR will be required. The permit involves the utilization of BMPs to minimize off-site erosion into nearby waters.

**Department of Transportation Act, Section 4(f) and Section 6(f)**

The U.S. Department of Transportation's Section 4(f) law (49 USC 303) states that federal funds may not be approved for projects that use land from a significant publicly-owned park, recreation area, wildlife or waterfowl refuge, or any significant historic site unless it is determined that there is no feasible and prudent alternative to the use of land from such properties and the action includes all possible planning to minimize harm to the property resulting from such use.

Section 6(f) of the *Land and Water Conservation Fund Act* (L&WCF) states that property purchased or developed with funds under the Act may not be converted to other than outdoor public recreation uses. The Act also states that land required from such properties must be replaced with property of at least equal fair market value and of reasonably equivalent usefulness and location, or be compensated through other means in consultation with DNR, the agency responsible for administering L&WCF funds and other aspects of the Act.

The Morgan Soccer Complex, located on airport property and situated to the east-northeast of the airfield, is considered a Section 4(f) resource according to federal law. Given that FTT's preferred airfield alternative does not impact the complex, and given the absence of additional Section 4(f) lands in the vicinity of the airport, the proposed airfield and terminal area improvements are not expected to impact any 4(f) resources in the area. Additionally, due to the lack of Section 6(f) lands adjacent to the airport, the preferred alternatives are also not expected to impact this classification of publicly owned lands.

**DOT Act, Section 4(f) and Section 6(f)**

*Given the absence of Section 4(f) lands in the vicinity of the airport, the preferred airfield and terminal area improvements are not expected to impact any 4(f) resources in the area. Additionally, due to the lack of Section 6(f) lands adjacent to the airport, the preferred alternatives are also not expected to impact this classification of publicly owned lands.*

**Historic, Architectural, Archeological, and Cultural Resources**

The *National Historic Preservation Act of 1966* states that if any properties in or eligible for inclusion into the National Register of Historic Places are within the area of the Proposed Action's potential environmental impact, and if so, what impacts, direct and indirect, could be expected to affect the cultural, historic, archeological or architectural qualities of the property. Another piece of legislation, the Archeological and Historic Preservation Act of 1974, provides for the recovery, survey, and preservation of scientific, prehistoric, historical, archeological, and paleontologic data where the data may be adversely affected by a federal, federally funded, or federally licensed project.

**Cultural Resources**

*The SHPO, after reviewing the preferred development alternatives and performing a review in accordance with Title 36 CFR 800, found that there will be no historic property affected by the proposed airport improvements.*

The State Historic Preservation Officer (SHPO) for the DNR, State Historical Preservation Office, after reviewing the preferred development alternatives and performing a review in accordance with Title 36, Code of Federal Regulations (CFR) 800, found that there will be no historic property affected by the proposed airport improvements.

**Biotic Communities (Including both Flora and Fauna)**

The *Fish and Wildlife Coordination Act of 1934* authorizes the Departments of Agriculture and Commerce to provide assistance to and cooperate with Federal and state agencies to protect and increase the supply of game and fur-bearing animals, as well as to study the effects of polluting substances on wildlife. The Act also authorizes the preparation of plans to protect wildlife resources and the completion of wildlife surveys on public lands in an effort to prevent loss of and damage to wildlife resources. The amendments enacted in 1946 require consultation with the U.S. Fish and Wildlife Service (USFWS), as well as state fish and wildlife agencies where the waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted or otherwise controlled or modified by any agency under a Federal permit or license.

### Biotic Communities

*The USFWS and Missouri Department of Conservation (MDC) reviewed the proposal and determined that no federally listed species, candidate species or designated critical habitat occur within the project area. Also, MDC indicated that there were no wildlife preserves, designated wilderness areas or critical habitats and no state endangered-list species records within one mile of FTT.*

The USFWS and Missouri Department of Conservation (MDC) were consulted to provide input on potential impacts posed by the proposed airport expansion on biotic communities in the vicinity of the airport. The USFWS reviewed the proposal and determined that no federally listed species, candidate species or designated critical habitat occur within the project area. The USFWS also indicated that implementation of the preferred development concept would have negligible impacts on wetlands, migratory birds and other priority fish and wildlife resources. Also, the MDC indicated that there were no wildlife preserves, designated wilderness areas or critical habitats and no state endangered-list species records within one mile of FTT. Accordingly, the proposed development alternatives are not expected to significantly impact any biotic communities in the area.

However, the MDC did indicate that Bald Eagles nest within 1/2 mile of the airport. The MDC further advised that while Bald Eagles are no longer listed as endangered, they continue to be protected under the *Bald and Golden Eagle Protection Act*. The city should be alert for nesting areas within 1,500 meters of project activities and follow USFWS National Bald Eagle Management Guidelines and MDC's best management recommendations.

### Endangered and Threatened Species of Flora and Fauna

The *Endangered Species Act of 1973* provides for the preservation of threatened and endangered species of fish, wildlife and plants in their respective biotic communities which refers to the flora and fauna habitats (vegetation and wildlife) that might be present in the locality of proposed construction projects. In addition, should a construction project affect water resources including wetlands, groundwater, impoundment, diversion, deepening, controlling, modifying, polluting, dredging, or filling of any stream or other body of water, provisions of the Endangered Species Act make the Fish and Wildlife Coordination Act applicable as well.

### Threatened and Endangered Species

*The USFWS and MDC were consulted to provide input on potential impacts posed by the preferred development alternative on endangered and threatened species. Both agencies determined that no Federal or state-listed endangered or candidate species occur within the project site or within one mile of FTT. Both agencies also determined that there are no critical habitats, wildlife preserves or designated wilderness areas in the immediate vicinity of the airport.*

The USFWS and MDC were consulted to provide input on potential impacts posed by the preferred development alternatives on endangered and threatened species. Both agencies determined that no Federal or state-listed endangered or candidate species occur within the project site or within one mile of FTT. Both agencies also determined that there are no critical habitats, wildlife preserves or designated wilderness areas in the immediate vicinity of the airport. Therefore, the proposed airfield and terminal area improvements are not expected to significantly impact any endangered or threatened species.

### Wetlands

The importance of wetlands is emphasized in Executive Order (EO) 11990, issued May 24, 1977, as well as Section 404 of the Clean Water Act of 1977 (33 USC 1344 and 33 CFR 320-332). E.O. 11990 is implemented by DOT Order 5660.1A, *Preservation of the Nation's Wetlands*. Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "...those areas

that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, or similar areas…" The intent of the Clean Water Act, as well as EO 11990, is to avoid short and long-term adverse impacts associated with damaging or modifying wetlands area, as well as to avoid construction in wetlands where there is a reasonable alternative.

The USACE was consulted to provide input on potential impacts posed by the preferred development alternative to wetlands in the proposed project area. In their correspondence, the USACE, Kansas City District, State Regulatory Program Office-Missouri, indicated that the proposed activity will not involve the discharge of dredged or fill material into jurisdictional waters of the U.S. Therefore, Department of the Army (DA) permit authorization associated with Secton 404 of the Clean Water Act wil not be required.

**Floodplains**

Floodplains are characterized as low lying flatlands adjoining inland and coastal waters where the possibility of flooding in any given year is approximately one percent or greater. These inland and coastal waters susceptible to flooding are most likely within the 100-year floodplain. Knowledge of floodplains in the vicinity of an airport is important in reducing the risk of flood loss, restoration and preservation of natural beneficial values of floodplains including groundwater recharge to aquaculture and forestry, and protection of human health and welfare.

Federal Emergency Management Agency (FEMA) Flood Hazard Boundary Maps (FHBM) for Callaway County and the Fulton community (Panel Nos. 29027C0300D and 29027C0303D) were researched to determine the potential impacts of proposed expansion on existing floodplains. Although floodplains occur to the southeast and west of FTT, airport expansion is not expected to be impacted nor are floodplains expected to adversely influence future capital improvements. However, prior to implementing the preferred airfield alternative, it is recommended that the city's floodplain manager coordinate with FEMA and the Missouri Floodplain and Stormwater Managers Association (MFSMA) to consider strategies to minimize potential impacts to floodplains in the area posed by airfield and terminal area expansion.

**Wild and Scenic Rivers**

The National Wild and Scenic Rivers System is a classification of certain selected rivers of the U.S. which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

**Wetlands**

*The USACE was consulted to provide input on potential impacts posed by the preferred development alternative to wetlands in the proposed project area. In their correspondence, the USACE, indicated that the proposed activity will not involve the discharge of dredged or fill material into jurisdictional waters of the U.S. Therefore, DA permit authorization will not be required.*

**Floodplains**

*Although floodplains occur to the southeast and west of FTT, airport expansion is not expected to be impacted nor are floodplains expected to adversely influence future capital improvements.*

**Wild and Scenic Rivers**

*The national inventory for the Wild and Scenic Rivers System does not list any rivers of this classification within the vicinity of FTT and does not warrant further consideration or investigation.*

The national inventory for the Wild and Scenic Rivers System does not list any rivers of this classification in the vicinity of FTT and does not warrant further consideration or investigation.

**Prime and Unique Farmland**

*In accordance with the FPPA, the city is recommended to coordinate with the USDA, Natural Resources Conservation Service (NRCS), to complete a Farmland Conversion Impact Rating, prior to acquiring land to determine what impacts, if any, are posed to prime farmland by the preferred airfield development concept.*

**Prime and Unique Farmland**

The *Farmland Protection Policy Act of 1984* (FPPA) authorizes the U.S. Department of Agriculture (USDA) to develop criteria for evaluating the potential effects of federally-funded transportation projects on the conversion of farmland to non-agricultural uses. This evaluation includes determining the adverse impacts to prime farmland, mitigating or minimizing adverse effects, and ensuring that transportation projects are compatible with local, state, and private programs aimed at preserving farmland areas.

In accordance with the FPPA, the city is recommended to coordinate with the USDA, Natural Resources Conservation Service (NRCS), to complete a *Farmland Conversion Impact Rating*, prior to acquiring land to determine what impacts, if any, are posed to prime farmland by the preferred airfield development concept. The proposed property acquisition north of the airport and CR 304 does not appear to cause a significant loss of prime farmland of statewide importance.

**Energy Supply and Natural Resources**

The preferred development alternatives will be evaluated to determine any significant impacts on local energy resources including construction of additional buildings or aviation-related facilities such as airfield and runway lighting or those energy requirements associated with the movement of air and ground vehicles.

**Energy Supply and Natural Resources**

*The preferred airfield and terminal area alternatives are not expected to significantly impact energy supplies or natural resources of the Callaway County or Fulton area.*

The preferred development alternatives will result in an increase in energy demand related to the installation of airfield lighting improvements including taxiway lighting improvements, visual approach aids as well as the construction of T-hangars, clear span hangars and the expansion of the terminal building. However, this increase in energy demand is not considered to have a measurable effect on local energy supplies and is expected to be accommodated by current utility facilities and service providers.

The overall operational activity of the airport is expected to increase as a result of the implementation of the preferred alternatives. However, the preferred alternatives are not expected to significantly increase aircraft ground operations or movement times nor is it expected to have an appreciable affect on existing flight patterns or en route flight times. With the increase in airport activity, the surface transportation activity is expected to increase at a nominal rate as well. Motor vehicle fuel consumption is not expected to increase significantly because airport access routes are not expected to be adversely influenced by the implementation of the preferred alternatives.

With regard to natural resources, with the exception of automobile gasoline and aviation fuel, the preferred development alternatives are not anticipated to impact rare materials that are in short supply. Also, the proposed alternatives are not expected to result in demand for natural resources or energy reserves exceeding supplies. Therefore, the preferred airfield and terminal area alternatives are not expected to significantly impact energy supplies or natural resources of the Callaway County or Fu**lton area.**

**Light Emissions**

Light emissions created by the preferred airfield alternative require consideration of whether or not runway lighting would create an annoyance to the population residing in the vicinity of the airport. The preferred alternatives will include the installation or upgrade of the following runway lighting systems:

*Medium Intensity Runway Lighting (MIRL)*

MIRL is a steady burning lighting system classified by the system's intensity or brightness. The brightness of the system is classified by a series of "steps" varying from low (15 watts) to medium (40 watts) intensity depending on the visibility conditions, as well as 10, 30, and 100 percent of the required level of brightness. Runways 18-36 and 6-24 are currently equipped with MIRL. The MITL systems are recommended to be maintained throughout the planning period.

*Threshold Lighting and Runway End Indicator Lights (REILs)*

This low to medium intensity, pole mounted, frangible, and steady burning lighting system marks the end of the runway by utilizing colored split lenses. The REIL lighting system provides rapid and positive identification of the runway approach end, consisting of a pair of white synchronized high-intensity (200 watt) photo-strobe lights located laterally along the runway threshold and angled 15 degrees from the extended runway centerline. Runway 18-36 and Runway 6-24 are recommended to remain equipped with REILs at both runway thresholds throughout the planning period.

*Visual Guidance Indicators*

The Precision Approach Path Indicators (PAPI-4L) system consists of a four lamp housing unit, emitting red and white light beams, which is installed 600-800 feet from the runway threshold and offset 50 feet to the left side. Runways 18 and 36 are recommended to remain equipped with PAPIs throughout the planning period.

The simplified abbreviated visual approach slope indicator (SAVASI-2L) serving Runway 6-24 is recommended to be upgraded during the planning period with a two box PAPI system. The SAVASI-2L, designed for non-jet runways and provides descent information under daytime conditions, consists of two light boxes with a single lamp in each box and functions in a similar way that the PAPI system provides approach guidance to the runway.

**Light Emissions**

*Given the lighting systems currently utilized and proposed for use at FTT, the preferred airfield development alternative is not expected to contribute significant light emissions.*

Given the lighting systems currently utilized and proposed for use at FTT, the preferred airfield development alternative is not expected to contribute significant light emissions. However, should these lighting systems prove to result in excess ambient light, particular adjustments and engineered solutions can be made to the systems during or after installation. Optical baffles can be installed and angular tolerances be made in order to channel the light emitted from the lamps, thereby reducing the likelihood of objectionable light emissions from either runway end.

**Solid Waste Impacts**

FAA Order 5200.5, *FAA Guidance Concerning Sanitary Landfills On or Near Airports*, provides guidance with respect to the establishment, elimination, or monitoring of sanitary landfills, transfer facilities, and solid waste facilities on or in the vicinity of airports. Assessing the potential impacts of the preferred development alternative on the generation of solid waste is necessary to determine potential available disposal capability and capacity of waste facilities in the region.

**Solid Waste Impacts**

*Given the location of the nearest landfills to the airport, the preferred airfield alternative will not be adversely affected by potential wildlife hazards associated with sanitary landfills and/or waste disposal facilities.*

The DNR, Solid Waste Management Program, was consulted to determine the location of the nearest sanitary landfill to FTT. The Fulton Sanitary Landfill (SLF), closed in early 2011, was formerly located approximately one mile southwest of the airport. According to the DNR, the nearest operational landfills to FTT are the City of Columbia SLF and the Jefferson City SLF. Given the location of the nearest landfills to the airport, the preferred airfield alternative will not be adversely affected by potential wildlife hazards associated with sanitary landfills and/or waste disposal facilities.

Airport improvement projects, except for construction associated with expansion of runways and taxiways, rarely include any direct relationship to solid waste collection facilities. Given the attributes of the preferred development alternatives, the airport is not expected to generate excessive solid waste materials and/or impact landfill or transfer stations in the region.

The DNR recommends that during the implementation of the preferred airfield and terminal area alternatives, the city dispose of waste from demolition and/or construction activities at a permitted sanitary landfill or transfer station. This waste cannot be stockpiled at an alternate site for separation at a later time. DNR also indicates that should any asbestos containing material from demolition of residential and/or commercial structures be identified, a registered asbestos contractor should be contacted to remove and properly dispose of the material.

Lastly, DNR suggests that no waste may be buried on-site except for certified clean fill. Certified clean fill includes uncontaminated soil, rock, sand, gravel, concrete, asphaltic concrete, cinder blocks and unpainted brick. Clean fill must not contain extruding material and/or demolition debris.

### Construction Impacts

Temporary environmental effects resulting from construction operations include noise of construction equipment on the site; noise and dust from delivery of materials through local roadways; creation of borrow pits and disposal of raw materials; air pollution from burning debris; and water pollution from erosion. Although environmental effects resulting from construction are of lesser magnitude than long-term impacts, they can be minimized through implementation of control measures and utilization of BMPs. Additionally, construction operations are recommended to be conducted in accordance with FAA Advisory Circular (AC) 150/ 5370-10A, *Standards for Specifying Construction of Airports*, Item P 156-Temporary Air and Water Pollution, Soil Erosion and Siltation Control, as well as an established NPDES permit and SPCC program.

**Construction Impacts**

*Although environmental effects resulting from construction are of lesser magnitude than long-term impacts, they can be minimized through implementation of control measures and utilization of BMPs.*

### Hazardous Waste

Regulatory law affecting airports includes the *Resource Conservation and Recovery Act of 1976* (RCRA). Through this legislation, the U.S. Congress directed the EPA to develop and implement programs meant to protect human health and welfare, as well as the environment, from improper hazardous waste management practices. The RCRA is applicable to any party who transports or generates hazardous waste, as well as those parties who own or operate a facility for the storage, treatment, or disposal of hazardous wastes. Other pertinent legislation regarding this matter includes legislation that was a national campaign aimed at toxic waste cleanup efforts which included *The Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), a.k.a. Superfund Act, as well as *The Superfund Amendments and Reauthorization Act of 1986* (SARA).

**Hazardous Waste**

*FTT is not located in the vicinity of any Superfund Sites as listed on the National Priority List nor will airfield and/or terminal area development result in creation of hazardous waste.*

Hazardous wastes are those materials that can cause injury or death, or that can damage or pollute the air, land and water. Material waste might also be considered hazardous if the material exhibits any one or all of the following characteristics, including ignitability (flammable or combustible), reactivity (rapid, violent chemical reaction with $H_2O$ or other element), toxicity (high concentrations of heavy metals or pesticides), or corrosiveness (burns or dissolves other elements or various materials). In the event that a reportable amount of hazardous wastes are released into the environment, as established by the EPA, the city must contact the National Response Center (NRC), Washington, D.C., at 800.424.8802 and abide by proper reporting requirements and procedures. FTT is not located in the vicinity of any Superfund Sites as listed on the National Priority List nor will airfield and/or terminal area development result in creation of hazardous waste.

The DNR recommends that any household hazardous waste generated from and/or by acquired residences must be properly managed. This includes waste consistent with the operation of a business out of a home which would not be exempt and would be subject to a hazardous waste determination including management, storage and disposal per applicable

regulations. Additionally, DNR considers construction of hangars a commercial endeavor and requires that all waste from these operations be properly characterized for hazardous waste constituents. All hazardous waste must be managed, stored, transported and disposed of in accordance with applicable guidelines and requirements.

Lastly, DNR recommends that if during excavation activities any contaminated soil that could be classified as a hazardous waste is discovered, the DNR spill line should be notified immediately.

**Environmental Justice**

In accordance with Executive Order 12988, *Federal Action to Address Environmental Justice in Minority Populations and Low Income Population* (1994), the preferred development alternative must not pose a disproportional impact on low income or minority communities in the vicinity of the airport.

It is recommended that during the completion of the future EA, in necessary, the preferred development alternatives be examined to determine if the project poses a potential disproportionate affect on low income and/or minority populations. It is expected that in the course of determining the social and induced socioeconomic impacts of implementing the preferred alternatives, significant impacts, if any, related to environmental justices will be determined.

**Environmental Justice**

*It is recommended that during the completion of the future EA the preferred airfield development alternative be examined to determine if the project poses a disproportionate affect on low income and/or minority populations.*

## SUMMARY

Table 5.1 details the potential impacts and recommendations to address the environmental impact categories for the preferred airfield and terminal area alternatives at FTT.

Table 5.1
Environmental Impact Categories Summary

| Environmental Categories | Preferred Development Alternatives | |
|---|---|---|
| | Impact(s) | Mitigation |
| Noise | None | None Required |
| Compatible Land Use | None | Enact Height & Hazard Regulations |
| Social Impacts | None | None Required |
| Induced Socioeconomic Impacts | None | None Required |
| Air Quality | None | None Required |
| Water Quality | Not Significant | Complete NPDES and SPCC Plans; practice BMPs |
| Section 4(f) and Section 6(f) Lands | None | None Required |
| Historic, Architectural, Archeological, and Cultural Resources | None | None Required |
| Biotic Communities (Including Flora and Fauna) | None | None Required |
| Endangered and Threatened Species of Flora and Fauna | None | None Required |
| Wetlands | None | Coordinate with the USACE, Kansas City District |
| Floodplains | None | Coordinate with FEMA & MFSMA |
| Wild and Scenic Rivers | None | None Required |
| Prime and Unique Farmland | None | Coordinate with the USDA, NRCS |
| Energy Supply and Natural Resources | None | None Required |
| Light Emissions | None | None Required |
| Solid Waste Impacts | None | None Required |
| Construction Impacts | Not Significant | None Required |
| Hazardous Waste | None | Abide by CERCLA/SARA Guidelines |
| Environmental Justice | None | None Required |

Source: Lochner.

Table 5.2 details the federal and state agencies contacted to complete the environmental overview for this project.

Table 5.2
Resource Agency Coordination and Contacts

| Agency Contact & Title | Agency Address |
|---|---|
| Mr. David K. Kacirek<br>Area Resource Soil Scientist | U.S. Department of Agriculture<br>National Resource Conservation Service<br>3915 Oakland Ave., Suite 103<br>St. Joseph, MO 64506 |
| Mr. Charles Scott<br>Field Supervisor | U.S. Fish & Wildlife Service<br>Columbia Field Office<br>101 Park De Ville Drive #A<br>Columbia, MO 65203-0007 |
| Mr. Mark A. Miles<br>Deputy State Historic Preservation Officer | Missouri Department of Natural Resources<br>State Historic Preservation Office<br>P.O. Box 176<br>Jefferson City, MO 65102 |
| Mr. Shannon Cave<br>Public Involvement Coordinator | Missouri Department of Conservation<br>2901 W. Truman Blvd.<br>P.O. Box 180<br>Jefferson City, MO 65102-0180 |
| Mr. Kenny Pointer<br>Regulatory Project Manager | U.S. Army Corps of Engineers<br>Kansas City District<br>Missouri State Regulatory Office<br>221 Bolivar St., Suite 103<br>Jefferson City, MO 65101 |

Source: Lochner.

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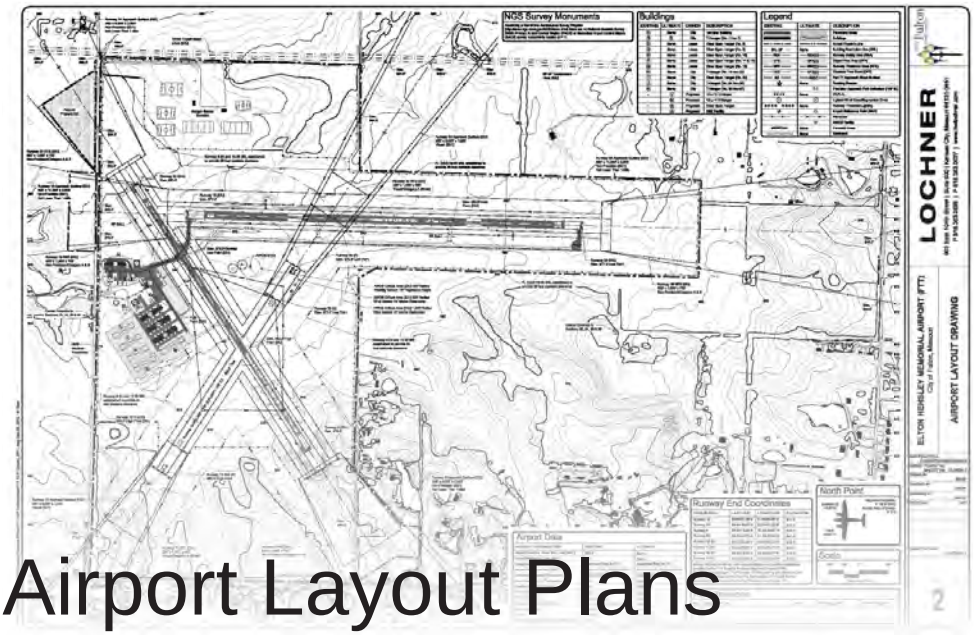



# Airport Layout Plans

## INTRODUCTION

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

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

- An approved ALP is necessary in order for the airport to receive financial assistance from the FAA under the terms of the Airport and Airway Improvement Act of 1982 (AIP) and/or grants from the Missouri State Aviation Trust Fund. The city is required to keep the ALP current and follow the preferred development concept, which reflect grant assurance requirements of the AIP.

- An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP also provides a guideline by which the city can ensure that airport improvements are implemented in accordance with the FAA's design standards and safety requirements.

- The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a point of reference for considerations regarding land use proposals, land acquisition and budgetary allocations and planning.

- The approved ALP enables the city, FAA and MoDOT to plan for facility improvements at the airport. It also allows MoDOT and FAA to anticipate long-term operational and maintenance needs for the facility. The approved ALP will also enable the city to protect the airport's airspace surfaces, thereby preserving the facility's airspace infrastructure.

- The ALP is a working tool to be utilized by the city, including city personnel, airport management staff, and airport board members, as well as airport stakeholders.

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

## AIRPORT LAYOUT DRAWING

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

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

**Runway System**

The airfield layout consists of two paved runways situated in an open-V configuration. The two runways, designated 18-36 and 6-24, are aligned in a north-south and northeast-southwest orientation, respectively. Runway 18-36 is expected to remain at its current dimensions throughout the planning period and remain capable of accommodating 100 percent of the general aviation aircraft fleet weighing less than 12,500 pounds.

Runway 6-24 is expected to remain at its current length but is recommended to be widened to 60 feet. Runway 6-24 is also expected to continue to serve primarily small single and twin engine piston aircraft weighing less than 12,500 pounds.

FTT is also served by a turf runway, designated 12-30, situated in a northwest-southeast orientation. 12-30 is recommended to be reduced in length to 1,800 while the runway is also recommended to be widened to 120 feet.

**Taxiway System**

The taxiway system consists of a 40-foot wide concrete connector taxiway which provides direct access between the aircraft apron and Runway 6-24. The taxiway system also includes one additional access taxiway at the Runway 18 threshold providing direct access to Runway 6-24 and the aircraft apron.

Ultimately, Runway 18-36 is recommended to be served by a 35-foot wide full parallel taxiway. The future parallel taxiway centerline is recommended to be situated 240 feet from the runway centerline. Additionally, Runway 6-24 is recommended to be equipped with a 25-foot partial parallel taxiway extending from the current aircraft apron and providing direct access to the Runway 24 threshold. The future taxiway system is recommended to be equipped with medium intensity taxiway lighting (MITL).

**NAVAIDS and Airfield Lighting**

Runway 18-36 is a non-precision runway capable of accommodating (RNAV) GPS approach procedures to both runway thresholds. The GPS approaches to both thresholds allow lateral and vertical navigation LPV approach procedures with minimum visibilities not less than 1-mile and minimum descent altitudes below 400 feet AGL. Ultimately, both thresholds of 18-36 are expected to accommodate 34:1 non-precision approaches with minimum visibilities not less than 1-mile with minimum descent altitudes equal to and/or less than 300 feet AGL.

Runway 6-24 is also a non-precision runway also capable of accommodating (RNAV) GPS approach procedures to both runway thresholds. Both thresholds are expected to remain capable of accommodating non-precision approaches throughout the planning period.

The pilot-controlled medium intensity runway lighting (MIRL), threshold lighting and runway end indicator lights (REIL) serving Runways 18-36 and 6-24 are programmed to remain in place throughout the planning period and upgraded as needed.

The four-box PAPI visual guidance system serving Runway 18-36 is recommended to remain operational throughout the planning period. The two-unit SAVASI visual guidance system serving Runway 6-24 is recommended to be upgraded to two-box PAPIs.

**Terminal Area Development**

Ultimately, the airport's terminal area will experience significant operational improvements. These changes are expected to include the development of approximately 40 new T-hangar

units consisting of nearly 52,000 square feet of storage space. New T-hangar development is expected to occur to the northwest of the main terminal area complex.

Individual clear span hangar accommodations are expected to consist of 5,000 square feet of space to accommodate potential based turbo-prop aircraft. Three additional large clear span hangars are proposed in an effort to accommodate demand beyond projected levels. These new facilities will be located within the northeastern terminal area.

In addition to clear span and T-hangar development, a new 5,000 to 10,000 square foot FBO/maintenance hangar is anticipated to be constructed during the planning period. The maintenance hangar will be located north and east of the aircraft apron.

In order to increase the operational efficiency and address spatial limitations of the terminal building, the existing 900 square foot structure is recommended to be expanded to 3,200 square feet during the planning period. Reconfiguration of the auto parking facilities will accompany the terminal building improvements.

Finally, expansion of the aircraft parking apron by approximately 6,000 to 7,900 square yards and reconfiguration of the aircraft parking area to accommodate 13 small and one large aircraft tie-downs are recommended to serve long-term perk period aircraft demand.

**Land Acquisition**

The preferred development concept is expected to involve the acquisition of approximately seven acres in fee simple located to the north of CR 304 located within the Runway 24 RPZ. According to FAA guidelines, RPZs are to be free and clear of any structure, property or places of public assembly.

## AIRSPACE DRAWING

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

Runway 18-36 is depicted as having 34:1 non-precision instrument approaches. Runway 6-24 is expected to retain its current 20:1 non-precision approach surfaces. The turf Runway 12-30 is also expected to remain a visual runway with 20:1 approach surfaces.

There are 19 structures located within a three nautical mile radius of the airport. Of these, seven structures, located to the northeast, east and southeast of the airport, are defined as obstructions to air navigation. These structures are located in the vicinity of the airport (three nautical miles) and/or have elevations at or greater than 200 feet above ground level.

There are three known penetrations to the airport's imaginary airspace surfaces beyond the inner portions of the approaches to each runway. Two communications towers penetrate the airport's Horizontal Surface southeast of the airfield while the third penetrates the Conical Surface east of the facility.

### INNER PORTION OF THE APPROACH SURFACE DRAWING(S)

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

## RUNWAY CENTERLINE PROFILE DRAWING

The Runway Centerline Profile Drawing includes a plan and profile view of the existing and ultimate runway alignment which delineates the runway's line-of-sight attributes including runway end elevations, effective runway gradient, section gradient, touchdown zone elevations (TDZ) and runway high and low point elevations. This information is provided for both paved runways, 18-36 and 6-24, as well as the turf crosswind Runway 12-30.

## TERMINAL AREA DRAWING

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

**Passenger Terminal Building**

The existing 900 square foot terminal building is located adjacent to and north of the aircraft apron. Given its size, layout, age and overall physical condition, the terminal building is not

considered conducive to supporting necessary passenger processes including flight planning, pilot lounge and passenger circulation areas. The preferred terminal area development concept recommends the expansion of the existing structure by approximately 2,300 square feet to total 3,200 square feet. Future improvements may include expanding the existing facility or constructing a new building.

**Aircraft Apron**

From an operational and spatial standpoint, the airport's 4,900 square yard parking apron is insufficient to accommodate peak hour transient demand throughout the planning period. Ultimately, the apron is recommended to be expanded by 6,000 to 7,900 square yards which will feature reconfigured tie-down spaces. The future apron is expected to be capable of accommodating one large and 13 small aircraft tie-downs. The new apron configuration will allow maneuvering by large turbine aircraft with wingspans from 48 feet up to 78 feet.

**Hangar Facilities**

Given the projected based aircraft demand, 42 nested T-hangars totaling nearly 52,000 square feet of space are recommended for development throughout the planning period. New T-hangar construction will take place to the northwest of the terminal building and aircraft apron. Also, given the potential for based turbo-prop aircraft, four 5,000 square foot clear span hangars will be proposed for development starting during the 6-10 year planning period. Clear span hangar development is expected to occur to the northeast of the aircraft apron and terminal building.

**Support and Other Facilities**

The airport's fuel farm is located adjacent to and west of the terminal building. The fuel farm consists of one above-ground tank capable of storing 12,000 gallons of 100 LL fuel. The existing fuel farm is expected to remain at its current location while the storage facility is not expected to require additional capacity during the planning period.

Should the need and/or demand arise, the city and/or the FBO would be recommended to acquire a 500 to 1,000 gallon capacity fuel truck to dispense Jet A to locally based and/or transient turbine aircraft. Acquisition of the fuel truck would be accompanied by the construction of a 30' x 46' fuel truck parking area/spill containment berm. Ideally, this area would be located adjacent to the fuel farm and aircraft apron.

Should the opportunity and/or demand arise, a 5,000 to 10,000 square foot clear span FBO/maintenance hangar would be recommended for airframe and powerplant maintenance for piston and turbine airplanes. This new facility is recommended to be located within the northeastern portion of the terminal area complex.

## LAND USE DRAWING

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

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

## PROPERTY MAP

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

FTT's property consists of 12 tracts totaling 412 acres held as fee simple ownership and one additional tract totaling approximately seven acres of avigation easement. As noted above, the preferred development concept is expected to include the acquisition of the seven acre easement located to the north of CR 304 in fee simple ownership.

## 40:1 DEPARTURE SURFACE DRAWING

The 40:1 Departure Surface Drawing depicts the plan and profile view of the current and ultimate 40:1 departure surfaces to provide information on existing and potential obstructions to the engine-out departures on instrument procedure for Runway 18-36 and 6-24.

The departure surface for Runway 18 is penetrated by 13 obstacles which include trees located south of the runway. The Runway 36 departure surface is penetrated by five obstacles which include hangars located within the terminal area and trees located north of the runway and CR 304.

The Runway 6 departure surface is penetrated by nine obstacles including trees and transmission lines located to the northeast of the runway, as well as light poles located east-northeast of the airfield. The departure surface for Runway 24 is penetrated by nine obstacles which include trees and forested areas located to the southwest of the runway.

## SUMMARY

The recommended development concept, as presented in the following ALP drawings, has been developed in conjunction with the city, airport board and planning advisory committee. This concept was developed based on demand projections and a facility requirements assessment which indicated the need to implement extensive taxiway improvements to serve Runway 18-36 and 6-24; install an AWOS-III weather reporting station; acquire property north of CR 304 within the inner portion of the approach to Runway 24; and perform significant terminal area improvements throughout the 20-year planning period.

The following chapter, *Capital Improvement Program*, will present a schedule of airfield and terminal area improvement projects and cost summaries necessary to implement the recommended development concept throughout the 0-5 year (short-term), 6-10 year (mid-term) and 11-20 year (long-term) planning periods.

# Airport Layout Plan

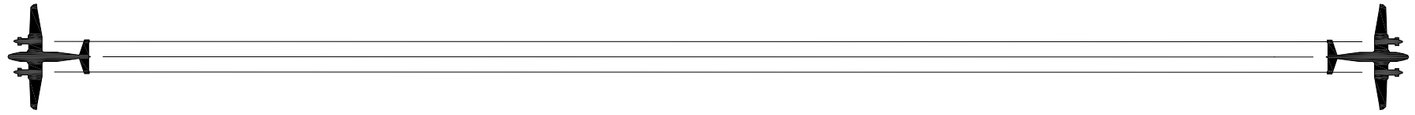
## for the

# Elton Hensley Memorial Airport (FTT)

## City of Fulton, Missouri

MoDOT Project No. 10-040A-1

MoDOT/FAA Approval Documents



Index of Drawings



MoDOT Approval Stamp

Sponsor Approval Stamp

For Approval by:

The City of Fulton, Missouri

Signed by: _____ Dated: _____

Greg Hayes, P.E.
City Engineer

MoDOT Disclaimer


The preparation of this document may have been supported, in part, through the Airport Improvement Program (Project Number 09-020A-1) as provided under Title 49 U.S.C., Section 47104. The contents do not necessarily reflect the official views or policy of the FAA or the Missouri DOT. Acceptance of this report by the FAA and Missouri DOT does not in any way constitute a commitment on the part of the United States or the State of Missouri to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws.



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ELTON HENSLEY MEMORIAL AIRPORT (FTT)
City of Fulton, Missouri

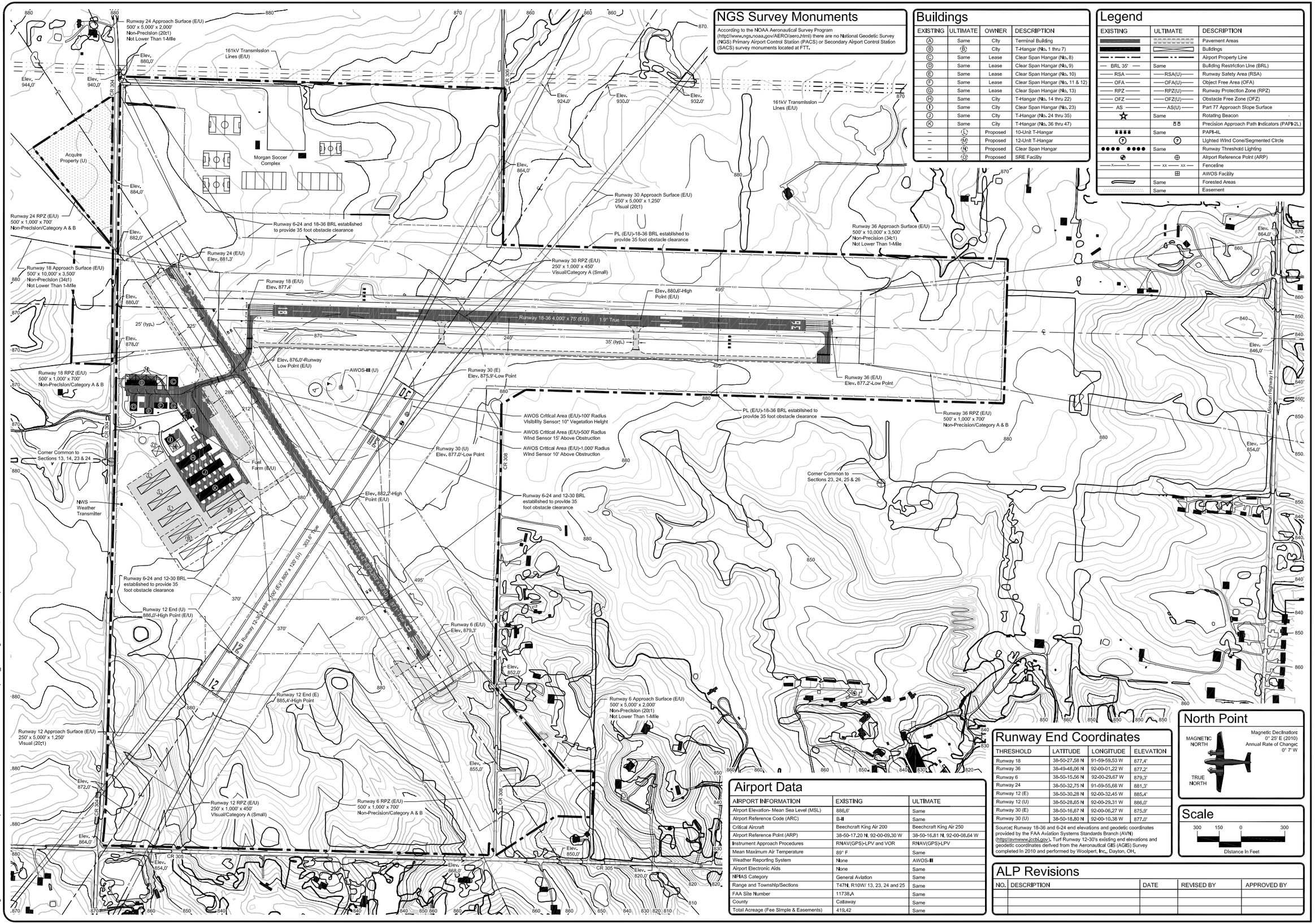
TITLE SHEET

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE

SUBMITTAL DATE 12/22/2011

1

SHEET 1 OF 14




## NGS Survey Monuments

According to the NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/AERO/aero.html) there are no National Geodetic Survey (NGS) Primary Airport Control Station (PACS) or Secondary Airport Control Station (SACS) survey monuments located at FTT.

## Buildings

| EXISTING | ULTIMATE | OWNER | DESCRIPTION |
|---|---|---|---|
| (A) | Same | City | Terminal Building |
| (B) | (B) | City | T-Hangar (No. 1 thru 7) |
| (C) | Same | Lease | Clear Span Hangar (No. 8) |
| (D) | Same | Lease | Clear Span Hangar (No. 9) |
| (E) | Same | Lease | Clear Span Hangar (No. 10) |
| (F) | Same | Lease | Clear Span Hangar (No. 11 & 12) |
| (G) | Same | Lease | Clear Span Hangar (No. 13) |
| (H) | Same | City | T-Hangar (No. 14 thru 22) |
| (I) | Same | City | Clear Span Hangar (No. 23) |
| (J) | Same | City | T-Hangar (No. 24 thru 35) |
| (K) | Same | City | T-Hangar (No. 36 thru 47) |
| – | (L) | Proposed | 10-Unit T-Hangar |
| – | (M) | Proposed | 12-Unit T-Hangar |
| – | (N) | Proposed | Clear Span Hangar |
| – | (O) | Proposed | SRE Facility |

## Legend

| EXISTING | ULTIMATE | DESCRIPTION |
|---|---|---|
| | | Pavement Areas |
| | | Buildings |
| | | Airport Property Line |
| BRL 35' | Same | Building Restriction Line (BRL) |
| RSA | RSA(U) | Runway Safety Area (RSA) |
| OFA | OFA(U) | Object Free Area (OFA) |
| RPZ | RPZ(U) | Runway Protection Zone (RPZ) |
| OFZ | OFZ(U) | Obstacle Free Zone (OFZ) |
| AS | AS(U) | Part 77 Approach Slope Surface |
| | Same | Rotating Beacon |
| | | Precision Approach Path Indicators (PAPI-2L) |
| | Same | PAPI-4L |
| (Y) | (Y) | Lighted Wind Cone/Segmented Circle |
| | Same | Runway Threshold Lighting |
| | | Airport Reference Point (ARP) |
| XX | XX | Fenceline |
| | | AWOS Facility |
| | Same | Forested Areas |
| | Same | Easement |

## Airport Data

| AIRPORT INFORMATION | EXISTING | ULTIMATE |
|---|---|---|
| Airport Elevation- Mean Sea Level (MSL) | 886.6' | Same |
| Airport Reference Code (ARC) | B-II | Same |
| Critical Aircraft | Beechcraft King Air 200 | Beechcraft King Air 250 |
| Airport Reference Point (ARP) | 38-50-17.20 N, 92-00-09.30 W | 38-50-16.81 N, 92-00-08.64 W |
| Instrument Approach Procedures | RNAV(GPS)-LPV and VOR | RNAV(GPS)-LPV |
| Mean Maximum Air Temperature | 89° F | Same |
| Weather Reporting System | None | AWOS-III |
| Airport Electronic Aids | None | Same |
| NPIAS Category | General Aviation | Same |
| Range and Township/Sections | T47N, R10W/ 13, 23, 24 and 25 | Same |
| FAA Site Number | 11738.A | Same |
| County | Callaway | Same |
| Total Acreage (Fee Simple & Easements) | 419.42 | Same |

## Runway End Coordinates

| THRESHOLD | LATITUDE | LONGITUDE | ELEVATION |
|---|---|---|---|
| Runway 18 | 38-50-27.58 N | 91-59-59.53 W | 877.4' |
| Runway 36 | 38-49-48.06 N | 92-00-01.22 W | 877.2' |
| Runway 6 | 38-50-15.56 N | 92-00-29.67 W | 879.3' |
| Runway 24 | 38-50-32.75 N | 91-59-55.68 W | 881.3' |
| Runway 12 (E) | 38-50-30.28 N | 92-00-32.45 W | 885.4' |
| Runway 12 (U) | 38-50-28.65 N | 92-00-29.31 W | 886.0' |
| Runway 30 (E) | 38-50-16.67 N | 92-00-06.27 W | 875.9' |
| Runway 30 (U) | 38-50-18.80 N | 92-00-10.38 W | 877.0' |

Source: Runway 18-36 and 6-24 end elevations and geodetic coordinates provided by the FAA Aviation Systems Standards Branch (AVN) (http://avnwww.jccbi.gov). Turf Runway 12-30's existing end elevations and geodetic coordinates derived from the Aeronautical GIS (AGIS) Survey completed in 2010 and performed by Woolpert, Inc., Dayton, OH.

## North Point




Magnetic Declination: 0° 25' E (2010)
Annual Rate of Change: 0° 7' W

## Scale

300 150 0 300

Distance In Feet

## ALP Revisions

| NO. | DESCRIPTION | DATE | REVISED BY | APPROVED BY |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

City of Fulton, Missouri

# AIRPORT LAYOUT DRAWING

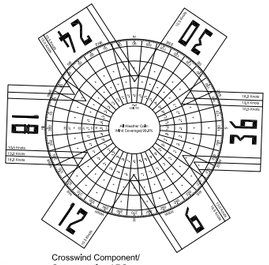
BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE

SUBMITTAL DATE 12/22/2011



Drawing Name: C:\Users\mwaller\Desktop\Remote Office\FTT AMP Deliverables\FTT ALP Update_2011.dwg Dec 05,2012 - 8:13pm

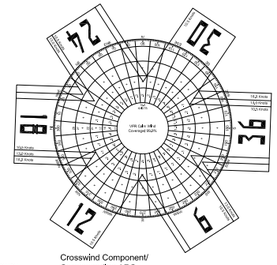
## All Weather Wind Rose



| Runway | Crosswind Component/ Corresponding ARC 10,5 Knots (A-I & B-I) | 13,0 Knots (A-II & B-II) | 16,0 Knots (A-III, B-III, C-I to D-III) |
|---|---|---|---|
| Runway 18-36 | 90,9% | 95,1% | 98,5% |
| Runway 6-24 | 86,3% | 92,4% | 97,9% |
| Runway 12-30 | 90,3% | 94,9% | 98,4% |
| Combined | 99,9% | 100,0% | 100,0% |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Asheville, NC; Columbia Regional Airport (COU), Columbia, MO (2000-2009).

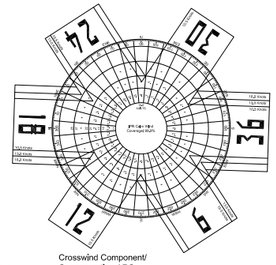
## VFR Wind Rose



| Runway | Crosswind Component/ Corresponding ARC 10,5 Knots (A-I & B-I) | 13,0 Knots (A-II & B-II) | 16,0 Knots (A-III, B-III, C-I to D-III) |
|---|---|---|---|
| Runway 18-36 | 91,1% | 95,2% | 95,8% |
| Runway 6-24 | 86,3% | 92,4% | 97,9% |
| Runway 12-30 | 90,3% | 94,9% | 98,4% |
| Combined | 99,9% | 100,0% | 100,0% |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Asheville, NC; Columbia Regional Airport (COU), Columbia, MO (2000-2009).

## IFR Wind Rose



| Runway | Crosswind Component/ Corresponding ARC 10,5 Knots (A-I & B-I) | 13,0 Knots (A-II & B-II) | 16,0 Knots (A-III, B-III, C-I to D-III) |
|---|---|---|---|
| Runway 18-36 | 87,2% | 93,4% | 98,2% |
| Runway 6-24 | 84,0% | 91,4% | 97,7% |
| Runway 12-30 | 89,3% | 94,3% | 98,4% |
| Combined | 99,9% | 100,0% | 100,0% |

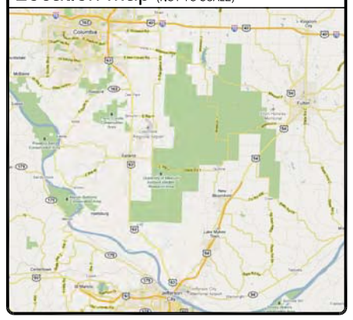
Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Asheville, NC; Columbia Regional Airport (COU), Columbia, MO (2000-2009).

## Runway Data

| RUNWAY DETAILS | RUNWAY 18-36 | | | | RUNWAY 6-24 | | | | RUNWAY 12-30 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EXISTING | | ULTIMATE | | EXISTING | | ULTIMATE | | EXISTING | | ULTIMATE | |
| | 18 | 36 | 18 | 36 | 6 | 24 | 6 | 24 | 12 | 30 | 12 | 30 |
| Airport Reference Code (ARC) | B-II | | Same | | B-I | | Same | | A-I (Small) | | Same | |
| Percent (%) Wind Coverage (10,5 Knots) | 90,9% | | | | 86,3% | | | | 90,3% | | | |
| Runway Azimuth | 181,9° True | 1,9° True | Same | Same | 57,1° True | 237,1° True | Same | Same | 303,6° True | 123,6° True | Same | Same |
| Runway Dimensions | 4,000' x 75' | | Same | | 3,203' x 47' | | 3,203' x 60' | | 2,488' x 100' | | 1,800' x 120' | |
| FAR Part 77 Approach Use Type | NP | NP | Same | Same | NP | NP | Same | Same | V | V | Same | Same |
| Aeronautical Survey Required for Approach | VG | VG | Same | Same | NVG | NVG | Same | Same | NVG | NVG | Same | Same |
| Approach Visibility Minimums | 1-Mile | 1-Mile | Same | Same | 1-Mile | 1-Mile | Same | Same | V | V | Same | Same |
| Approach Slope | 34:1 | 34:1 | Same | Same | 20:1 | 20:1 | Same | Same | 20:1 | 20:1 | Same | Same |
| Runway Safety Area (RSA) | 4,600' x 150' | | Same | | 3,683' x 120' | | Same | | 2,488' x 120' | | 1,800' x 120' | |
| Runway Object Free Area (OFA) | 4,600' x 500' | | Same | | 3,683' x 400' | | Same | | 2,488' x 250' | | 1,800' x 250' | |
| Runway Obstacle Free Zone (OFZ) | 4,400' x 250' | | Same | | 3,603' x 250' | | Same | | 2,488' x 250' | | 1,800' x 250' | |
| Runway Pavement Strength (Thousands of lbs.) | 30,000 (SWG) | | Same | | 30,000 (SWG) | | Same | | N/A | | Same | |
| Runway Pavement Material | Concrete | | Same | | Asphalt | | Same | | Turf | | Same | |
| Runway Markings | NP | NP | Same | Same | NP | NP | Same | Same | None | None | Same | Same |
| Runway Gradient | 0,0% | 0,0% | Same | Same | 0,1% | -0,1% | Same | Same | -0,4% | 0,4% | -0,5% | 0,5% |
| Runway Lighting | MIRL | | Same | | MIRL | | Same | | None | | Same | |
| Taxiway Lighting | MITL/Blue Reflectors | | MITL | | MITL/Blue Reflectors | | MITL | | None | | Same | |
| Taxiway Width | 35' | | Same | | 25' | | Same | | N/A | | Same | |
| NAVAIDS | GPS/VOR | GPS/VOR | GPS | GPS | GPS | GPS | Same | Same | None | None | Same | Same |
| Approach Visual Aids | PAPI-4L | PAPI-4L | Same | Same | SAVASI-2L | SAVASI-2L | PAPI-2L | PAPI-2L | None | None | Same | Same |
| Touchdown Zone Elevation (TDZE) | 880,6' | 880,6' | Same | Same | 882,2' | 882,2' | Same | Same | 885,4' | 885,4' | 886,0' | 886,0' |
| Takeoff Run Available (TORA) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Accelerate-Stop Distance Available (ASDA) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Landing Distance Available (LDA) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Takeoff Distance Available (TODA) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

SWG-Single Wheel Gear; NP-Non Precision; NVG-Non Vertical Guidance; VG-Vertical Guidance; V-Visual

## Location Map (NOT TO SCALE)



## Vicinity Map (NOT TO SCALE)


## General Notes

1. The Preferred Airfield Alternative involves acquisition of approximately seven acres in fee simple to the north of the airport and CR 304.

2. Shortening of turf Runway 12-30 and the shifting of the thresholds will allow the runway to be situated at higher elevations near the runway's mid-field, thereby improving the runway's line-of-sight. Furthermore, shifting of the Runway 12 threshold to the southeast will allow greater clearance over trees located to the northwest of the runway. Lastly, the shortened length is more efficient for accommodating single engine aircraft and reduces airfield maintenance costs over the long-term.

3. The existing windcone and segmented circle are recommended to be relocated to accommodate the installation of an AWOS-III. Relocation is recommended to keep the windcone outside of the ultimate AWOS's 100-foot radius critical area.

4. The full parallel taxiway intended to serve Runway 18-36 is designed to accommodate an FAA-recommended 240-foot separation distance between the runway and taxiway centerlines.

5. The partial parallel taxiway intended to serve Runway 6-24 is designed to accommodate an FAA-recommended 225-foot separation distance between the runway and taxiway centerlines.

6. Although the runway length requirements for Runway 6-24 recommends expansion to 3,400 feet, lengthening the runway is not considered feasible due to terrain and runway safety area limitations at the Runway 6 threshold. Extension of the Runway 24 threshold to the northeast is also impractical due to the location of CR 304 and its impacts on future safety areas recommendations. Accordingly, Runway 6-24 is expected to remain at its current length of 3,203 feet throughout the 20-year planning period.

7. T-Hangars 1 thru 7, located within the northeastern terminal area, are recommended to be removed and relocated to the western T-hangar development area. In addition to the age of the T-hangar building, this is also due to the northern clear span hangar area being readily capable of accommodating ground maneuvering by large turbo-prop and jet aircraft. Additionally, this portion of the terminal area complex is ideal to accommodate large hangar development that would serve these aircraft including maintenance hangars and facilities with land leases.

8. The western hangar development area was designed and planned to serve primarily small Airplane Design Group (ADG) I single and twin-piston airplanes.

## Obstacle Free Zone (OFZ) Object Penetrations

The Runway 6 threshold has a penetration of the OFZ. Refer to sheet seven (7) for further details.

## Threshold Siting Surface Object Penetrations

Runway 18-36, Runway 6-24 and the approach to Runway 12 each have penetrations to the TSS. Refer to sheets five (5) through eight (8) for further details.

## Modifications to Design Standards

None required.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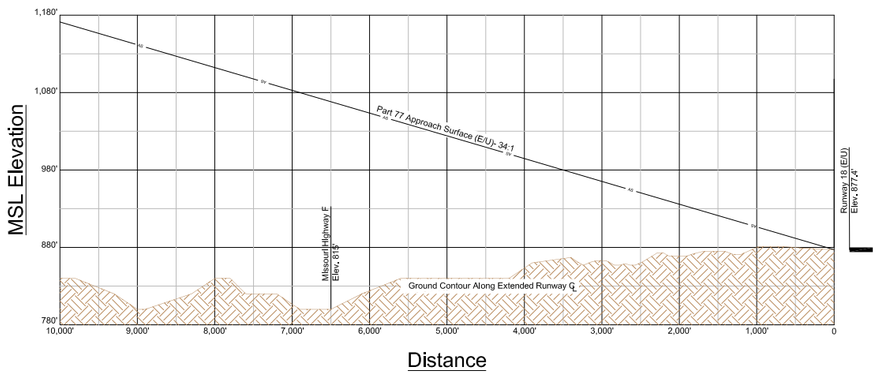
**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

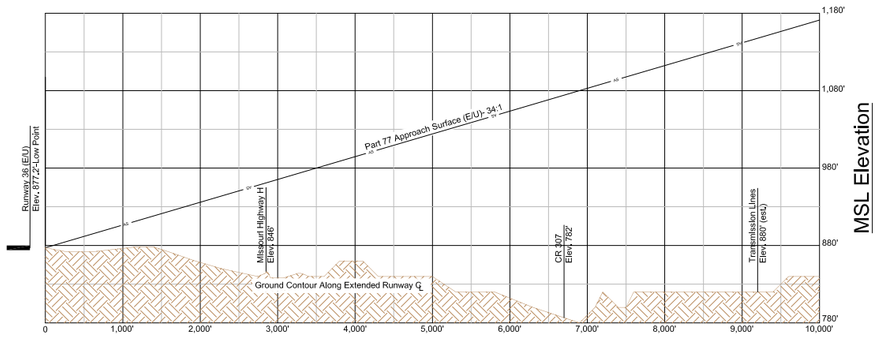
**AIRPORT LAYOUT DRAWING DATA TABLES**

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE
SUBMITTAL DATE 12/22/2011

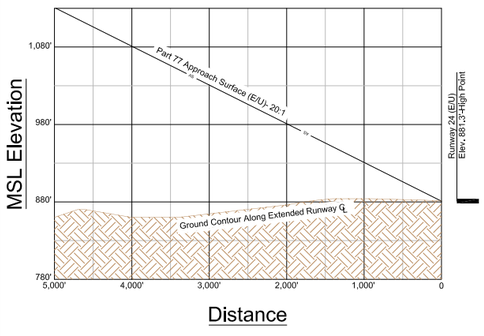
## Runway 18 Approach Profile View



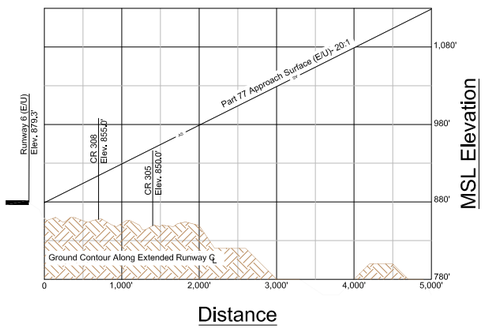

## Runway 36 Approach Profile View




## Runway 24 Approach Profile View




## Runway 6 Approach Profile View




## General Notes

1. Contour elevation information derived from the following Missouri USGS 7.5 minute topographic quadrangle maps: Guthrie, Fulton, Kingdom City and Millersburg NE.

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

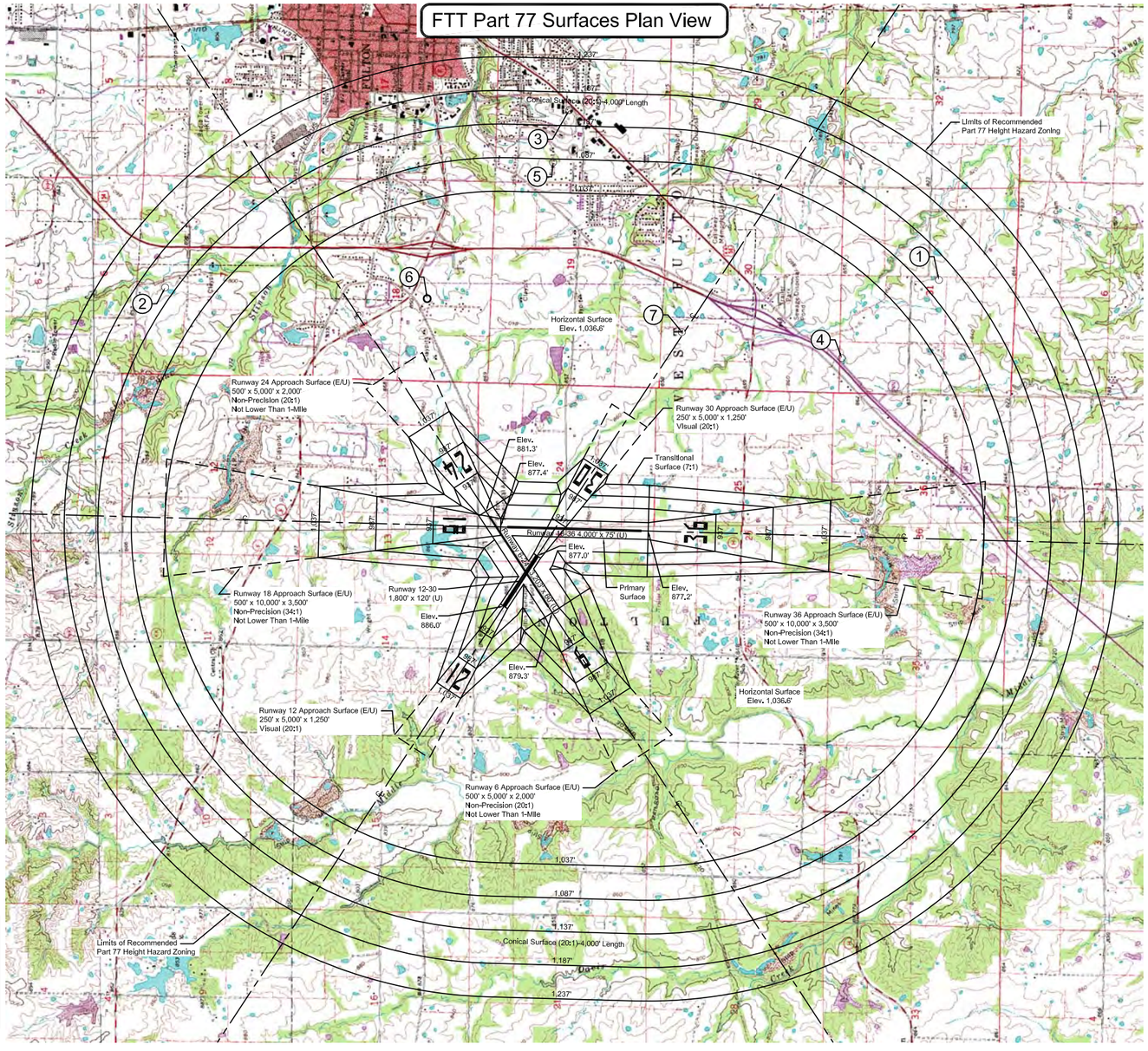
3. Refer to the Inner Portion of the Approach Surface Drawin gs for obstruction Information located within the Inner 3,400 feet of the approach surfaces and beyond the RPZs for Runway 18-36, Also refer to the Inner Portion Drawings for obstructions within the inner 2,000 feet of the approach surfaces and beyond the RPZs for Runway 6-24 and 12-30.

4. Refer to sheets 13 and 14 for obstruction Information and penetrations to the 40:1 Departure Surfaces for Runway 18-36 and 6-24.

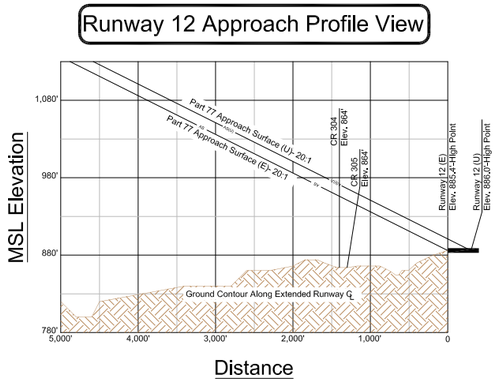
## Obstruction Data Table

| NO. | DESCRIPTION | STUDY NO. | LATITUDE | LONGITUDE | MSL ELEV. | AGL ELEV. | PENETRATION | SURFACE | DISPOSITION |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Water Tower | 1996-ACE-424-OE | 38-48-19,14 N | 91-58-28,65 W | 1,027' | 167' | 24 feet | FAR 77,23 (a)(2) | TBD |
| 2 | Comm. Tower | 2011-ACE-1298-OE | 38-52-08,56 N | 91-58-27,89 W | 1,033' | 205' | 8 feet | FAR 77,23 (a)(2) | TBD |
| 3 | Comm. Tower | 1998-ACE-1408-OE | 38-50-08,00 N | 91-57-22,00 W | 1,042' | 199' | 24 feet | FAR 77,23 (a)(2) | TBD |
| 4 | Comm. Tower | 2000-ACE-824-OE | 38-48-47,60 N | 91-58-57,20 W | 1,051' | 187' | 15 feet | Horizontal | TBD |
| 5 | Comm. Tower | 2002-ACE-2106-OE | 38-50-12,78 N | 91-57-41,23 W | 1,140' | 303' | 54 feet | Conical | TBD |
| 6 | Water Tower | 2005-ACE-2741-OE | 38-50-50,74 N | 91-58-33,35 W | 1,033' | 164' | 64 feet | FAR 77,23 (a)(2) | TBD |
| 7 | Comm. Tower | 2008-ACE-3127-OE | 38-49-35,10 N | 91-58-46,30 W | 1,072' | 210' | 36 feet | Horizontal | TBD |

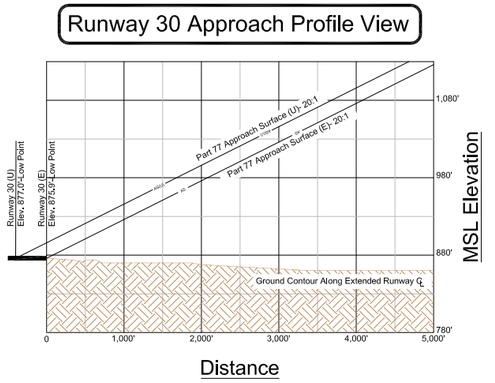
## FTT Part 77 Surfaces Plan View



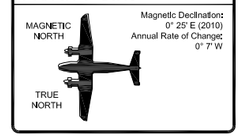

## Runway 12 Approach Profile View



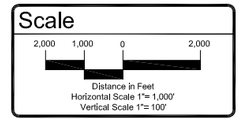

## Runway 30 Approach Profile View




## North Point




## Scale





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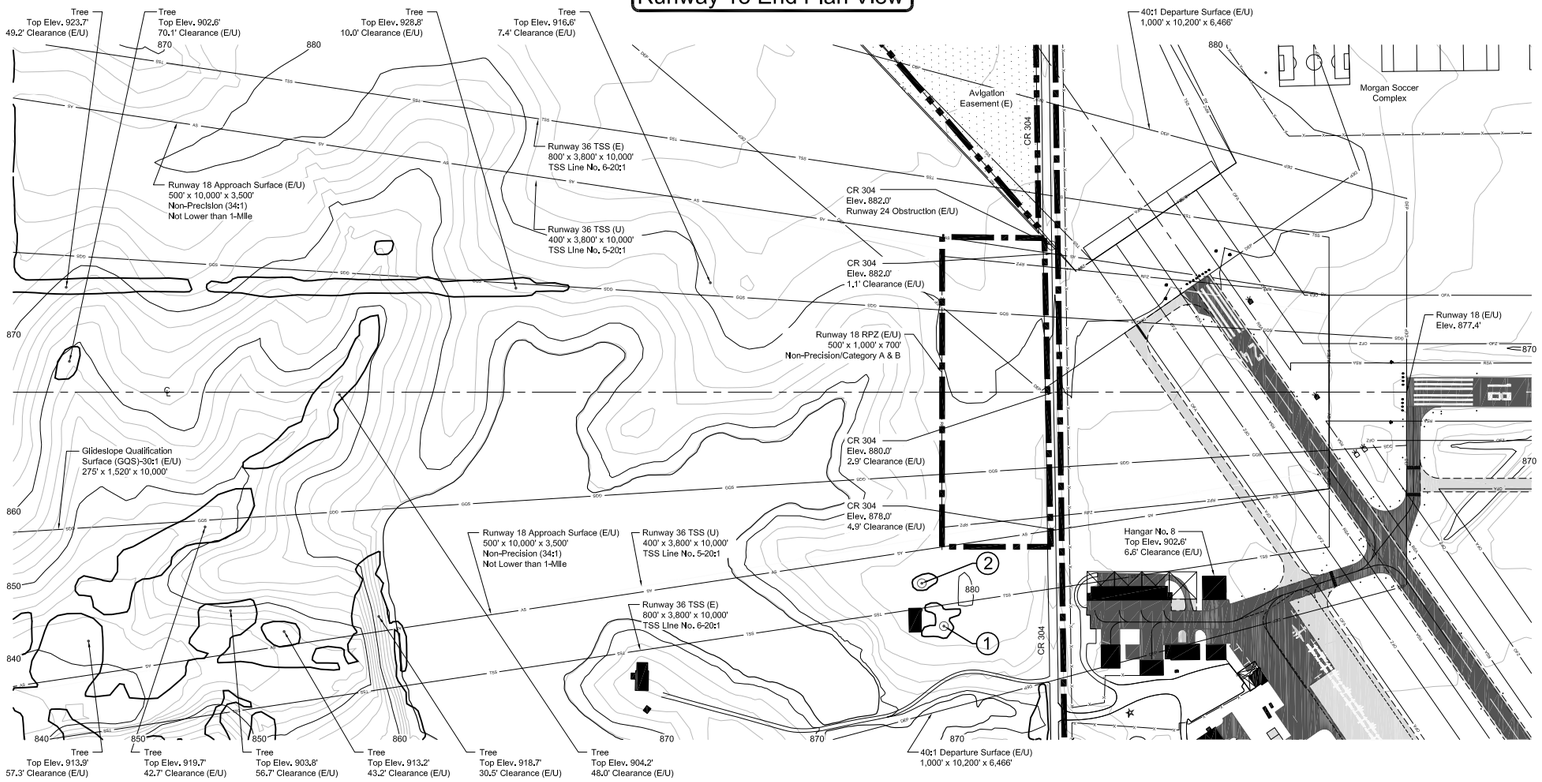
**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

**AIRSPACE DRAWING**

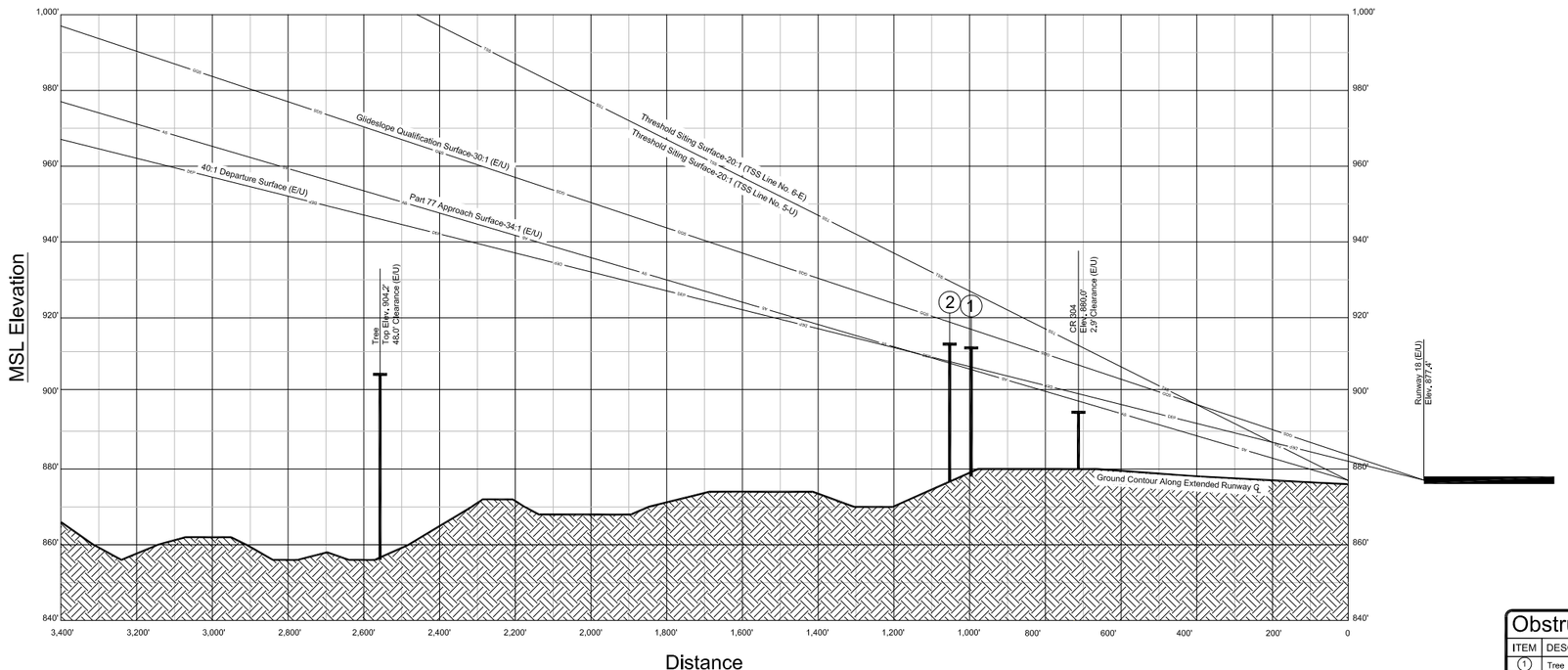
| | |
|---|---|
| BWR PROJECT NO. | 010025701/00001/00006 |
| AGENCY PROJECT NO. | MoDOT No. 10-040A-1 |
| DRAWN BY | MAW |
| CHECKED BY | MAW |
| DESIGNED BY | MAW |
| REVISIONS | DATE |
| SUBMITTAL DATE | 12/22/2011 |

SHEET 4 OF 14

## Runway 18 End Plan View



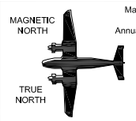

## Runway 18 End Profile View




## Legend

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

## North Point




Magnetic Declination:
0° 25' E (2010)
Annual Rate of Change:
0° 7' W

## Scale

200 100 0 200

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

## General Notes

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

2. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet. The existing calculated clearances over CR 304 reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.

3. The tallest trees within the Runway 18 inner portion of the approach surface were evaluated to determine their impacts on the existing and ultimate approach slope. Given the number of trees near the Runway 36 threshold, only the tallest trees outside the Approach Surface were evaluated to determine their impact upon the Transitional Surface. Also, the tallest trees beyond the airport property boundary (N of CR 304) were evaluated to determine their potential impact on the approach slope.

4. Completion of a Part 77 obstruction survey is recommended to identify and mitigate potential obstructions that might exist beyond the Approach Surface and within the Transitional Surfaces at the Runway 18 threshold.

5. Refer to sheet 13 of 14 for obstruction information and penetrations to the 40:1 Departure Surface.

## Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | SURFACE | LIGHTING | MITIGATION |
|---|---|---|---|---|---|---|---|---|
| (1) | Tree | 1,197 feet | 604 feet R | 910.9' MSL | 5 feet | Approach | None | Remove |
| (2) | Tree | 1,252 feet | 494 feet R | 911.8' MSL | 4 feet | Approach | None | Remove |

DEND- Distance from Runway End; DCL- Distance from Runway Centerline.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**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

**RUNWAY 18 INNER PORTION OF THE APPROACH SURFACE DRAWING**

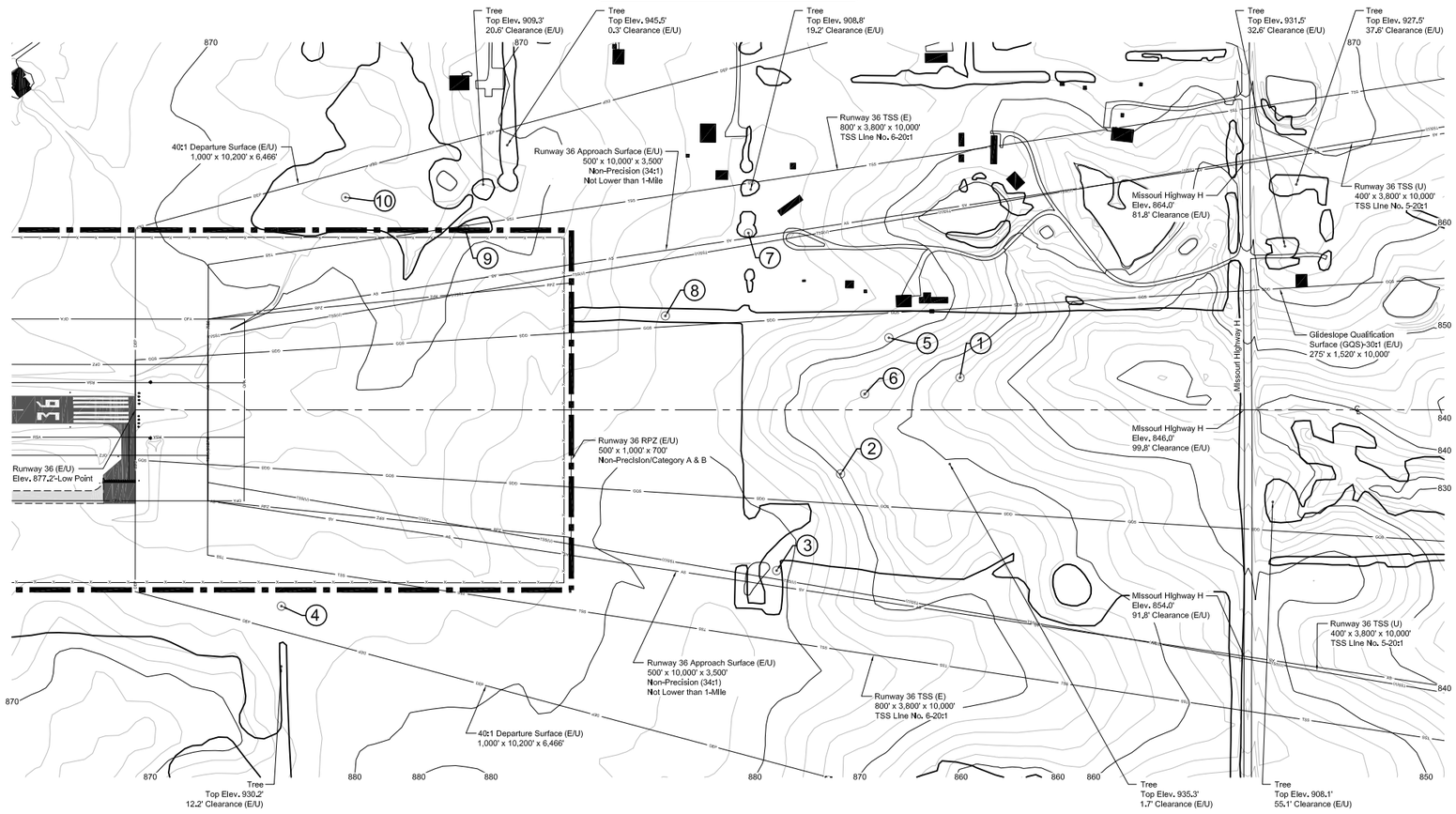
BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE
SUBMITTAL DATE 12/22/2011

**5**

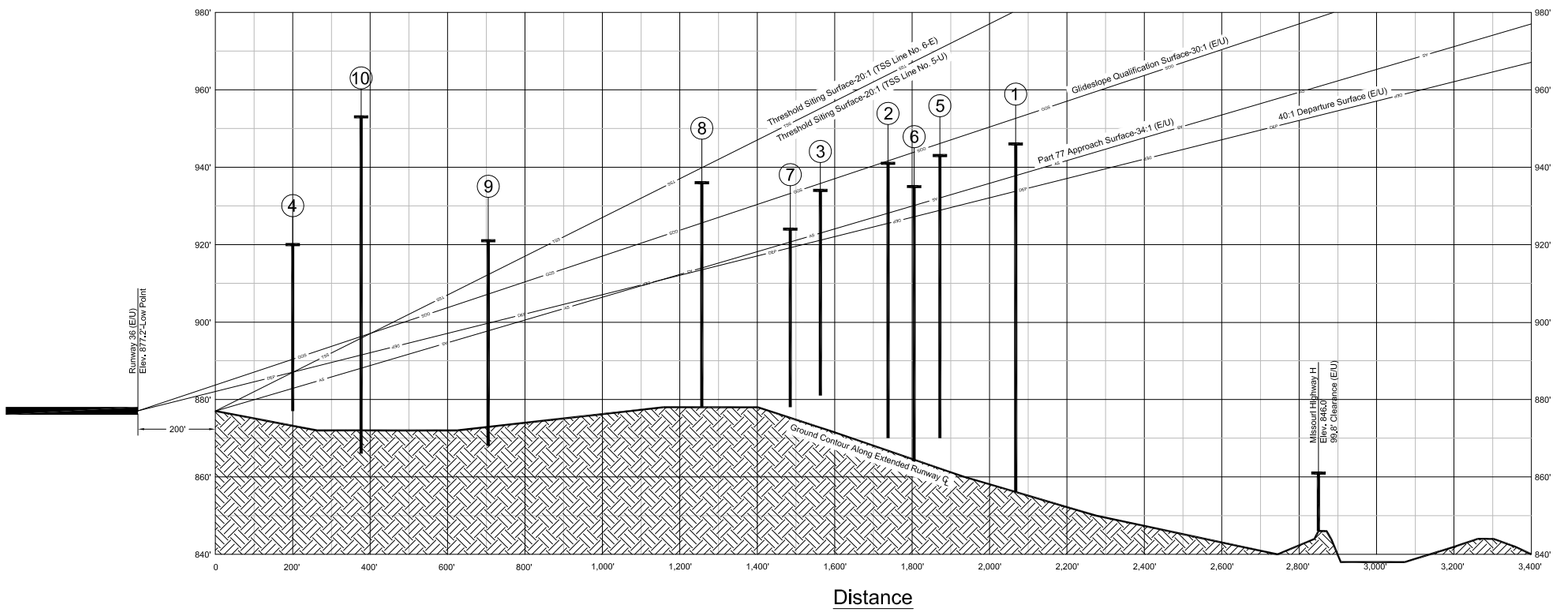
SHEET 5 OF 14

Drawing Name: K:\2010-0257-Fulton-MO_Master\Plan_ALP\01\AP\Master Plan\ACAD\ALP Update\FTT ALP Update_2011.dwg Apr 05,2012 - 2:02pm

## Runway 36 End Plan View



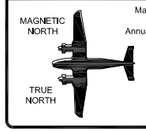

## Runway 36 End Profile View




## Legend

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

## North Point




## Scale

200 100 0 200

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

## General Notes

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

2. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet. The existing calculated clearances over Missouri Highway H reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.

3. The tallest trees within the Runway 36 inner portion of the approach surface were evaluated to determine their impacts on the existing and ultimate approach slope. Given the number of trees near the Runway 36 threshold, only the tallest trees outside the Approach Surface were evaluated to determine their impact upon the Transitional Surface. Also, the tallest trees beyond the airport property boundary (N and S of MO Highway H) were evaluated to determine their potential impact on the approach slope.

4. Completion of a Part 77 obstruction survey is recommended to identify and mitigate potential obstructions that might exist beyond the Approach Surface and within the Transitional Surfaces at the Runway 36 threshold.

5. Refer to sheet 13 of 14 for obstruction information and penetrations to the 40:1 Departure Surface.

## Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | SURFACE | LIGHTING | MITIGATION |
|---|---|---|---|---|---|---|---|---|
| (1) | Tree | 2,268 feet | 113 feet R | 945.5' MSL | 8 feet | Approach | None | Remove |
| (2) | Tree | 1,940 feet | 188 feet L | 941.0' MSL | 13 feet | Approach | None | Remove |
| (3) | Tree | 1,764 feet | 446 feet L | 933.9' MSL | 11 feet | Approach | None | Remove |
| (4) | Tree | 400 feet | 542 feet L | 920.3' MSL | 2 feet | Transitional | None | Remove |
| (5) | Tree | 2,072 feet | 209 feet R | 943.0' MSL | 11 feet | Approach | None | Remove |
| (6) | Tree | 2,006 feet | 73 feet R | 934.5' MSL | 4 feet | Approach | None | Remove |
| (7) | Tree | 1,686 feet | 489 feet R | 923.7' MSL | 13 feet | Transitional | None | Remove |
| (8) | Tree | 1,458 feet | 266 feet R | 936.4' MSL | 22 feet | Approach | None | Remove |
| (9) | Tree | 906 feet | 501 feet R | 921.0' MSL | 8 feet | Transitional | None | Remove |
| (10) | Tree | 578 feet | 590 feet R | 952.8' MSL | 27 feet | Transitional | None | Remove |

DEND- Distance from Runway End; DCL- Distance from Runway Centerline.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**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

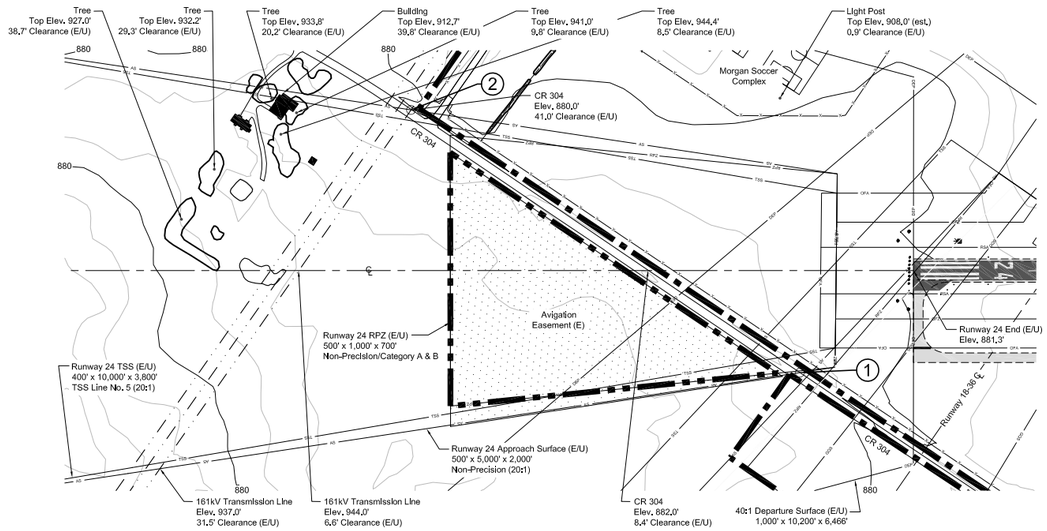
**RUNWAY 36 INNER PORTION OF THE APPROACH SURFACE DRAWING**

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE
SUBMITTAL DATE 12/22/2011

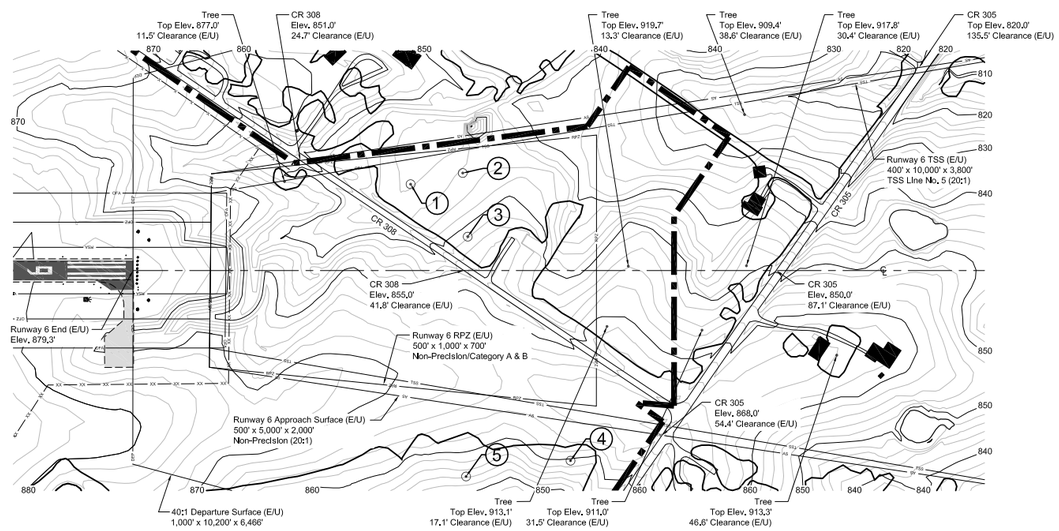
SHEET 6 OF 14

Drawing Name: K:\2010\0257-Fulton-MO_MasterPlan_ALP\01\AP\Master Plan\ACAD\ALP Update\FTT ALP Update_2011.dwg Apr 05,2012 - 2:03pm

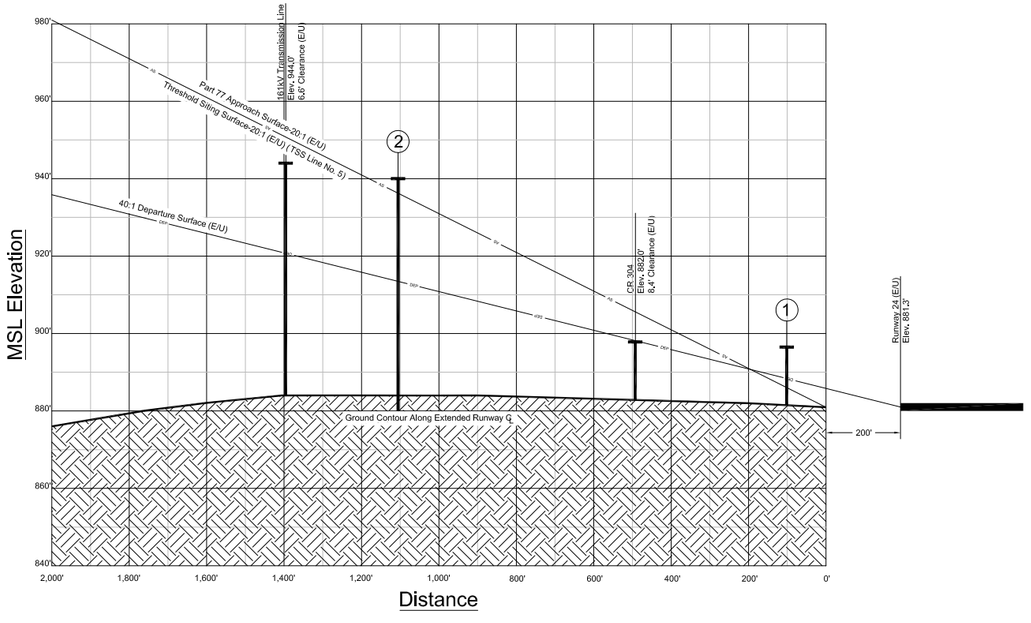
## Runway 24 End Plan View



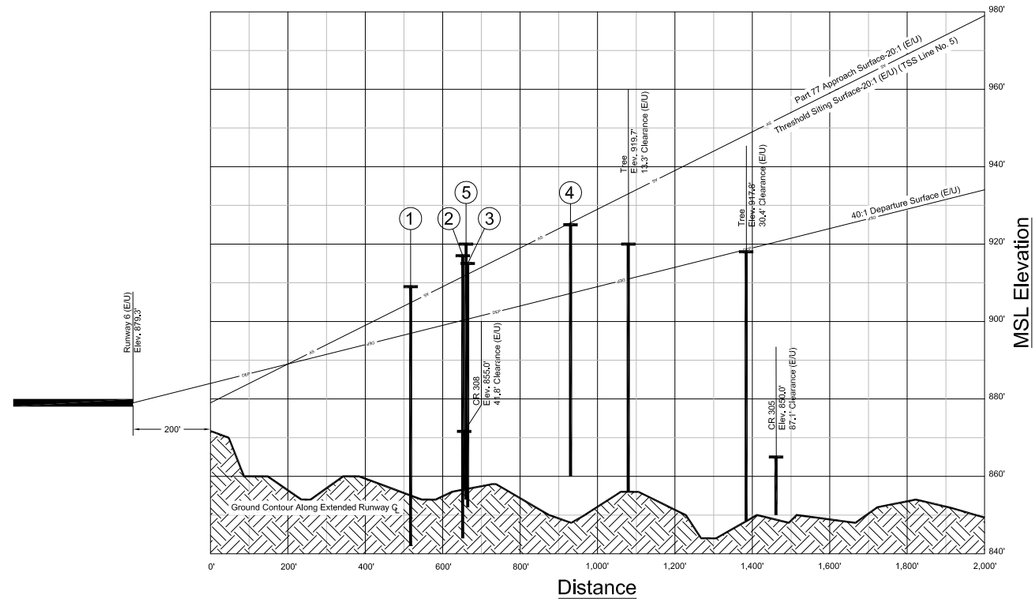

## Runway 6 End Plan View




## Runway 24 End Profile View




## Runway 6 End Profile View




## Legend

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

## Runway 24 Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | SURFACE | LIGHTING | MITIGATION |
|---|---|---|---|---|---|---|---|---|
| 1 | CR 304 | 296 feet | 263 feet R | 882.0' MSL | 11 feet | Approach | None | TBD |
| 2 | Transmission Line | 1,300 feet | 974 feet L | 940.0' MSL | 4 feet | Approach | Yes | TBD |

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

## General Notes

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

2. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet. The existing calculated clearances over CR 304, CR 305 and CR 308 reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.

3. The tallest trees within the inner portion of the approach surface, located on airport property, were evaluated to determine their impacts on the existing and ultimate approach slopes. Also, the tallest tree beyond the airport property boundary (N of CR 304, S of CR 308 and W of CR 305) were evaluated to determine their potential impact on the Runway 6 and 24 approach slope.

4. Completion of a Part 77 obstruction survey is recommended to identify and mitigate potential obstructions that might exist beyond the Approach Surface and within the Transitional Surfaces for both runway thresholds.

5. Refer to sheet 14 of 14 for obstruction information and penetrations to the Runway 6-24 40:1 Departure Surfaces.

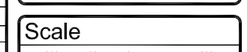
## Runway 6 Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | SURFACE | LIGHTING | MITIGATION |
|---|---|---|---|---|---|---|---|---|
| 1 | Tree | 718 feet | 225 feet R | 908.7' MSL | 4 feet | Approach | None | Remove |
| 2 | Tree | 852 feet | 255 feet R | 917.0' MSL | 5 feet | Approach | None | Remove |
| 3 | Tree | 864 feet | 96 feet R | 915.4' MSL | 3 feet | Approach | None | Remove |
| 4 | Tree | 1,130 feet | 494 feet L | 924.5' MSL | 11 feet | Transitional | None | Remove |
| 5 | Tree | 860 feet | 534 feet L | 920.1' MSL | 1 foot | Transitional | None | Remove |

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

## North Point


## Scale





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ELTON HENSLEY MEMORIAL AIRPORT (FTT)
City of Fulton, Missouri

RUNWAY 6-24 INNER PORTION OF THE APPROACH SURFACE DRAWING

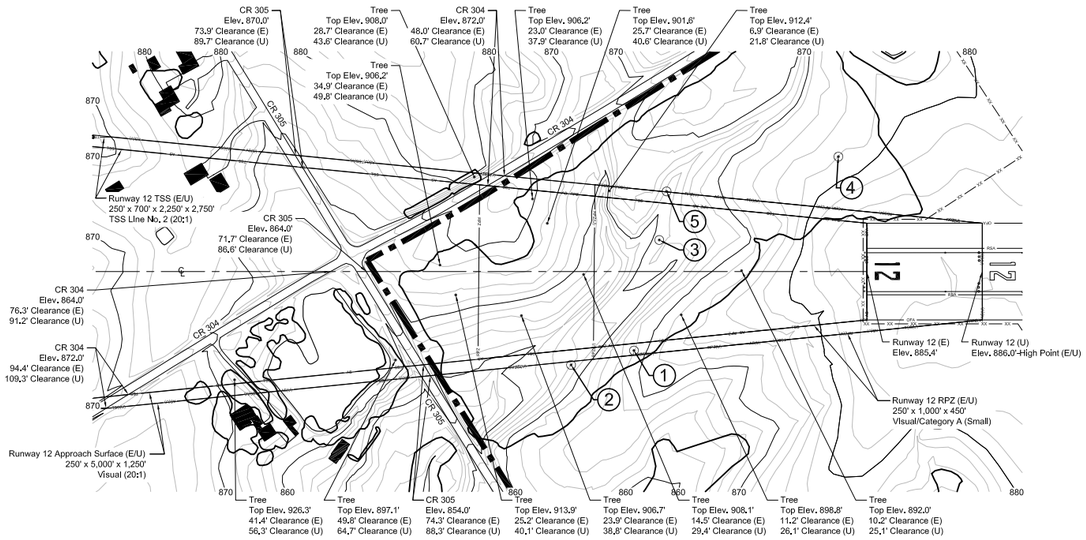
| | |
|---|---|
| BWR PROJECT NO. | 010025701/00001/00006 |
| AGENCY PROJECT NO. | MoDOT No. 10-040A-1 |
| DRAWN BY | MAW |
| CHECKED BY | MAW |
| DESIGNED BY | MAW |
| REVISIONS | DATE |
| SUBMITTAL DATE | 12/22/2011 |

7

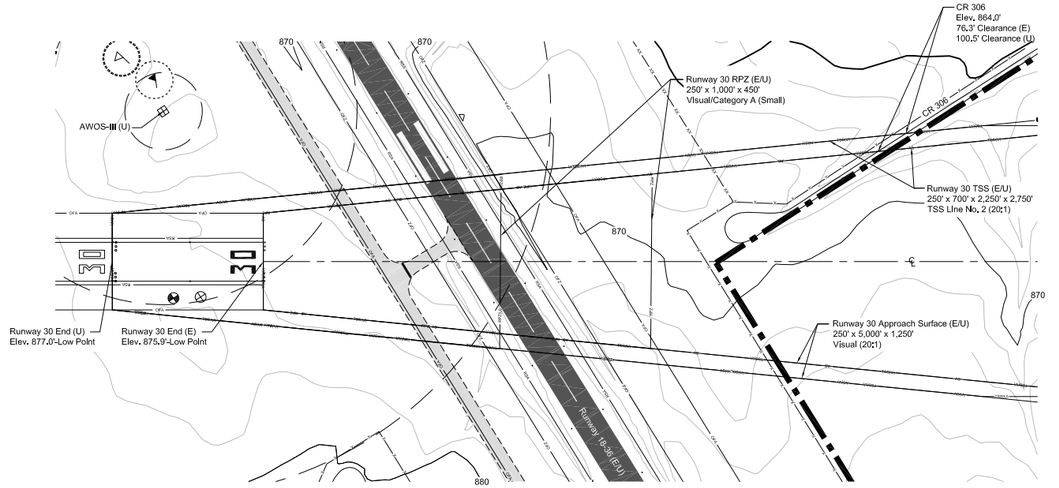
SHEET 7 OF 14

Drawing Name: C:\Users\mwaller\Desktop\Remote Office\FTT AMP Deliverables\FTT ALP Update_2011.dwg Dec 05,2012 - 8:17pm

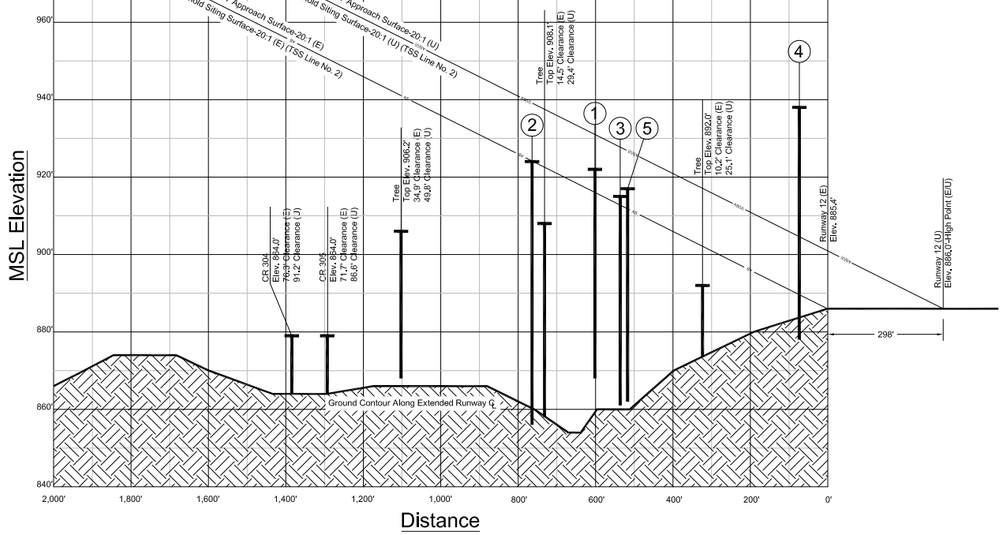
## Runway 12 End Plan View



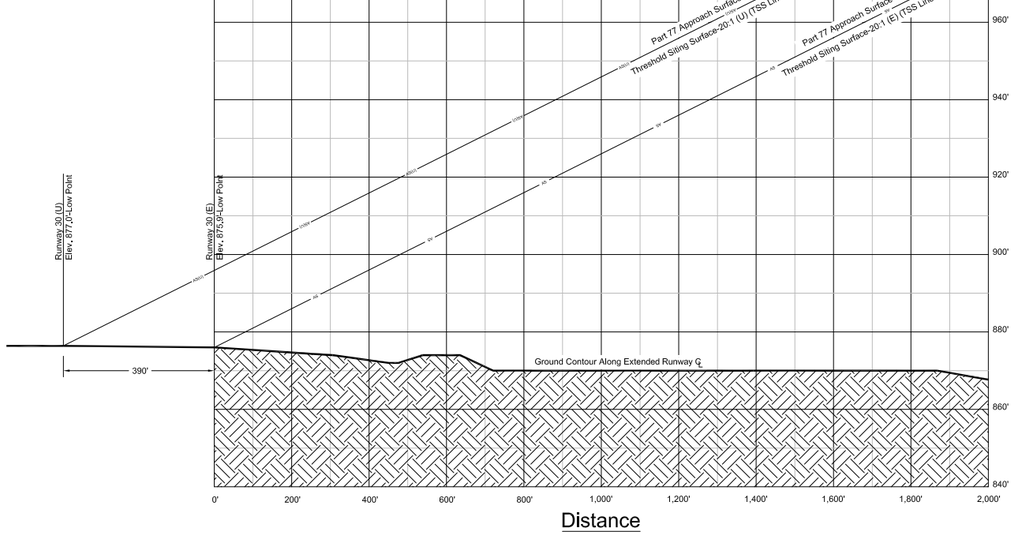

## Runway 30 End Plan View




## Runway 12 End Profile View




## Runway 30 End Profile View




## Legend

| EXISTING | ULTIMATE | DESCRIPTION |
|---|---|---|
| | | Pavement Areas |
| Same | | Structures |
| | | Airport Property Line |
| RSA | RSA(U) | Runway Safety Area (RSA) |
| OFA | OFA(U) | Object Free Area (OFA) |
| RPZ | RPZ(U) | Runway Protection Zone (RPZ) |
| OFZ | OFZ(U) | Obstacle Free Zone (OFZ) |
| AS | AS(U) | Approach Slope Surface |
| TSS | TSS(U) | Threshold Siting Surface |
| x x xx xx | | Fenceline |
| Same | | Traverse Way/Significant Object |
| | ⊕ | Airport Reference Point (ARP) |
| Same | | Forested Areas |

## Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | SURFACE | LIGHTING | MITIGATION |
|---|---|---|---|---|---|---|---|---|
| 1 | Tree | 600 feet | 209 feet R | 922.1' MSL | 6 feet | Approach | None | Top/Remove |
| 2 | Tree | 764 feet | 246 feet R | 924.4' MSL | 21 feet | Transitional | None | Top/Remove |
| 3 | Tree | 536 feet | 90 feet L | 914.6' MSL | 2 feet | Approach | None | Top/Remove |
| 4 | Tree | 74 feet | 303 feet L | 938.1' MSL | 27 feet | Transitional | None | Top/Remove |
| 5 | Tree | 518 feet | 211 feet L | 916.6' MSL | 5 feet | Approach | None | Top/Remove |

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

## General Notes

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

2. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet. The existing calculated clearances over CR 304, CR 305 and CR 306 reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.

3. The tallest trees within the Runway 12 inner portion of the approach surface were evaluated to determine their impacts on the existing and ultimate approach slope. Given the number of trees near the Runway 12 threshold, only the tallest tree outside the Approach Surface was evaluated to determine their impacts upon the Transitional Surface. Also, the tallest trees beyond the airport property boundary (N of CR 304 and W of CR 305) were evaluated to determine their potential impact on the approach slopes.

4. Completion of a Part 77 obstruction survey is recommended to identify and mitigate potential obstructions that might exist beyond the Approach Surface and within the Transitional Surfaces at the Runway 12 threshold.

## North Point


## Scale

200 100 0 200

Distance In Feet
Horizontal Scale 1"= 200'
Vertical Scale 1"= 20'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ELTON HENSLEY MEMORIAL AIRPORT (FTT)
City of Fulton, Missouri

RUNWAY 12-30 INNER PORTION OF THE APPROACH SURFACE DRAWING

BWR PROJECT NO.
*010025701/00001/00006*

AGENCY PROJECT NO.
*MoDOT No. 10-040A-1*

DRAWN BY *MAW*

CHECKED BY *MAW*

DESIGNED BY *MAW*

| REVISIONS | DATE |
|---|---|
| | |

SUBMITTAL DATE
*12/22/2011*

**8**

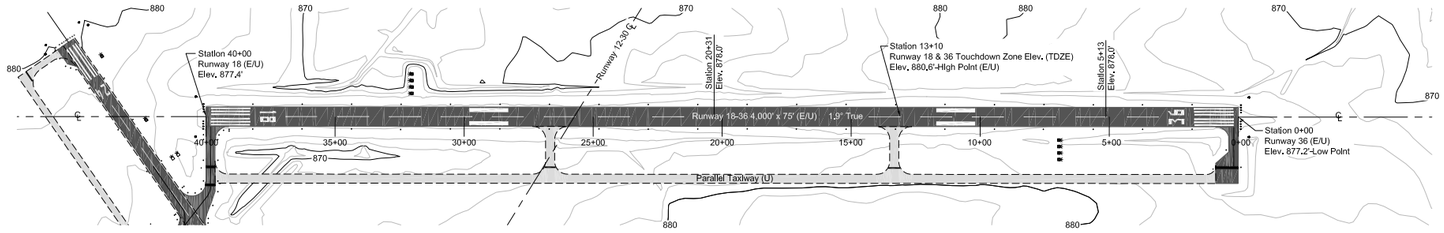
SHEET **8** OF **14**

## General Notes

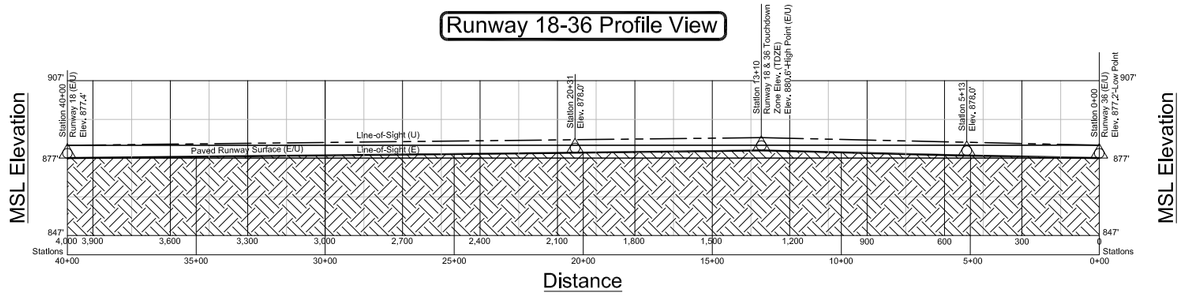
1. Existing runway end and centerline elevations derived from the FAA Aviation Systems Standards Branch (AVN) and the Aeronautical GIS (AGIS) Survey completed in 2010 and performed by Woolpert, Inc., Dayton, OH.

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

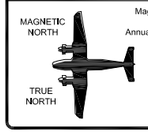
## Runway 18-36 Plan View




## Runway 18-36 Profile View




## North Point




Magnetic Declination:
0° 25' E (2010)
Annual Rate of Change:
0° 7' W

## Scale

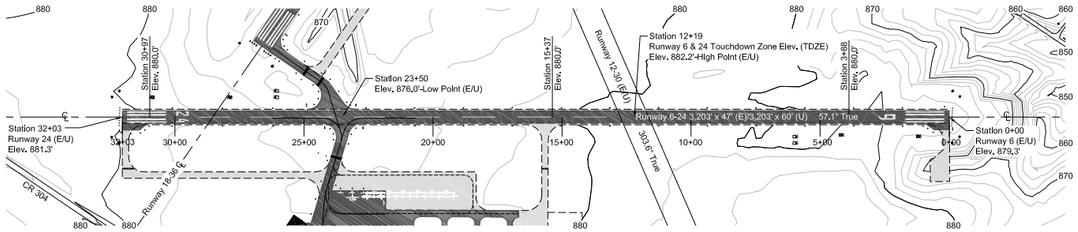
300 150 0 300

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

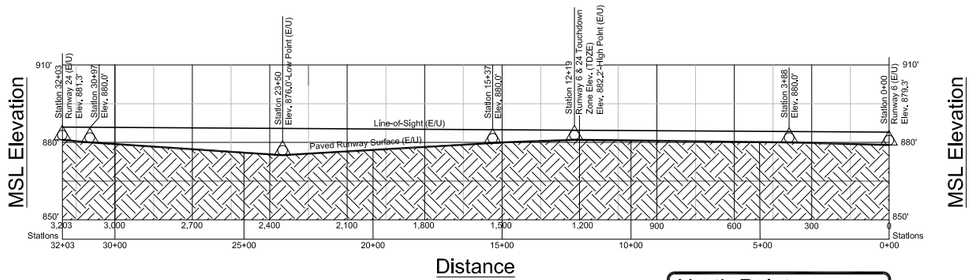
## Effective Gradient

Existing/Ultimate Runway Grade: 0.0%

## Runway 6-24 Plan View




## Runway 6-24 Profile View




## Effective Gradient

Existing/Ultimate Runway Grade: 0.1%

## Scale

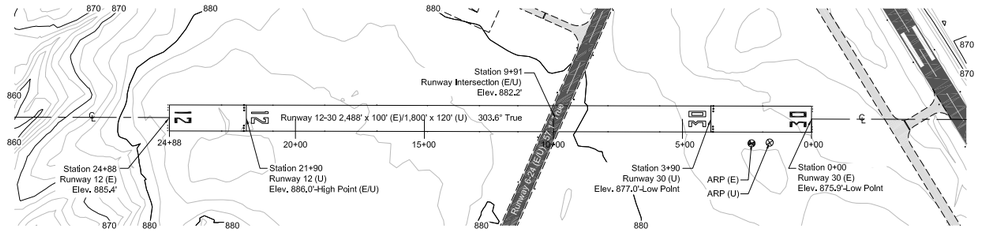
300 150 0 300

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

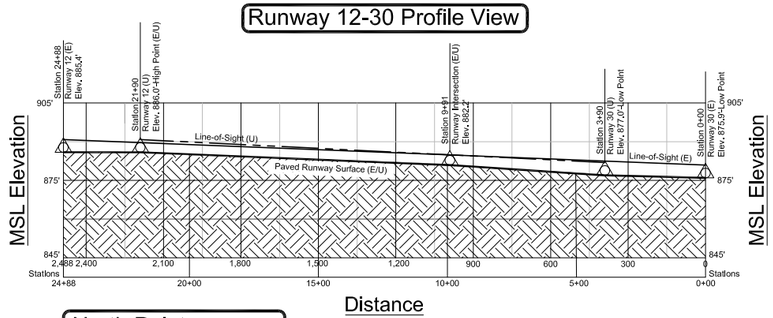
## North Point


Magnetic Declination:
0° 25' E (2010)
Annual Rate of Change:
0° 7' W

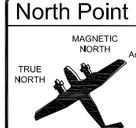
## Runway 12-30 Plan View




## Runway 12-30 Profile View




## North Point




Magnetic Declination:
0° 25' E (2010)
Annual Rate of Change:
0° 7' W

## Scale

300 150 0 300

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

## Effective Gradient

Existing Runway Grade: 0.4%
Ultimate Runway Grade: 0.5%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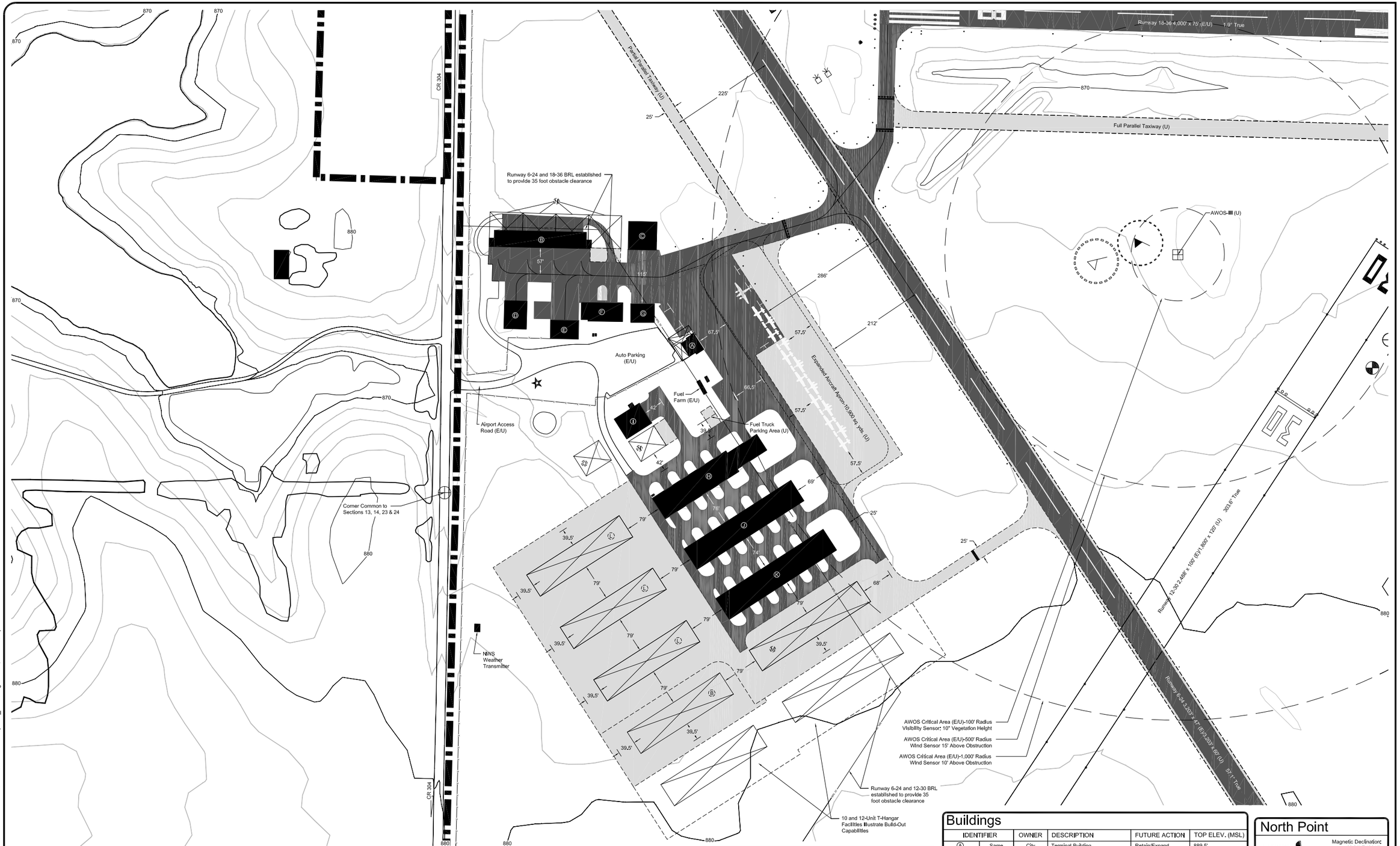
**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

**RUNWAY CENTERLINE PROFILE DRAWING**

| | |
|---|---|
| BWR PROJECT NO. | 010025701/00001/00006 |
| AGENCY PROJECT NO. | MoDOT No. 10-040A-1 |
| DRAWN BY | MAW |
| CHECKED BY | MAW |
| DESIGNED BY | MAW |
| REVISIONS | DATE |
| SUBMITTAL DATE | 12/22/2011 |

SHEET 9 OF 14




## Legend

| EXISTING | ULTIMATE | DESCRIPTION |
|---|---|---|
| | | Pavement Areas |
| | | Structures |
| | | Property Line |
| BRL 35' | Same | Building Restriction Line (BRL) |
| | Same | Rotating Beacon |
| | | Fenceline |
| | | Lighted Wind Cone/Segmented Circle |
| | | Airport Reference Point (ARP) |
| | Same | Forested Areas |

## General Notes

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

2. T-Hangars 1 thru 7, located within the northeastern terminal area, are recommended to be removed and relocated to the western T-hangar development area. In addition to the age of the T-hangar building, this is also due to the northern clear span hangar area being readily capable of accommodating ground maneuvering by large turbo-prop and jet aircraft. Additionally, this portion of the terminal area complex is ideal to accommodate large hangar development that would serve these aircraft including maintenance hangars and facilities with land leases.

3. The western hangar development area was designed and planned to serve primarily small Airplane Design Group (ADG) I single and twin-piston airplanes.

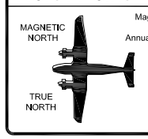
## Terminal Area Design Criteria

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

## Buildings

| IDENTIFIER | | OWNER | DESCRIPTION | FUTURE ACTION | TOP ELEV. (MSL) |
|---|---|---|---|---|---|
| (A) | Same | City | Terminal Building | Retain/Expand | 889.5' |
| (B) | (B) | City | T-Hangar (No. 1 thru 7) | Relocate | 894.6' (E)/899' (est.)-U |
| (C) | Same | Lease | Clear Span Hangar (No. 8) | Retain | 902.6' |
| (D) | Same | Lease | Clear Span Hangar (No. 9) | Retain | 901.6' |
| (E) | Same | Lease | Clear Span Hangar (No. 10) | Retain | 900.1' |
| (F) | Same | Lease | Clear Span Hangar (No. 11 & 12) | Retain | 901.0' |
| (G) | Same | Lease | Clear Span Hangar (No. 13) | Retain | 894.8' |
| (H) | Same | City | T-Hangar (No. 14 thru 22) | Retain | 898.8' |
| (I) | Same | City | Clear Span Hangar (No. 23) | Retain | 903.7' |
| (J) | Same | City | T-Hangar (No. 24 thru 35) | Retain | 894.9' |
| (K) | Same | City | T-Hangar (No. 36 thru 47) | Retain | 897.6' |
| – | (L) | Proposed | 10-Unit T-Hangar | Develop | 899' (est.) |
| – | (M) | Proposed | 12-Unit T-Hangar | Develop | 898' (est.) |
| – | (N) | Proposed | Clear Span Hangar | Develop | 904'-908' (est.) |
| – | (O) | Proposed | SRE Facility | Develop | 902' (est.) |

## North Point




Magnetic Declination: 0° 25' E (2010)
Annual Rate of Change: 0° 7' W

## Scale

100 50 0 100

Distance in Feet

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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

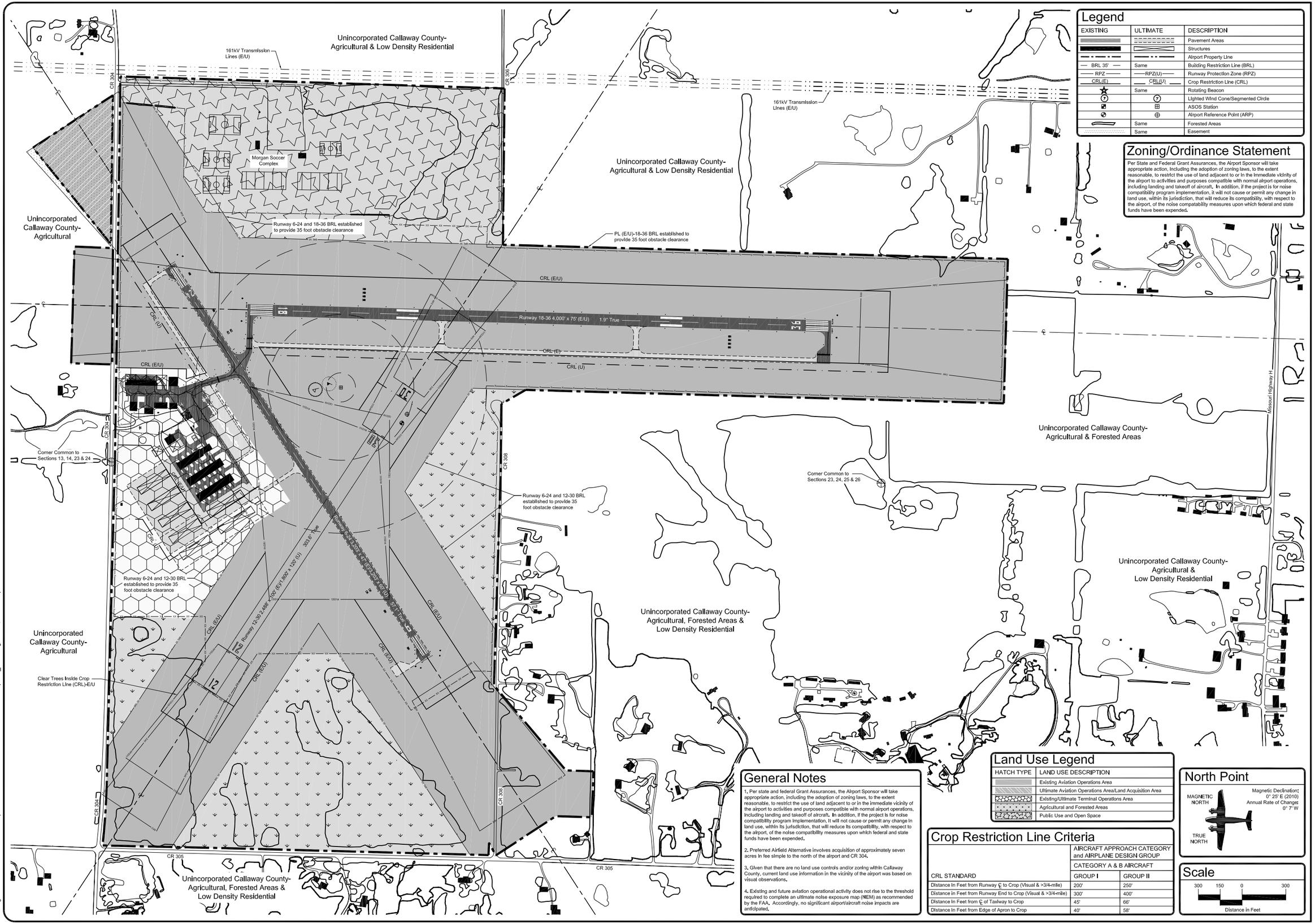
City of Fulton, Missouri

# TERMINAL AREA DRAWING

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE
SUBMITTAL DATE 12/22/2011

SHEET 10 OF 14

Drawing Name: C:\Users\mwaller\Desktop\Remote Office\FTT AMP Deliverables\FTT ALP Update_2011.dwg Dec 05,2012 - 8:21pm




## Legend

| EXISTING | ULTIMATE | DESCRIPTION |
|---|---|---|
| | | Pavement Areas |
| | | Structures |
| | | Airport Property Line |
| BRL 35' | Same | Building Restriction Line (BRL) |
| RPZ | RPZ(U) | Runway Protection Zone (RPZ) |
| CRL(E) | CRL(U) | Crop Restriction Line (CRL) |
| | Same | Rotating Beacon |
| | | Lighted Wind Cone/Segmented Circle |
| | | ASOS Station |
| | | Airport Reference Point (ARP) |
| | Same | Forested Areas |
| | Same | Easement |

## Zoning/Ordinance Statement

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

## General Notes

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

2. Preferred Airfield Alternative involves acquisition of approximately seven acres in fee simple to the north of the airport and CR 304.

3. Given that there are no land use controls and/or zoning within Callaway County, current land use information in the vicinity of the airport was based on visual observations.

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

## Land Use Legend

| HATCH TYPE | LAND USE DESCRIPTION |
|---|---|
| | Existing Aviation Operations Area |
| | Ultimate Aviation Operations Area/Land Acquisition Area |
| | Existing/Ultimate Terminal Operations Area |
| | Agricultural and Forested Areas |
| | Public Use and Open Space |

## Crop Restriction Line Criteria

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

## North Point

MAGNETIC NORTH

TRUE NORTH

Magnetic Declination:
0° 25' E (2010)
Annual Rate of Change:
0° 7' W

## Scale

300 150 0 300

Distance in Feet

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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)
City of Fulton, Missouri

# LAND USE DRAWING

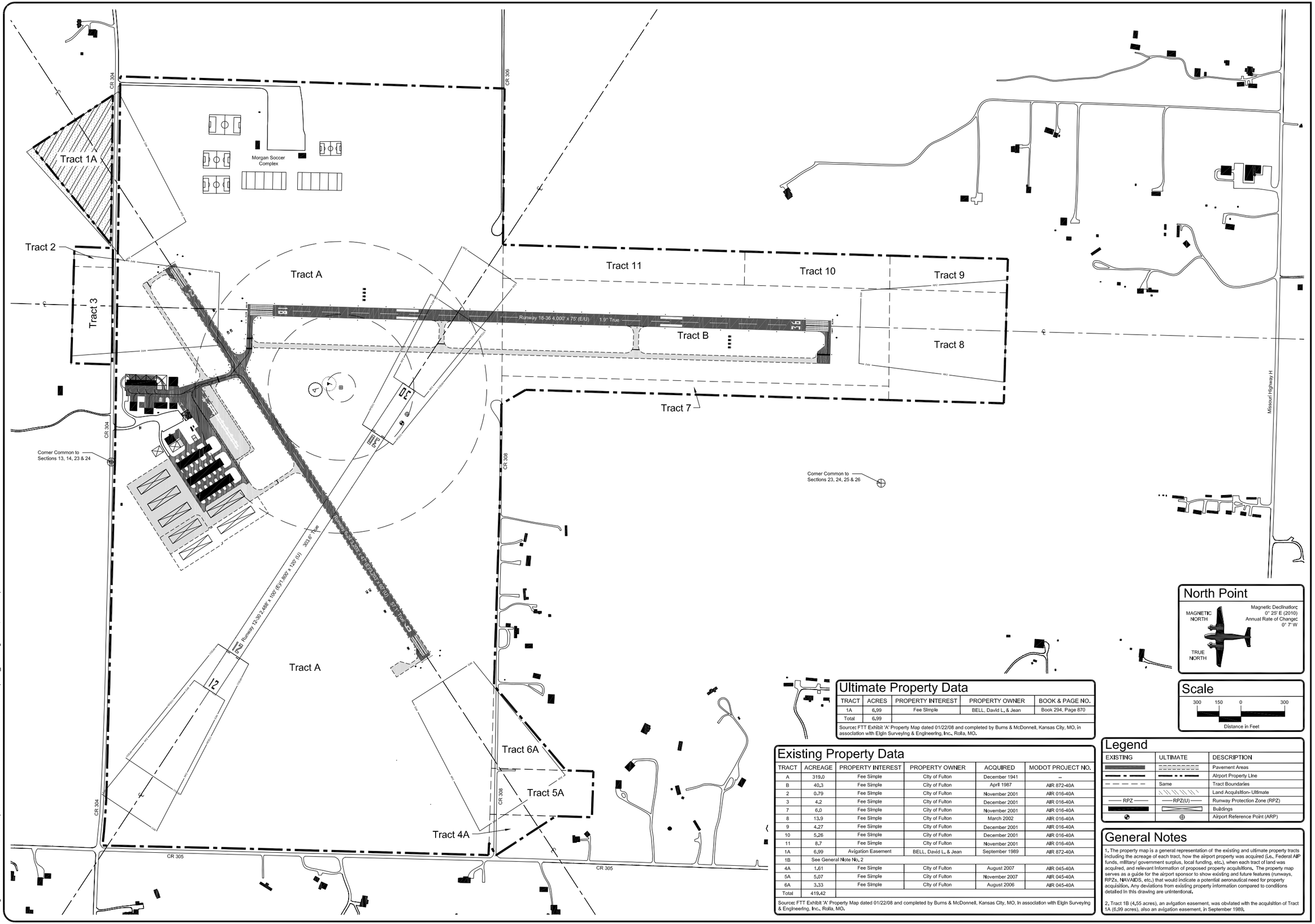
BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE

SUBMITTAL DATE 12/22/2011

11

SHEET 11 OF 14

Drawing Name: C:\Users\mwaller\Desktop\Remote Office\FTT AMP Deliverables\FTT ALP Update_2011.dwg Dec 05,2012 - 8:24pm




## Ultimate Property Data

| TRACT | ACRES | PROPERTY INTEREST | PROPERTY OWNER | BOOK & PAGE NO. |
|---|---|---|---|---|
| 1A | 6.99 | Fee Simple | BELL, David L. & Jean | Book 294, Page 870 |
| Total | 6.99 | | | |

Source: FTT Exhibit 'A' Property Map dated 01/22/08 and completed by Burns & McDonnell, Kansas City, MO, in association with Elgin Surveying & Engineering, Inc., Rolla, MO.

## Existing Property Data

| TRACT | ACREAGE | PROPERTY INTEREST | PROPERTY OWNER | ACQUIRED | MODOT PROJECT NO. |
|---|---|---|---|---|---|
| A | 319.0 | Fee Simple | City of Fulton | December 1941 | – |
| B | 40.3 | Fee Simple | City of Fulton | April 1987 | AIR 872-40A |
| 2 | 0.79 | Fee Simple | City of Fulton | November 2001 | AIR 016-40A |
| 3 | 4.2 | Fee Simple | City of Fulton | December 2001 | AIR 016-40A |
| 7 | 6.0 | Fee Simple | City of Fulton | November 2001 | AIR 016-40A |
| 8 | 13.9 | Fee Simple | City of Fulton | March 2002 | AIR 016-40A |
| 9 | 4.27 | Fee Simple | City of Fulton | December 2001 | AIR 016-40A |
| 10 | 5.26 | Fee Simple | City of Fulton | December 2001 | AIR 016-40A |
| 11 | 8.7 | Fee Simple | City of Fulton | November 2001 | AIR 016-40A |
| 1A | 6.99 | Avigation Easement | BELL, David L. & Jean | September 1989 | AIR 872-40A |
| 1B | See General Note No. 2 | | | | |
| 4A | 1.61 | Fee Simple | City of Fulton | August 2007 | AIR 045-40A |
| 5A | 5.07 | Fee Simple | City of Fulton | November 2007 | AIR 045-40A |
| 6A | 3.33 | Fee Simple | City of Fulton | August 2006 | AIR 045-40A |
| Total | 419.42 | | | | |

Source: FTT Exhibit 'A' Property Map dated 01/22/08 and completed by Burns & McDonnell, Kansas City, MO, in association with Elgin Surveying & Engineering, Inc., Rolla, MO.

## North Point

MAGNETIC NORTH

TRUE NORTH

Magnetic Declination: 0° 25' E (2010)
Annual Rate of Change: 0° 7' W

## Scale

300 150 0 300

Distance in Feet

## Legend

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

## General Notes

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

2. Tract 1B (4.55 acres), an avigation easement, was obviated with the acquisition of Tract 1A (6.99 acres), also an avigation easement, in September 1989.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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

City of Fulton, Missouri

# PROPERTY MAP

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE

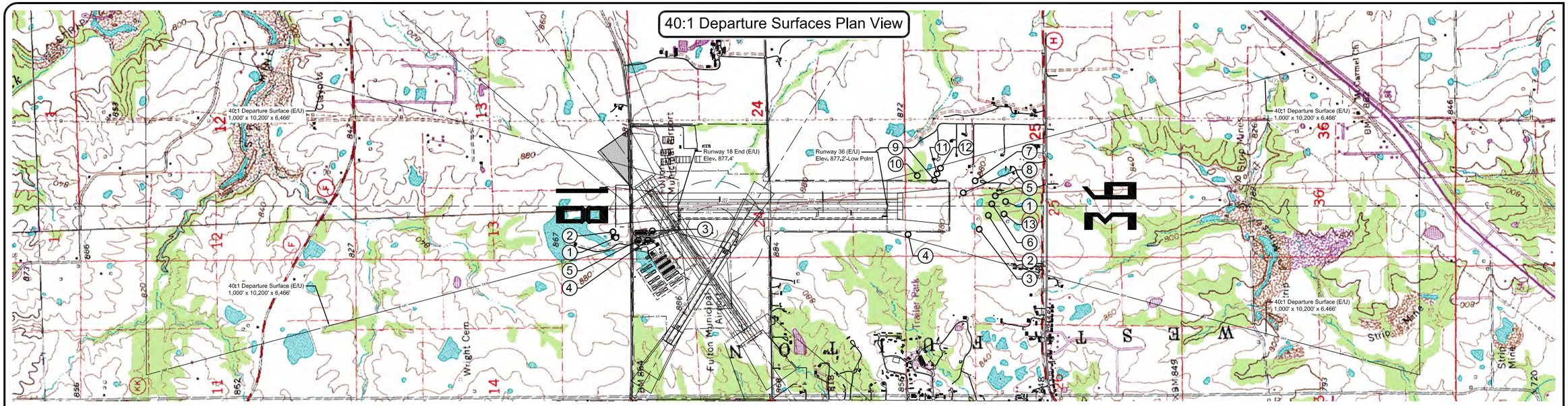
SUBMITTAL DATE 12/22/2011

12

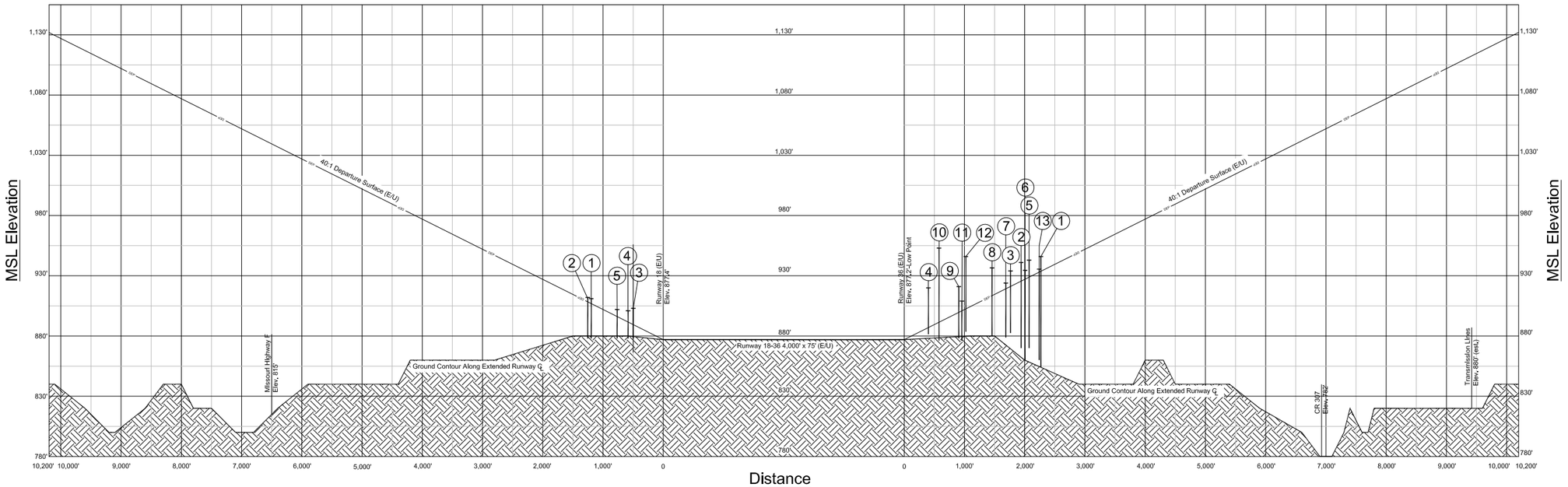


Drawing Name: C:\Users\mwalter\Desktop\Remote Office\FTT AMP Deliverables\FTT ALP Update_2011.dwg Dec 05,2012 - 8:27pm

## 40:1 Departure Surfaces Plan View




## 40:1 Departure Surface Profile View




## Runway 18 Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | MITIGATION |
|---|---|---|---|---|---|---|
| 1 | Tree | 1,197 feet | 604 feet R | 910.9' MSL | 4 feet | Remove |
| 2 | Tree | 1,252 feet | 494 feet R | 911.8' MSL | 4 feet | Remove |
| 3 | Hangar | 496 feet | 997 feet R | 902.6' MSL | 13 feet | TBD |
| 4 | Hangar | 580 feet | 1,092 feet R | 901.0' MSL | 10 feet | TBD |
| 5 | Hangar | 764 feet | 1,094 feet R | 901.6' MSL | 6 feet | TBD |

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

## Runway 36 Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | MITIGATION |
|---|---|---|---|---|---|---|
| 1 | Tree | 2,268 feet | 113 feet R | 945.5' MSL | 12 feet | Remove |
| 2 | Tree | 1,940 feet | 188 feet L | 941.0' MSL | 16 feet | Remove |
| 3 | Tree | 1,764 feet | 446 feet L | 933.9' MSL | 13 feet | Remove |
| 4 | Tree | 400 feet | 542 feet L | 920.3' MSL | 33 feet | Remove |
| 5 | Tree | 2,072 feet | 209 feet R | 943.0' MSL | 14 feet | Remove |
| 6 | Tree | 2,006 feet | 73 feet R | 934.5' MSL | 7 feet | Remove |
| 7 | Tree | 1,686 feet | 489 feet R | 923.7' MSL | 5 feet | Remove |
| 8 | Tree | 1,458 feet | 266 feet R | 936.4' MSL | 23 feet | Remove |
| 9 | Tree | 906 feet | 501 feet R | 921.0' MSL | 21 feet | Remove |
| 10 | Tree | 578 feet | 590 feet R | 952.8' MSL | 61 feet | Remove |
| 11 | Tree | 958 feet | 621 feet R | 909.3' MSL | 8 feet | Remove |
| 12 | Tree | 1,024 feet | 732 feet R | 945.5' MSL | 43 feet | Remove |
| 13 | Tree | 2,240 feet | 160 feet L | 935.3' MSL | 2 feet | Remove |

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

## General Notes

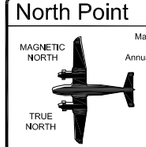
1. The Departure Surface Drawing depicts the plan and profile view of the current and ultimate 40:1 departure surfaces. This drawing provides information on existing and potential obstructions to the engine-out departures for Instrument procedures established for Runway 18-36. Any deviations from existing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

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

## Legend

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

## North Point




Magnetic Declination:
0° 25' E (2010)
Annual Rate of Change:
0° 7' W

## Scale

1,000 500 0 1,000

Distance in Feet
Horizontal Scale 1"= 1,000'
Vertical Scale 1"= 50'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**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

**RUNWAY 18-36**
**40:1 DEPARTURE SURFACE DRAWING**

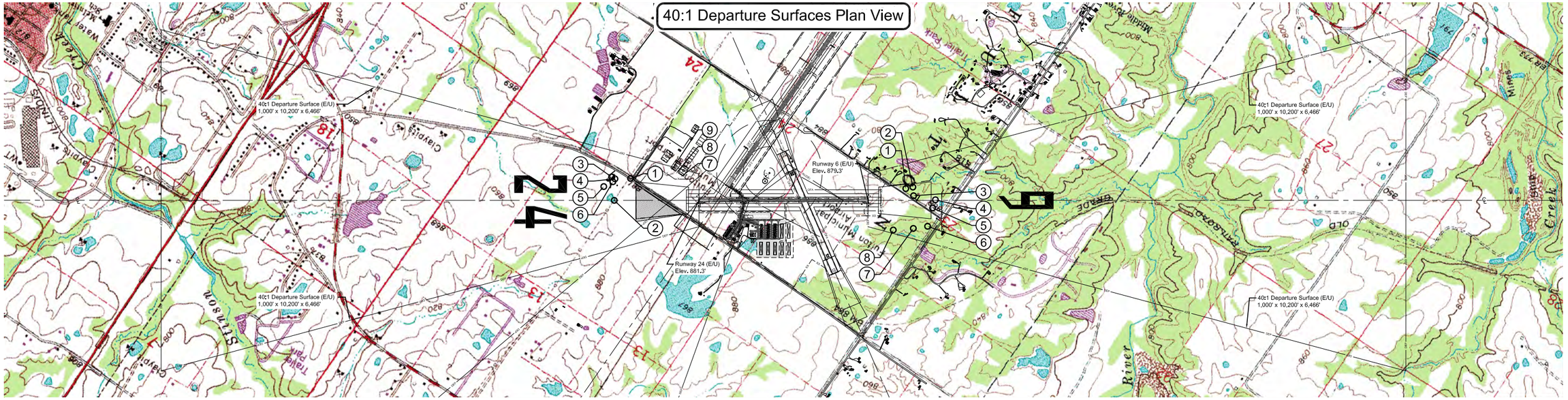
| | |
|---|---|
| BWR PROJECT NO. | 010025701/00001/00006 |
| AGENCY PROJECT NO. | MoDOT No. 10-040A-1 |
| DRAWN BY | MAW |
| CHECKED BY | MAW |
| DESIGNED BY | MAW |
| REVISIONS | DATE |
| SUBMITTAL DATE | 12/22/2011 |

13

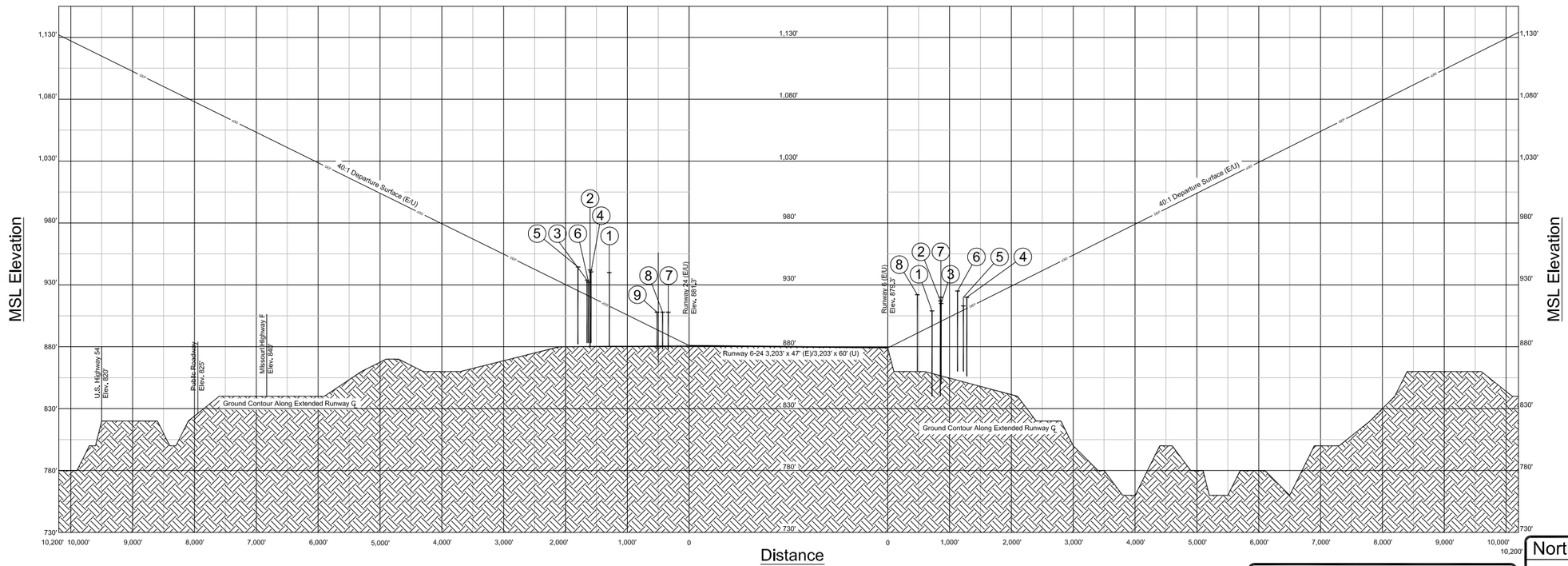
SHEET 13 OF 14

Drawing Name: K:\2010-0257-Fulton-MO_MasterPlan_ALP\01\AP\Master Plan\ACAD\ALP Update\FTT ALP Update_2011.dwg Apr 05,2012 - 2:13pm

## 40:1 Departure Surfaces Plan View




## 40:1 Departure Surface Profile View




### Runway 24 Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | MITIGATION |
|---|---|---|---|---|---|---|
| 1 | Transmission Line | 1,300 feet | 974 feet L | 940.0' MSL | 27 feet | TBD |
| 2 | Transmission Line | 1,588 feet | 0 feet | 944.0' MSL | 23 feet | TBD |
| 3 | Tree | 1,658 feet | 448 feet L | 933.8' MSL | 11 feet | Remove |
| 4 | Tree | 1,594 feet | 413 feet L | 941.0' MSL | 20 feet | Remove |
| 5 | Tree | 1,634 feet | 359 feet L | 944.4' MSL | 23 feet | Remove |
| 6 | Tree | 1,806 feet | 268 feet L | 932.2' MSL | 6 feet | Remove |
| 7 | Light Post | 346 feet | 445 feet L | 908.0' MSL | 18 feet | TBD |
| 8 | Light Post | 436 feet | 507 feet L | 908.0' MSL | 16 feet | TBD |
| 9 | Light Post | 526 feet | 569 feet L | 908.0' MSL | 14 feet | TBD |

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

### Runway 6 Obstruction Data Table

| ITEM | DESCRIPTION | DEND | DCL | TOP ELEV. | PENETRATION | MITIGATION |
|---|---|---|---|---|---|---|
| 1 | Tree | 718 feet | 225 feet R | 908.7' MSL | 12 feet | Remove |
| 2 | Tree | 852 feet | 255 feet R | 917.0' MSL | 17 feet | Remove |
| 3 | Tree | 864 feet | 96 feet R | 915.4' MSL | 15 feet | Remove |
| 4 | Tree | 1,280 feet | 45 feet R | 919.7' MSL | 9 feet | Remove |
| 5 | Tree | 1,224 feet | 149 feet L | 913.1' MSL | 4 feet | Remove |
| 6 | Tree | 1,130 feet | 494 feet L | 924.5' MSL | 17 feet | Remove |
| 7 | Tree | 860 feet | 534 feet L | 920.1' MSL | 20 feet | Remove |
| 8 | Tree | 480 feet | 564 feet L | 922.3' MSL | 31 feet | Remove |

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

### General Notes

1. The Departure Surface Drawing depicts the plan and profile view of the current and ultimate 40:1 departure surfaces. This drawing provides information on existing and potential obstructions to the engine-out departures for instrument procedures established for Runway 6-24. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

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

### Legend

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

### North Point


Magnetic Declination: 0° 25' E (2010)
Annual Rate of Change: 0° 7' W

### Scale

1,000 500 0 1,000

Distance in Feet
Horizontal Scale 1"= 1,000'
Vertical Scale 1"= 50'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**ELTON HENSLEY MEMORIAL AIRPORT (FTT)**
City of Fulton, Missouri

**RUNWAY 6-24**
**40:1 DEPARTURE SURFACE DRAWING**

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE
SUBMITTAL DATE 12/22/2011

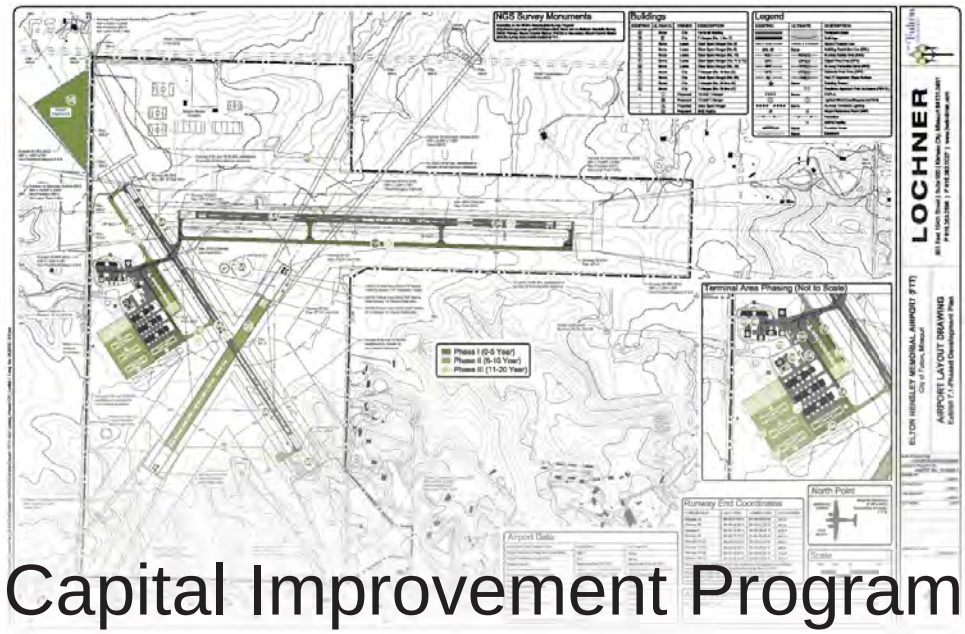
14

SHEET 14 OF 14

Drawing Name: C:\Users\mwaller\Desktop\Remote Office\FTT AMP Deliverables\FTT ALP Update_2011.dwg Dec 05,2012 - 8:29pm

7

7




# Capital Improvement Program

## INTRODUCTION

The Capital Improvement Program (CIP) involves the compilation of a schedule of recommended development projects, and their probable costs, that are based on the findings of the demand forecasts and facility requirements evaluation. The CIP identifies the improvements necessary to accommodate projected aircraft and passenger demand throughout the 20-year planning period.

## CAPITAL DEVELOPMENT PHASING

FTT's CIP will be based on short (0-5 year), intermediate (6-10 year), and long-term (11-20 year) development requirements. The short-term planning period serves as an immediate action program which recognizes federal, state and local funding capabilities. For this reason, the 0-5 year development phase is given special attention in that projects are outlined by year due to the critical nature of the improvements and the necessary financial investments that accompany each improvement project.

The short-term improvement plan also plays a key role in formulating the CIP submitted to the MoDOT, Aviation Section, and utilized by the FAA, which indicates development priorities for the airport and costs to be incurred by the city. Aside from assisting with the development of the CIP, the short-term implementation plan should allow for additional capital improvement items which contribute to the overall operational safety and efficiency of the facility such as pavement maintenance and rehabilitation, as well as terminal area improvements.

The intermediate development plan consists of projects that will affect the overall geometry and layout of the facility including improvements to the airfield and terminal area. The long-

**Capital Development Phasing**

*The short-term planning period serves as an immediate action program which recognizes federal, state and local funding capabilities. Also, the short-term CIP plays a key role in formulating the CIP submitted to the MoDOT, Aviation Section, and is utilized by the FAA, which indicates development priorities for the airport and costs to be incurred by the city.*

range development phase is formulated in an effort to identify the ultimate role of the airport including a planning concept that will eventually accommodate the airport's future facility needs.

## PROJECT SCHEDULING

**Project Scheduling**

*Timing of improvement projects are merely suggested planning schedules and may require some reprioritizing throughout each phase of airport development. Operational safety, demand for certain airfield and/or terminal area facilities and the economic feasibility of their development are considered prime factors in determining the timing and construction of individual projects throughout the planning period.*

Decisions regarding project scheduling will evolve from numerous considerations involved with implementation of the CIP. For instance, care must be given to the amount of time and effort that will be needed to acquire land and/or develop engineering and construction design reports including plans and specifications. For this reason, the timing of particular improvement projects presented in this chapter are merely suggested planning schedules and may require some reprioritizing throughout each phase of airport development. Operational safety, demand for certain airfield and/or terminal area facilities and the economic feasibility of their development are considered prime factors in determining the timing and construction of individual projects throughout the planning period.

## MoDOT and FAA CAPITAL IMPROVEMENT PROGRAMS

The overall purpose of establishing the CIP is to provide a reasonable expectation of costs associated with capital improvements that will be utilized by MoDOT and the FAA for purposes of project prioritization and financial programming. Upon publication, the implementation plan presented in this chapter, due to variances in past capital development priorities, will differ to some degree from the five-year CIP worksheets currently maintained by MoDOT and the FAA.

## COST ESTIMATES

**Cost Estimates**

*The CIP cost estimates are based on current dollar value without consideration being given to inflation. As with project scheduling, financial considerations such as the availability and timing of funding availability have the ability to impact the scheduling priority of certain improvements. The proposed cost estimates are intended to be utilized for planning purposes only, and should not be considered an engineer's opinion of probable construction costs.*

The CIP cost estimates are based on current dollar value without consideration being given to inflation. Cost estimates are based on unit prices which correspond to the breadth and size of the particular project. As with project scheduling, financial considerations, such as the availability and timing of funding availability, have the ability to impact the scheduling priority of certain improvements.

The airport's short-term CIP is presented within Table 7.1 while Table 7.2 summarizes improvement cost estimates for the intermediate and long-term planning periods. Table 7.1 is categorized by year showing capital improvements throughout the short-term planning period. Each year of Phase I also includes potential engineering, inspection and administrative costs for each project. These contingent costs are included in the total costs of the 0-5 year planning period. Phases II (mid-term) and III (long-term) of the CIP also include contingent costs added to the sum of the costs for each of the development phases.

Table 7.1
Phase I CIP Project Summary

| Project Description | Projected Local/ City Share (10%) | Projected MoDOT/ Federal Share (90%) | Projected Total Cost (100%) |
|---|---|---|---|
| Year 1—2012 | | | |
| 1A Widen T-Hangar Taxiway (25 feet)<br>2A Rehabilitate T-hangar Taxlianes and Apron*<br>3A Improve Runway 6 RSA<br>4A Runway 18-36 Pavement Maint. (Crack Repair) | $ 16,100 | $ 306,300 | $ 322,400 |
| Total Cost | $ 16,100 | $ 306,300 | $ 322,400 |
| Year 2—2013 | | | |
| 5A Overlay and Widen Runway 6-24 (60 feet) | $ 65,000 | $ 585,000 | $ 650,000 |
| 6A Replace Runway 6-24 lighting** | $ 25,000 | $ 225,000 | $ 250,000 |
| Total Cost | $ 90,000 | $ 810,000 | $ 900,000 |
| Year 3—2014 | | | |
| 7A Expand Apron to 8,700 sq. yds. | $ 45,000 | $ 405,000 | $ 450,000 |
| 8A Install AWOS-III | $ 17,000 | $ 158,000 | $ 175,000 |
| Total Cost | $ 62,000 | $ 563,000 | $ 625,000 |
| Year 4—2015 | | | |
| 9A Construct 12-Unit T-hangar and Taxilanes*** | $ 392,000 | $ 158,000 | $ 550,000 |
| 10A Expand Terminal Building to 3,200 sq. ft.**** | $ 225,000 | $ 275,000 | $ 500,000 |
| Total Cost | $ 617,000 | $ 433,000 | $ 1,050,000 |
| Year 5—2016 | | | |
| 11A Design/Construct Parallel Taxiway (18-36) | $ 360,000 | $ 3,240,000 | $ 3,600,000 |
| 12A Rehabilitate Runway 18-36* | $ 27,000 | $ 243,000 | $ 270,000 |
| Total Cost | $ 387,000 | $ 3,483,000 | $ 3,870,000 |
| TOTAL 0-5 YEAR CIP COST | $ 1,172,100 | $ 5,595,300 | $ 6,767,400 |

Note: All costs are rounded to the nearest thousand for planning purposes and are based on current dollar value. Costs also include estimated engineering design and inspection fees.
Note: With the exception of 2012 projects, cost projections are intended for planning purposes only and should not be used as actual construction cost estimates. Also, the federal versus local share of project costs is 90/10, respectively, as a result of passage of the FAA Reauthorization enacted in February 2012.
(*) Rehabilitation of concrete surfaces includes cleaning and sealing joints, remarking, as well as replacing panels, if necessary.
(**) Includes MITL, threshold lights and REILs, as well as installation of PAPI-2Ls to replace the SAVASIs.
(***) Federal and/or MoDOT grants will fund 90 percent of the design and construction cost for the T-hangar taxilanes.
(****) Federal and/or MoDOT grants will fund 55 percent of the overall construction cost; the city would be responsible for funding the remaining 45 percent of construction.
AWOS—Automated Weather Observation System

Source: FTT Facility Requirements; MoDOT CIP; Lochner.

The CIP cost estimates presented for airside, landside and support facilities were derived from engineering bid tabs taken from recent construction projects similar to those recommended for the airport. Absent a real or market value appraisal for property

acquisition, costs associated with land acquisition are not included as part of the CIP. Lastly, the proposed cost estimates are intended to be utilized for planning purposes only and should not be considered an engineer's opinion of probable construction costs.

Table 7.2
Phase II & III CIP Project Summary

| Project Description | Projected Local/ City Share (10%) | Projected MoDOT/ Federal Share (90%) | Projected Total Cost (100%) |
|---|---|---|---|
| Phase II (6-10 Year) Capital Improvements | | | |
| 1B Perform Runway 6-24 Taxiway Improvements* | $ 55,000 | $ 495,000 | $ 550,000 |
| 2B Perform Runway 12-30 Improvements** | $ 15,000 | $ 0.00 | $ 15,000 |
| 3B Acquire Land—Tract 1A (Runway 24 RPZ) | Absent Appraised Value, This Cost is N/A | | |
| 4B Perimeter Fence Improvements*** | $ 7,000 | $ 63,000 | $ 70,000 |
| 5B Expand Apron to 10,100 sq. yds. | $ 25,000 | $ 225,000 | $ 250,000 |
| 6B Construct (2) 10-Unit T-hangars and Taxilanes**** | $ 630,000 | $ 270,000 | $ 900,000 |
| 7B Rehabilitate Auto Parking Area***** | $ 55,000 | $ 0.00 | $ 55,000 |
| 8B Relocate T-hangar Nos. 1-7 to West T-hangar Area**** | $ 315,000 | $ 135,000 | $ 450,000 |
| 9B Construct (1) Clear Span Hangar | $ 250,000 | $ 0.00 | $ 250,000 |
| 10B Acquire Jet A Fuel Truck | $ 100,000 | $ 0.00 | $ 100,000 |
| 11B Construct Fuel Truck Parking Area | $ 50,000 | $ 0.00 | $ 50,000 |
| 12B Construct Maintenance Hangar | $ 250,000 | $ 0.00 | $ 250,000 |
| TOTAL 6-10 YEAR CIP COST | $ 1,752,000 | $ 1,188,000 | $ 2,940,000 |
| Phase III (11-20 Year) Capital Improvements | | | |
| 1C Overlay Runway 6-24 | $ 58,000 | $ 522,000 | $ 580,000 |
| 2C Rehab. Runway 18-36****** | $ 27,000 | $ 243,000 | $ 270,000 |
| 3C Rehab. Runway 18-36 Taxiway System****** | $ 15,000 | $ 135,000 | $ 150,000 |
| 4C Rehab. Runway 6-24 Taxiway System****** | $ 7,000 | $ 63,000 | $ 70,000 |
| 5C Rehab./Expand Apron to 10,900 sq. yds.******* | $ 17,000 | $ 158,000 | $ 175,000 |
| 6C Rehab. T-hangar Taxilanes****** | $ 20,000 | $ 185,000 | $ 205,000 |
| 7C Construct (1) 10-Unit T-hangar and Taxilanes**** | $ 315,000 | $ 135,000 | $ 450,000 |
| 8C Construct SRE Facility | $ 50,000 | $ 0.00 | $ 50,000 |
| TOTAL 11-20 YEAR CIP COST | $ 509,000 | $ 1,441,000 | $ 1,950,000 |

Note: All costs are rounded to the nearest thousand for planning purposes and are based on current dollar value. Costs also include estimated engineering design and inspection fees.
Note: Cost projections are intended for planning purposes only and should not be used as actual construction cost estimates.
(*) Includes construction of partial parallel taxiway, aircraft turn-around and mid-field connector taxiway.
(**) Includes shortening runway to 1,800 feet and widening to 120 feet.
(***) Includes installation of new fencing (4-strand barb-wire) to the west of the airfield and to the east of Runway 18-36 and south of the Morgan Soccer Complex. Installation of a seven-foot high wildlife perimeter fence is estimated to total nearly $500,000.
(****) Federal and/or MoDOT grants will fund 90 percent of the design and construction cost for the T-hangar taxilanes.
(*****) Rehab. of asphalt surfaces includes crack seal, slurry seal, seal coat and remarking. Additionally, cost to reconstruct the auto parking area with Portland Cement Concrete (PCC) is estimated to total $240,000.
(******) Rehab. of concrete surfaces includes cleaning and sealing joints, as well as replacing panels, if necessary.
SRE—Snow Removal and Equipment

Source: FTT Facility Requirements; Lochner.

## SUMMARY

FTT's CIP cost projections, not including direct operational and maintenance expenses, are expected to total approximately $11.7 million. The MoDOT/federal share of capital improvements is anticipated to be approximately $8.2 million, while the city's share is estimated to total slightly more than $3.4 million.

The source of funding (e.g., MoDOT/federal versus local funding) for improvement projects is included within the three CIP summary tables. The city is expected to expend approximately $1.2 million during the short-term period, nearly $1.8 million during the mid-term period, and an additional $500,000 during the long-term phase of airport development. Table 7.3 summarizes the total expected CIP expenditures during the short, intermediate and long-term planning periods.

Table 7.3
20-Year CIP Cost Summary

| Planning Period (Years) | Projected Local/ City Share (10%) | Projected MoDOT/ Federal Share (90%) | Projected Total Cost (100%) |
|---|---|---|---|
| Phase I (0-5 Year) | $ 1,172,100 | $ 5,595,300 | $ 6,767,400 |
| Phase II (6-10 Year) | $ 1,752,000 | $ 1,188,000 | $ 2,940,000 |
| Phase III (11-20 Year) | $ 509,000 | $ 1,441,000 | $ 1,950,000 |
| GRAND TOTAL CIP COST | $ 3,433,100 | $ 8,224,300 | $ 11,657,400 |

Note: All costs are rounded to the nearest thousand for planning purposes and are based on current dollar value. Costs also include estimated engineering design and inspection fees.
Note: Cost projections are intended for planning purposes only and should not be used as actual construction cost estimates.

Source: Lochner.

Until recently, development projects associated with T-hangar construction and terminal building improvements had been ineligible for AIP funds. As of 2010, AIP funds are eligible to be expended on these revenue-generating projects provided that all airfield facility needs are met and in compliance with FAA criteria. Otherwise, these specific improvement projects will be ineligible due to low prioritization and available AIP funds will be expended on higher priority airfield and terminal area facility improvements. Of the total CIP, approximately $2.4 million in improvements are ineligible for federal Airport Improvement Program (AIP) and/or state trust fund grants and will be fully financed by the city and/or third-party investors. Improvement projects ineligible for federal and/or state assistance include fuel truck parking areas, T-hangars, clear span and maintenance hangars, as well as maintenance and/or reconstruction of public auto parking areas. Additionally, improvements associated with the turf Runway 12-30 are also ineligible for federal/MoDOT funding due to both paved runways providing the recommended wind coverage per FAA airport design guidelines.

**CIP Summary**

*The city is expected to expend approximately $1.2 million during the short-term period, nearly $1.8 million during the mid-term period, and an additional $500,000 during the long-term phase of airport development. Approximately $2.4 million in improvements are ineligible for federal Airport Improvement Program (AIP) and/or state trust fund grants and will be fully financed by the city and/or third-party investors. Improvement projects ineligible for federal and/or state assistance include fuel truck parking areas, T-hangars, clear span and maintenance hangars, maintenance and/or reconstruction of public auto parking areas, as well as improvements to Runway 12-30.*

The following list of capital improvement projects coincides with Exhibit 7.1 in which the airport's CIP is presented in a phased format depicting facility maintenance and expansion through 2031.

**Phase I (0-5 Year) Improvements**

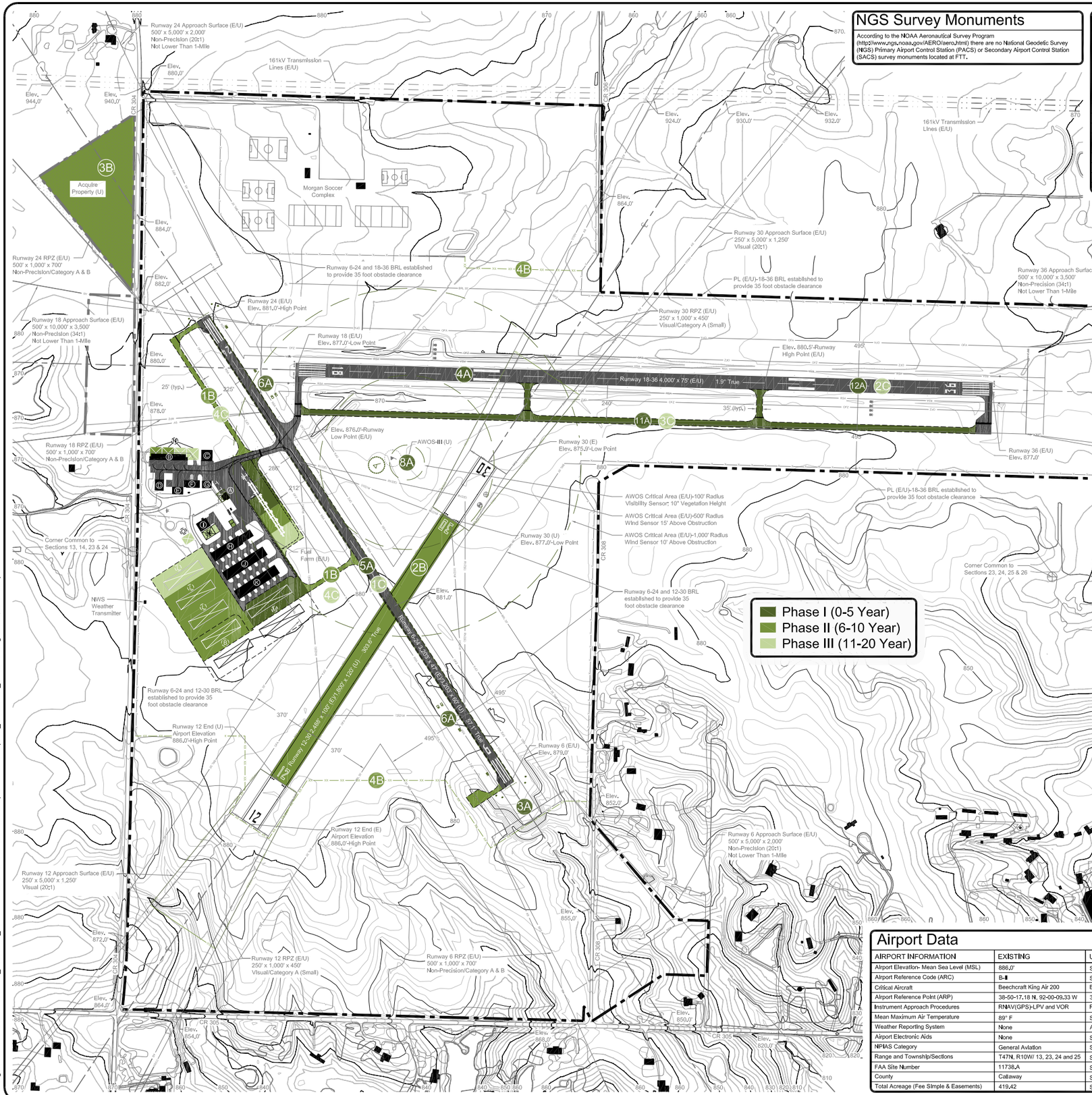
1A Widen T-hangar Taxiway (25 feet)
2A Rehabilitate (Clean and Seal Joints) T-hangar Taxlianes and Apron
3A Improve Runway 6 RSA
4A Runway 18-36 Pavement Maintenance (Crack Repair)
5A Overlay and Widen Runway 6-24 (60 feet)
6A Replace Runway 6-24 Lighting
7A Expand Apron to 8,700 sq. yds.
8A Install AWOS-III
9A Construct 12-Unit T-hangar and Taxilanes
10A Expand Terminal Building to 3,200 sq. ft.
11A Design and Construct Parallel Taxiway (18-36)
12A Rehabilitate Runway 18-36

**Phase II (6-10 Year) Improvements**

1B Perform Runway 6-24 Taxiway Improvements
2B Perform Runway 12-30 Improvements
3B Acquire Land—Tract 1A (Runway 24 RPZ)
4B Perform Perimeter Fence Improvements (4-strand barb-wire)
5B Expand Apron to 10,100 sq. yds.
6B Construct (2) 10-Unit T-hangars and Taxilanes
7B Rehabilitate Auto Parking Area
8B Relocate T-hangar Nos. 1 thru 7 to West T-hangar Area
9B Construct (1) Clear Span Hangar
10B Acquire Jet A Fuel Truck
11B Construct Fuel Truck Parking Area
12B Construct Maintenance Hangar

**Phase III (11-20 Year) Improvements**

1C Overlay Runway 6-24
2C Rehabilitate Runway 18-36
3C Rehabilitate Runway 18-36 Taxiway System
4C Rehabilitate Runway 6-24 Taxiway System
5C Rehabilitate and Expand Apron to 10,900 sq. yds.
6C Rehabilitate T-hangar Taxilanes
7C Construct (1) 10-Unit T-hangar and Taxilanes
8C Construct SRE Facility




## NGS Survey Monuments

According to the NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/AERO/aero.html) there are no National Geodetic Survey (NGS) Primary Airport Control Station (PACS) or Secondary Airport Control Station (SACS) survey monuments located at FTT.

## Buildings

| EXISTING | ULTIMATE | OWNER | DESCRIPTION |
|---|---|---|---|
| A | Same | City | Terminal Building |
| B | B | City | T-Hangar (No. 1 thru 7) |
| C | Same | Lease | Clear Span Hangar (No. 8) |
| D | Same | Lease | Clear Span Hangar (No. 9) |
| E | Same | Lease | Clear Span Hangar (No. 10) |
| F | Same | Lease | Clear Span Hangar (No. 11 & 12) |
| G | Same | Lease | Clear Span Hangar (No. 13) |
| H | Same | City | T-Hangar (No. 14 thru 22) |
| I | Same | City | Clear Span Hangar (No. 23) |
| J | Same | City | T-Hangar (No. 24 thru 35) |
| K | Same | City | T-Hangar (No. 36 thru 47) |
| – | L | Proposed | 10-Unit T-Hangar |
| – | M | Proposed | 12-Unit T-Hangar |
| – | N | Proposed | Clear Span Hangar |
| – | O | Proposed | SRE Facility |

## Legend

| EXISTING | ULTIMATE | DESCRIPTION |
|---|---|---|
| | | Pavement Areas |
| | | Buildings |
| | | Airport Property Line |
| BRL 35' | Same | Building Restriction Line (BRL) |
| RSA | RSA(U) | Runway Safety Area (RSA) |
| OFA | OFA(U) | Object Free Area (OFA) |
| RPZ | RPZ(U) | Runway Protection Zone (RPZ) |
| OFZ | OFZ(U) | Obstacle Free Zone (OFZ) |
| AS | AS(U) | Part 77 Approach Slope Surface |
| | Same | Rotating Beacon |
| | | Precision Approach Path Indicators (PAPI-2L) |
| | Same | PAPI-4L |
| | | Lighted Wind Cone/Segmented Circle |
| | Same | Runway Threshold Lighting |
| | | Airport Reference Point (ARP) |
| | | Fenceline |
| | | AWOS Facility |
| | Same | Forested Areas |
| | Same | Easement |

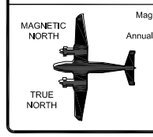
## Terminal Area Phasing (Not to Scale)

## Runway End Coordinates

| THRESHOLD | LATITUDE | LONGITUDE | ELEVATION |
|---|---|---|---|
| Runway 18 | 38-50-27.58 N | 91-59-59.53 W | 877.4' |
| Runway 36 | 38-49-46.06 N | 92-00-01.22 W | 877.2' |
| Runway 6 | 38-50-15.56 N | 92-00-29.67 W | 879.3' |
| Runway 24 | 38-50-32.75 N | 91-59-55.68 W | 881.3' |
| Runway 12 (E) | 38-50-30.28 N | 92-00-32.45 W | 885.4' |
| Runway 12 (U) | 38-50-28.65 N | 92-00-29.31 W | 886.0' |
| Runway 30 (E) | 38-50-16.67 N | 92-00-06.27 W | 875.9' |
| Runway 30 (U) | 38-50-18.80 N | 92-00-10.38 W | 877.0' |

Source: Runway 18-36 and 6-24 end elevations and geodetic coordinates provided by the FAA Aviation Systems Standards Branch (AVN) (http://avnwww.jccbi.gov). Turf Runway 12-30's existing end elevations and geodetic coordinates derived from the Aeronautical GIS (AGIS) Survey completed in 2010 and performed by Woolpert, Inc., Dayton, OH.

## North Point




Magnetic Declination: 0° 25' E (2010)
Annual Rate of Change: 0° 7' W

## Scale

300 150 0 300

Distance In Feet

## Airport Data

| AIRPORT INFORMATION | EXISTING | ULTIMATE |
|---|---|---|
| Airport Elevation- Mean Sea Level (MSL) | 886.0' | Same |
| Airport Reference Code (ARC) | B-II | Same |
| Critical Aircraft | Beechcraft King Air 200 | Beechcraft King Air 250 |
| Airport Reference Point (ARP) | 38-50-17.18 N, 92-00-09.33 W | 38-50-16.83 N, 92-00-08.65 W |
| Instrument Approach Procedures | RNAV(GPS)-LPV and VOR | RNAV(GPS)-LPV |
| Mean Maximum Air Temperature | 89° F | Same |
| Weather Reporting System | None | AWOS-III |
| Airport Electronic Aids | None | Same |
| NPIAS Category | General Aviation | Same |
| Range and Township/Sections | T47N, R10W/ 13, 23, 24 and 25 | Same |
| FAA Site Number | 11738.A | Same |
| County | Callaway | Same |
| Total Acreage (Fee Simple & Easements) | 419.42 | Same |

## ALP Revisions

| NO. | DESCRIPTION | DATE | REVISED BY | APPROVED BY |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |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# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

City of Fulton, Missouri

# AIRPORT LAYOUT DRAWING

## Exhibit 7.1-Phased Development Plan

BWR PROJECT NO. 010025701/00001/00006
AGENCY PROJECT NO. MoDOT No. 10-040A-1
DRAWN BY MAW
CHECKED BY MAW
DESIGNED BY MAW
REVISIONS DATE
SUBMITTAL DATE 12/22/2011

SHEET 1 OF 1

Drawing Name: K:\2010\0257-Fulton+MO_MasterPlan_ALP\01AP\Master Plan\ACAD\Exhibits\Chapter 7\FTT ALP Update_Phased CIP_Exhibit 7.1.dwg Dec 06,2012 - 2:37pm

8

8

# Financial Evaluation

## INTRODUCTION

Financing the airport's 20-year capital improvement program can be accomplished through a variety of resources by utilizing a combination of federal, state and local funding methods. These include the FAA's Airport Improvement Program (AIP); The Missouri State Aviation Trust Fund; State Transportation Assistance Revolving (STAR) Fund loan program; as well as revenue bonds, private investments, airport revenues and budgeted allocations from the city.

This chapter discusses these funding methods and will evaluate the airport's revenues and expenditures over the past five fiscal years to determine the airport's net income from operation during that period. Additionally, a projected cash flow analysis will be completed for the short and mid-term planning periods to forecast airport revenues and expenditures. Finally, the master plan financial evaluation will highlight guidelines for generating revenue at the airport while minimizing expenses to the extent practical.

## CAPITAL IMPROVEMENT FUNDING SOURCES

**Federal Grants**

Originally authorized by the *Airport and Airway Improvement Act of 1982*, the Airport Improvement Program (AIP) is funded through the Airport and Airway Trust Fund (enacted by legislation in 1970), which receives 100 percent of its funding from aviation-generated user fees including passenger and facility fees, as well as cargo and fuel taxes. The AIP provides Federal entitlement and discretionary funding grants to be used for eligible projects at public use airports that serve primarily general aviation activity. Table 8.1 lists eligible and ineligible improvement projects as they relate to AIP funding guidelines.

**Federal Funding Grants**

*The AIP is funded through the Airport and Airway Trust Fund (enacted by legislation in 1970), which receives 100 percent of its funding from aviation-generated user fees including passenger and facility fees, as well as cargo and fuel taxes. The AIP provides Federal entitlement and discretionary funding grants to be used for eligible projects at public use airports that serve primarily general aviation activity.*

Table 8.1
AIP Eligible and Ineligible Projects

| Eligible Projects | Ineligible Projects |
|---|---|
| Runway Improvements | Mowers, Sweepers, Trucks, Office Equipment |
| Taxiway Improvements | Automobile Parking Lots |
| Apron Improvements | Industrial Park Infrastructure and Buildings |
| Airfield Pavement Maintenance | Business and Marketing Plans |
| Airfield Lighting/ Signage | Training of any Kind |
| Airport Master/ Layout Plans | |
| Environmental Studies | |
| Access Roads Located on Airport Property | |
| Mitigating Obstructions/ Hazards to Navigation | |
| Drainage Improvements | |
| AWOS Facilities | |
| Land Acquisition for Eligible Development | |
| Tree Clearing in Approach Surfaces | |
| NAVAIDs | |
| Hangar Development* | |
| Terminal Building Development* | |
| Fuel Farms* | |

(*) These items are eligible for AIP funds only when all airfield facility needs are met and in compliance with FAA planning criteria. Otherwise, they are typically ineligible for AIP funding due to low prioritization.

Source: FAA.

**NPE Funding**

*During any fiscal year in the AIP and Aviation Trust Fund exceeds $3.2 billion dollars, NPE funds in the amount of $150,000 per fiscal year, or 20 percent of the total five-year NPIAS improvements, whichever is less, will be allocated to the city. NPE funds are available during the initial year of allocation, as well as the next three fiscal years.*

### Non-Primary Entitlement Funds

Non-primary entitlement (NPE) funds are specifically for general aviation airports included within the latest published National Plan of Integrated Airport Systems (NPIAS) that show a justified need for airfield and terminal area improvements. During any fiscal year in which the total amount of system-wide apportionments from the AIP and Aviation Trust Fund exceeds $3.2 billion dollars, NPE funds in the amount of $150,000 per fiscal year, or 20 percent of the total five-year NPIAS improvements, whichever is less, will be allocated to the city. NPE funds are available during the initial year of allocation, as well as the next three fiscal years. Unused entitlement funds will expire if not obligated under a grant after four years.

The Federal portion of AIP grants eligible to fund capital improvements is currently 90 percent with the remaining 10 percent of development costs to be funded through city and local revenues and/or third-party investments.

### Discretionary Funds

There are two types of Discretionary funds. The first, Set-Aside Funds, are reserved for noise compatibility planning and implementing noise compatibility programs. The second type of discretionary funds includes those that are remaining after the apportionments are

made and set-aside are accommodated. Of these remaining funds, 75 percent is reserved for preserving and enhancing capacity, safety, security, and carrying out noise compatibility planning and programs at primary and reliever airports. The remaining 25 percent of the funds are known as remaining, or pure discretionary, and may be used at any airport for any AIP eligible improvement project.

**State Aviation Trust Fund**

The Missouri State Aviation Trust Fund is the primary state-funded source for capital improvement and maintenance projects on public-use general aviation airports in Missouri. Eligible projects include airfield and terminal area improvements, which exclude revenue producing facilities such as hangar and/or terminal buildings, that are included within the current five-year State Transportation Improvement Program (STIP). The trust fund is funded with Jet A fuel taxes collected by the state of and has an annual cap of $10 million. The trust fund portion of grants for eligible improvement projects is 90 percent while the remaining 10 percent of improvement costs are to be funded through local revenue sources.

**State Transportation Assistance Revolving (STAR) Fund**

The STAR Fund was created by the Missouri General Assembly and is administered by the Missouri Transportation Finance Corporation (MTFC) in an effort to assist with the planning, development and construction of non-highway transportation facilities. The MTFC provides STAR loans at a maximum of $500,000 to $550,000 per grant depending on the fund's reserve. Additionally, the MTFC will fund up to 50 percent of the airport sponsor's share toward an AIP funding grant, or 2.5 percent. STAR loans received from the MTFC are to be amortized over a period of 10 years or less and offer competitive interest rates. The typical interest rate for a 10-year STAR loan is approximately three percent.

**Third Party Financing**

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

**Bonds**

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

*General Obligation (GO) Bonds*

GO Bonds are backed by the creditworthiness and taxing power of the municipality operating the airport. They usually bear low interest rates because of their high degree of

**State Aviation Trust Fund**

*The Missouri State Aviation Trust Fund is the primary state-funded source for capital improvement and maintenance projects on public-use general aviation airports in Missouri. Eligible projects include airfield and terminal area improvements, which exclude revenue producing facilities such as hangar and/or terminal buildings, that are included within the current five-year State Transportation Improvement Program (STIP).*

**STAR Loans**

*STAR loans can be awarded at a maximum of $500,000 to $550,000 per grant depending on the fund's reserve. STAR Loans will can be used to fund up to 50 percent of the airport sponsor's share toward an AIP funding grant, or 2.5 percent. STAR loans are generally amortized over a period of 10 years or less and offer competitive interest rates of approximately three percent.*

security. However, state laws may limit a municipality's overall debt, and competition from other community financing requirements may preclude their use for an airport project. Some states have an exemption from the debt limitation rule for general obligation bonds because they are used for a revenue producing improvement project.

*Revenue Bonds*

Revenue bonds pledge the revenues of an airport sponsor to the repayment of debt service. These are the most common sources of funding at larger commercial service airports. Revenue bonds are popular because they do not burden the taxpayer or affect the bonding capacity of the municipality. However, their use is limited to airports with a sufficient operating surplus to cover the debt service. Projected Net Revenues must exceed debt service requirements by at least 1.25 times and up to 2.0 times, depending on the strength of the bond issuer and the underlying assumptions with respect to the market risk for the bonds. Interest rates are dependent on the coverage ratio, but in any case will be higher than for general obligation bonds. Other factors that may affect the interest rates on revenue bonds are the strength of the local passenger market and the financial condition of the airlines serving the market.

*Special Facility Revenue Bonds*

Special Facility Revenue Bonds are normally issued by the airport sponsor for the construction of a facility for a third party and backed by the revenues generated from that facility. This method of funding can be used for such facilities as maintenance hangars, airline reservation centers, terminal buildings, and air cargo terminals.

*Industrial Development Bonds (IDB)*

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

**Local Funds**

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

Sponsor Grant Assurance No. 25. *Airport Revenues* stipulates that all revenue, including agricultural leases, generated at the airport will be expended exclusively for the operating costs of the airport including maintenance and improvements projects as well as debt service obligations. Federal grant assurances expressly forbid revenue generated on-airport from being transferred to any other city account and/or department.

## HISTORIC CASH FLOW

An analysis of airport revenues and operating and maintenance (O&M) expenses for the previous five fiscal years (FY07-FY11) was completed in an effort to highlight and evaluate FTT's financial trends.

### Airport Revenues

Table 8.2 indicates that over the past five fiscal years operating revenues, on average, have totaled approximately $347,200 annually resulting in $1.74 million in income over the period.

Table 8.2
Historic Cash Flow Summary

| Budget Item | FY07 | FY08 | FY09 | FY10 | FY11 | Period Total |
|---|---|---|---|---|---|---|
| Airport Revenues | | | | | | |
| Hangar Rent | $76,246 | $75,316 | $86,176 | $85,816 | $80,288 | $403,842 |
| Fuel Sales | $84,591 | $87,128 | $63,887 | $80,496 | $99,520 | $415,622 |
| Penalty Revenue | $0.00 | $0.00 | $1,250 | $475 | $300 | $2,025 |
| Agricultural Leases | $10,732 | $10,738 | $10,758 | $10,758 | $25,673 | $68,659 |
| Soccer Park Rent | $880 | $880 | $0.00 | $0.00 | $0.00 | $1,760 |
| NWS Tower Lease | $315 | $0.00 | $0.00 | $315 | $0.00 | $630 |
| Grant Revenue | $313,155 | $226,782 | $132,307 | $9,342 | $152,933 | $834,519 |
| Miscellaneous | $0.00 | $0.00 | $0.00 | $0.00 | $9,056 | $9,056 |
| Total Revenues | $485,919 | $400,844 | $294,378 | $187,202 | $367,770 | $1,736,113 |
| Operating Expenses | | | | | | |
| Fuel and Oil | $55,252 | $79,479 | $52,695 | $57,936 | $106,496 | $351,858 |
| Consumables* | $4,873 | $4,052 | $17,335 | $4,266 | $3,953 | $34,479 |
| Contractual Services** | $94,932 | $94,220 | $98,469 | $98,828 | $100,082 | $486,531 |
| Capital Outlays*** | $319,429 | $7,555 | $12,112 | $10,125 | $0.00 | $349,221 |
| Other Expenses**** | $53,811 | $60,561 | $105,508 | $141,094 | $137,273 | $498,247 |
| Total Expenses | $528,297 | $245,867 | $286,119 | $312,249 | $347,804 | $1,720,336 |
| Net Income (Loss) | ($42,378) | $154,977 | $8,259 | ($125,047) | $19,966 | $15,777 |

Note: Figures are rounded to the nearest dollar for planning purposes.
(*) Includes equipment, materials, supplies and repairs.
(**) Includes insurance, contract labor, utilities, building and grounds maintenance, as well as vehicle and equipment repairs.
(***) Includes non-operating expenses such as airfield and terminal area capital improvements, as well as budget transfers.
(****) Includes interest and depreciation.
NWS-National Weather Service

Source: City of Fulton.

According to financial information, the airport's largest revenue center, fuel sales, averaged nearly $83,100 annually and increased at a rate of three percent per year during the period.

Additional revenues including hangar and tie-down rentals earned the city an annual average of $80,800 during the five year period and increased at a rate of slight more than one percent per year. Combined, these revenue centers accounted for nearly half of the airport's income. Additional sources of revenue were derived from agricultural and NWS tower leases, soccer park rent and miscellaneous charges.

Non-operating income in the form of grant revenues totaled $834,500 for the period and averaged nearly $167,000 per year.

**Operating Expenses**

As indicated in Table 8.2, expenses over the past five years have totaled, on average, approximately $344,100 annually resulting in nearly $1.72 million in operational costs over the period.

The airport's largest expense center, other expenses which include interest and depreciation, averaged nearly $99,600 annually and increased at a rate of approximately 13.1 percent per year during the period. Interest and depreciation accounted for 29 percent of the airport's annual expenditures .

Interest and depreciation are followed closely by contractual services, including contract labor, account for 28 percent of annual costs and totaled $486,500 throughout the period. Contractual expenses averaged $97,300 annually and increased at a nominal rate of slightly more than one percent per year.

Fuel and oil contracts accounted for 20 percent of the airport's operating costs and averaged nearly $70,400 annually and increased at a rate of roughly five percent annually over the period.

Lastly, capital outlays, in the form of airfield and terminal area improvements, totaled $926,300 and averaged $185,300 per year. However, these capital improvement costs were offset by yearly transfers totaling nearly $577,100, or $115,400 per year, throughout the period. These transfers have contributed significantly to FTT's positive financial condition.

**Net Income**

By comparing the airport's historic cash flow, the overall financial condition can be determined in the form of net revenues or negative net incomes, as indicated in Table 8.2. FTT's net income from airport operation since 2007 resulted in a surplus of approximately $15,800 for the period. In FY08, 09 and 11 the airport experienced positive cash flow totaling $183,200. FY07 and FY10 resulted in a combined net income of ($167,400). These two years were impacted by sharp increases in capital improvement spending and costs associated with depreciation.

The airport's financial condition is not unique in general aviation airport ownership and operation nor does it signal that fiscal management of the airport lacks oversight. It is a simple indication of the public welfare role the airport serves to the public and local community, the principals of supply and demand, as well as the revenue-expense relationship of airports.

## AIRPORT REVENUES TO FUND IMPROVEMENTS

As a condition of accepting AIP funding grant, the city is required to maintain a fee structure that, given the circumstances of the airport, allows it to be as financially self-sustaining as possible. Therefore, the city and airport are required to abide by accepted principles applicable to fees, rates and charges. This also includes the ability and willingness to assess fair and reasonable fees for use of the facility and prohibit discrimination against any class of user or aircraft type. Lastly, exercising good faith in governing revenue collection and use is important.

FTT benefits east-central Missouri through rapid, accessible and convenient transportation as well as economic activity generated by the airport. These benefits are diffused throughout the community, thereby providing a common welfare to the region. At the same time, the facility encourages the exchange of goods and services supporting the notion that the airport is a business enterprise and should be self-sustaining. With the assistance of AIP funds, coupled with fair and equitable rates and charges reflective of realities of supply and demand, the airport's CIP can be carried out in a financially feasible manner that will benefit both the airport and its users.

The following discussion concentrates on established practices regarding administering a rates and charges program to optimize the return on the airport's revenue centers. These revenue centers, or services, are those in which the airport will, or currently does, provide to airport users. These services include T-hangar and clear span hangar rental space; tie-down usage; terminal building rental space for an FBO or aviation related on-airport businesses; commercial/industrial/business lease rates within the terminal area; aircraft landing fees; fuel flowage fees; and agricultural leases.

**City or Private Owned T-Hangar Revenue**

Rental rates for T-hangars can be established based on an appraisal rate or rate per square foot. The appraisal rate formula involves appraising the value of the land at the facility. The rate would be a percentage of the appraised value of that portion of land supporting the structure sufficient to equal the appraised value and to allow debt service obligations. Conversely, a rate per square foot can be a fixed rate or tied to the value of the land appraisal. For both methods, regular appraisals are recommended so that rates can reflect the increase in the value of the land as the facility grows. Additionally, as maintenance

and operational costs increase, lease agreements are recommended to include escalation clauses to recover these costs for improvements and amortization. Where the structure is owned by a private entity, the tenant is recommended to be responsible for maintenance of the structure, as well as a specific amount of land adjacent to the structure.

**Clear Span Hangar Revenue**

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

**On-Airport Industrial/Commercial Business Revenue**

Airport property is not to be released, transferred or sold for private, industrial or commercial uses. The city is recommended to lease land for such uses to desirable tenants in order to provide continuous income for the airport. As is common for most general aviation airports, commercial/industrial facilities charges include a fixed rate (appraisal or rate per square foot) plus a percentage of sales. Percentage of sales most generally applies to commercial business, including restaurants or aircraft maintenance providers, that deal in sales while industrial establishments, not relying on local sales for revenue, provide fixed rate fees plus operational and maintenance costs through escalation clauses as part of the lease agreement. These rate structures allow the airport to benefit from the success of the businesses located there. The businesses recoup revenues due to the airport providing the necessary facilities which enable their business to be successful. Additional improvements to the airport, as provided by the city, will only enhance each firm's business outlook. In essence, the businesses are sharing in the cost of improvements in proportion to the financial success they experience as a result of the city's investment in the airport. Maintenance clauses, as well as insurance clauses (if applicable), are also recommended as part of these lease agreements.

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

**Terminal Building Lease Revenue**

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

**Landing Fee Revenue**

It is permissible for the city to establish landing fees by utilizing a compensatory model of rates and charges determination. In this approach, the user (large aircraft weighing in excess of 12,500 pounds maximum gross weight) is charged based on their actual use of the facility from which they derive a benefit. A fee is levied against the user to cover the corresponding expenses to maintain and operate the facility. The rate of the landing fee is based on the aircraft operator's prorated share of occupancy or usage. This share of usage may be based on the total weight of the aircraft or annual operational activity. A landing fee for large aircraft operators might be classified under an alternative term such as a ramp fee. In the event that the aircraft operator purchases a minimum amount of fuel, the FBO may elect to waive a landing fee.

**Fuel Flowage Revenue**

As is common for many general aviation airports, fuel flowage revenue includes either a fixed fee per gallon of fuel dispensed or a percentage of total sales. This percentage may be quarterly, bi-annually or annually. An alternative method for determining an appropriate fuel royalty/flowage fee might include instituting a graduated percentage of gross fuel revenue collection method in lieu of a fixed fuel flowage fee to allow for seasonal fluctuations, economic conditions or supply and demand. As with any other commercial businesses based at the airport, fuel flowage fees are necessary because the proprietor derives a benefit from airport operation and should compensate the city accordingly. Escalation clauses for a fixed rate fee, as well as minimum performance standards, are recommended to be included as part of the lease agreement.

**Equipment Use Revenue**

Just as landing fees are levied against aircraft for utilization of the runway facilities, so, too, should aircraft operators and airport users be charged a fee for use of airport equipment. In particular, ground power units (GPU) are often required for larger, more sophisticated aircraft that do not have an auxiliary power unit (APU) to power electrical components while the aircraft is shut down but still requires electrical power. Additionally, portable heaters used to pre-heat the aircraft during periods of cold weather before startup, as well as other items such as aircraft tugs, can be assigned specific costs for each use by aircraft operators.

**Aircraft Parking/Tie-Down Revenue**

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

**Agricultural Leases**

The city should receive fair market value for agricultural uses of airport property. The city is also entitled to receive the same rate as similar farmland in the area. Lease terms are

recommended to last no longer than five years. Two to three year terms are preferred because they allow the city to reassess the impact of the agricultural use on airport operations and development. Upon renewal of a lease, rates should be adjusted to reflect the fair market value of the land. All agricultural leases are recommended to contain an escape clause that allows the city to terminate the lease should the land be needed for aeronautical purposes. Finally, lease rates are generally based on a fixed price per acre of land.

## SUMMARY

This master plan document addresses the airport's current operational activity and projected operational demand over the next 20 years. It also determines the recommended airfield and terminal area improvements to accommodate existing and anticipated demand. Combined, these findings and recommendations will allow the city to improve and expand the airport in a financially and operationally feasible manner as demand warrants throughout the 20-year planning period.

A

**LOCHNER**
BWR Division

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October 27, 2011

Mr. Charles Scott
Field Supervisor
U.S. Fish & Wildlife Service
Columbia Field Office
101 Park De Ville Drive #A
Columbia, MO 65203-0007

Re: Elton Hensley Memorial Airport (FTT)
City of Fulton, MO
Environmental Overview
MoDOT No. 10-040A-1/LOCHNER No. 010025701

Dear Mr. Scott:

An environmental overview is being prepared for the City of Fulton as part of the city's master plan update which includes airfield and terminal area expansion as well as property acquisition for the Elton Hensley Memorial Airport (FTT). Additional information pertinent to the project site includes the following:

- Geodetic Reference Point: 38-50-17.18 N, 92-00-09.33 W
- County: Callaway
- USGS 1:24,000 Topo Quad Name: Guthrie and Fulton
- Township/Township & Range/Section: West Fulton Township/T47N, R10W/ Sections 13, 23, 24 and 25
- Exhibit Nos. (enclosed) 4.1 and 4.2

To further assess and evaluate the preferred development alternative and proposed airport improvements, environmental coordination is being assembled based on the ultimate design concept as depicted in the enclosed exhibits. The major capital development projects submitted for purposes of assessing the existing site include:

- Taxiway system improvements and development;
- Terminal area expansion including hangar, terminal building and aircraft apron development; and
- Acquisition of approximately seven (7) acres in fee simple to the north of the airport.

An assessment of your analysis regarding compliance and permitting requirements pertaining to the above stated capital improvements would be greatly appreciated at your earliest possible convenience, preferably within thirty (30) days of receipt of this letter. Should you have any questions, comments, or require additional information please feel free to contact us at 800.748.8276.

Best regards,

**H.W. LOCHNER, INC.**

Mike Waller, CM
Project Manager, Aviation

Enclosure(s)

"The U.S. Fish and Wildlife Service (Service) has reviewed the proposed action and determined that no federally listed species, candidate species, or designated critical habitat occurs within the project area. Furthermore, the Service has determined that this action will have negligible impacts on wetlands, migratory birds, and other priority fish and wildlife resources."

Field Supervisor

11/8/11
Date

# CULTURAL RESOURCE ASSESSMENT
## Section 106 Review

RECEIVED
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**CONTACT PERSON/ADDRESS**

Mike Waller, CM
H.W. Lochner, Inc.
903 East 104th Street, Suite 900
Kansas City, Missouri 64131

**C:**

Peggy Casey, FHWA
Bob Reeder, MoDOT

**PROJECT:**

Elton Hensley Memorial Airport Airfield & Terminal Expansion, Fulton

**FEDERAL AGENCY**

**FHWA**

**COUNTY:**

**CALLAWAY**

**The State Historic Preservation Office has reviewed the information submitted on the above referenced project. Based on this review, we have made the following determination:**

☐ After review of initial submission, the project area has a low potential for the occurrence of cultural resources. A cultural resource survey, therefore, is not warranted.

☒ Adequate documentation has been provided (36 CFR Section 800.11). There will be "no historic properties affected" by the current project.

☐ An adequate cultural resource survey of the project area has been previously conducted. It has been determined that for the proposed undertaking there will be "no historic properties affected".

**For the above checked reason, the State Historic Preservation Office has no objection to the initiation of project activities. PLEASE BE ADVISED THAT, IF THE CURRENT PROJECT AREA OR SCOPE OF WORK ARE CHANGED, A BORROW AREA IS INCLUDED IN THE PROJECT, OR CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, APPROPRIATE INFORMATION MUST BE PROVIDED TO THIS OFFICE FOR FURTHER REVIEW AND COMMENT. Please retain this documentation as evidence of compliance with Section 106 of the National Historic Preservation Act, as amended.**

**By:** Mark A. Miles — **November 1, 2011**

**Mark A. Miles, Deputy State Historic Preservation Officer** — **Date**

**MISSOURI DEPARTMENT OF NATURAL RESOURCES**
**STATE HISTORIC PRESERVATION OFFICE**
**P.O. Box 176, Jefferson City, Missouri 65102**
**For additional information, please contact Judith Deel, (573) 751-7862. Please be sure to refer to the project number: 002-CY-12**

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DEC 05 2011

**Missouri Department of Conservation**

# Heritage Review Report

*November 7, 2011 -- Page 1 of 2*

**Policy Coordination Unit**
**P. O. Box 180**
**Jefferson City, MO 65102**
heritage.review@mdc.mo.gov
573-522-4115 X 3367

Mike Waller
Lochner
903 East 104th Street, Suite 900
Kansas City, MO 64131

| | |
|---|---|
| ***Project type:*** | Other - airport |
| ***Location/Scope:*** | T47N, R10W, S 13, 23, 24, 25 |
| ***County:*** | Callaway |
| ***Query reference:*** | Elton Hensley Memorial Airport |
| ***Query received:*** | November 2, 2011 |

Prepared by: Jan Syrigos

***This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project.*** *On-site verification is the responsibility of the project. Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at http://mdc.mo.gov/discover-nature/places-go/natural-areas and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx. Contact information for the department's Natural History Biologist is online at http://mdc.mo.gov/contact-us.*

## Level 3 (federal-listed) and Level 2 (state listed) issues:

### Records of listed species or critical habitats:

Heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, no state or federal endangered-list species records within one mile of the site.

*FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act.* ***Consult with*** *U.S. Fish and Wildlife Service, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132*

## Level 1 recommendations: Unlisted species/habitats tracked due to their rarity, but not listed as endangered or threatened or subject to special regulations.

The following record occurs in this section or adjacent sections: Bald eagle nesting site within ½ mile of the site.

- Bald eagle (*Haliaeetus leucocephalus*) nests are large and fairly easy to identify. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Work managers should be alert for nesting areas within 1500 meters of project activities, and follow federal guidelines at http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf. See also MDC's best management recommendations at http://mdc.mo.gov/87.

*The state tracks many species not listed as endangered, but sufficiently rare or challenged that special efforts to conserve them may be important to their survival and to avoid future listing. We encourage conservation of them if encountered. The Missouri Wildlife Code protects all wildlife species and it includes no special regulatory requirements for these.*

## General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- The project area is in region with known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in heritage records, and ones not noted here may be

encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area. See http://mdc.mo.gov/8452 for best management information.

- The proposed project occurs in the vicinity of "booming grounds", or courtship areas, for greater prairie chickens (*tympanuchus cupido*, state endangered). This grassland bird may nest and forage in grasslands several miles away from the booming ground. Prairie chickens may use grasslands in the project area. See http://mdc.mo.gov/130 for best management recommendations.
- Streams in the area should be protected from soil erosion, water pollution and in-stream activities that modify or diminish aquatic habitats. Best management recommendations relating to streams and rivers may be found at http://mdc.mo.gov/79. The project should be managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions. Revegetate areas in which the natural cover is disturbed to minimize erosion using native plant species compatible with the local landscape and wildlife needs. Pollutants, including sediment, can have significant impacts far downstream. Use silt fences and/or vegetative filter strips to buffer streams and drainages, and monitor those after rain events and until a well-rooted ground cover is reestablished.
- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≧104° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

*These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.*

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
STATE REGULATORY PROGRAM OFFICE - MISSOURI
221 BOLIVAR STREET, SUITE 103
JEFFERSON CITY, MISSOURI 65101

February 9, 2012

REPLY TO
ATTENTION OF:
Missouri State Regulatory Office
(NWK-2011-00141)

RECEIVED
FEB 14 2012

City of Fulton, Missouri
Elton Hensley Memorial Airport
c/o Mike Waller, CM
H. W. Lochner, Inc.
903 East 104th Street, Suite 900
Kansas City, Missouri 64131

Dear Mr. Waller:

This is in response to your request received on October 28, 2011 for an assessment of analysis regarding compliance and permitting requirements pertaining to the following proposed project: The City of Fulton's master plan update to the Elton Hensley Memorial Airport which includes airfield and terminal area expansion and property acquisition. The master plan update includes taxiway system improvements and development, terminal area expansion including hanger, terminal building and aircraft apron development, and acquisition of approximately seven (7) acres in fee simple to the north of the airport. The project is located in Sections 13, 23, 24, and 25, Township 47 north, Range 10 west, Callaway County, Missouri.

We have reviewed the information furnished and have determined that the proposed activity will not involve the discharge of dredged or fill material in waters of the United States. Therefore, Department of the Army permit authorization is not required. Other Federal, state and/or local permits may be required, however, and you should verify this yourself.

The Corps of Engineers has jurisdiction over all waters of the United States. Discharges of dredged or fill material in waters of the United States, including wetlands, require prior authorization from the Corps under Section 404 of the Clean Water Act (33 USC 1344). The implementing regulation for this Act is found at 33 CFR 320-332.

Mr. Jon R. Miller reviewed the information furnished and made this determination. If you have any questions concerning this matter, please feel free to contact Mr. Miller at telephone number 816-389-3828 (FAX – 573-634-7960). Please reference Permit No. 2011-00141 in all comments and/or inquiries relating to this project.

Enclosure
Copies Furnished (electronically wo/enclosure)
Missouri Department of Natural Resources,
Water Protection Program
Missouri Department of Conservation

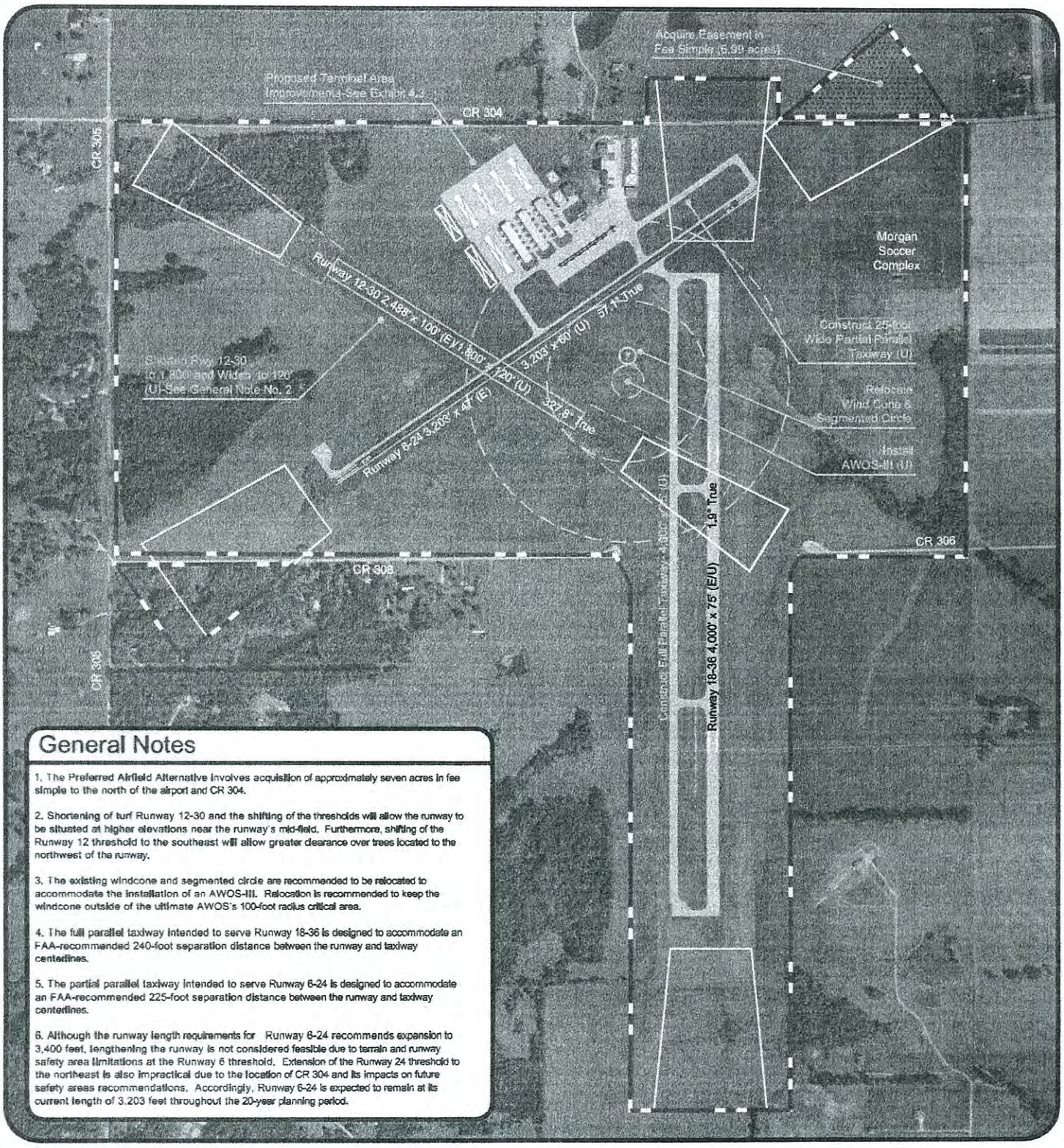
LOCHNER
BWR Division
903 East 104th Street | Suite 900 | Kansas City, Missouri 64131-3451
800.748.6276 | www.hwlochner.com

# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 4.1

**Preferred Airfield Development Alternative**




## General Notes

1. The Preferred Airfield Alternative involves acquisition of approximately seven acres in fee simple to the north of the airport and CR 304.

2. Shortening of turf Runway 12-30 and the shifting of the thresholds will allow the runway to be situated at higher elevations near the runway's mid-field. Furthermore, shifting of the Runway 12 threshold to the southeast will allow greater clearance over trees located to the northwest of the runway.

3. The existing windcone and segmented circle are recommended to be relocated to accommodate the installation of an AWOS-III. Relocation is recommended to keep the windcone outside of the ultimate AWOS's 100-foot radius critical area.

4. The full parallel taxiway intended to serve Runway 18-36 is designed to accommodate an FAA-recommended 240-foot separation distance between the runway and taxiway centerlines.

5. The partial parallel taxiway intended to serve Runway 6-24 is designed to accommodate an FAA-recommended 225-foot separation distance between the runway and taxiway centerlines.

6. Although the runway length requirements for Runway 6-24 recommends expansion to 3,400 feet, lengthening the runway is not considered feasible due to terrain and runway safety area limitations at the Runway 6 threshold. Extension of the Runway 24 threshold to the northeast is also impractical due to the location of CR 304 and its impacts on future safety areas recommendations. Accordingly, Runway 6-24 is expected to remain at its current length of 3,203 feet throughout the 20-year planning period.

*Source:* Woolpert, Inc., aerial photo.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

**Legend**

- Existing Property Line -
- Ultimate Property Line -
- Existing Avigation Easement -
- Ultimate Paved Surfaces-

city of Fulton
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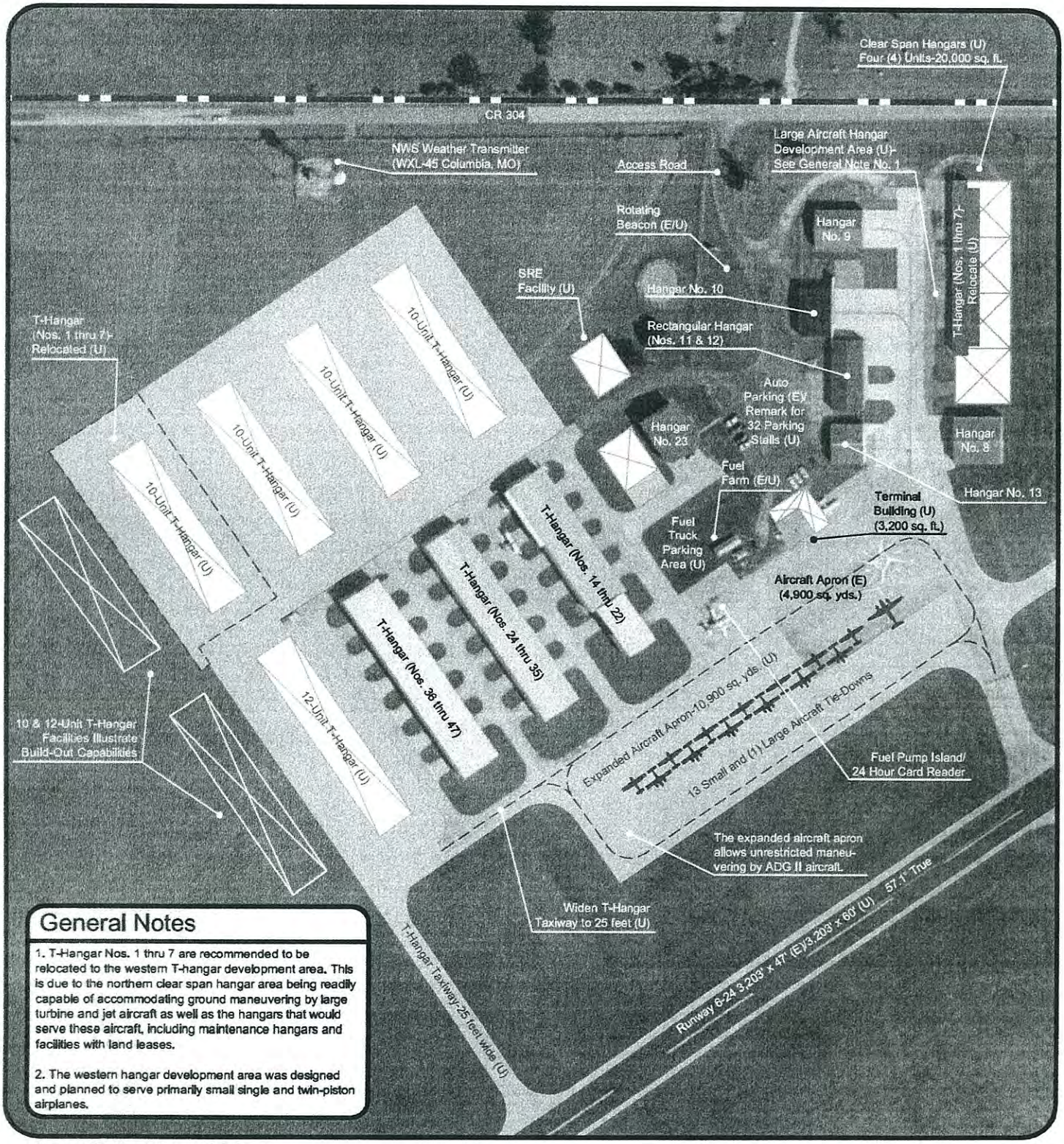
# ELTON HENSLEY MEMORIAL AIRPORT (FTT)

**City of Fulton, Missouri**

## Exhibit 4.3

**Preferred Terminal Area Development Alternative**




## General Notes

1. T-Hangar Nos. 1 thru 7 are recommended to be relocated to the western T-hangar development area. This is due to the northern clear span hangar area being readily capable of accommodating ground maneuvering by large turbine and jet aircraft as well as the hangars that would serve these aircraft, including maintenance hangars and facilities with land leases.

2. The western hangar development area was designed and planned to serve primarily small single and twin-piston airplanes.

*Source:* Woolpert, Inc., aerial photo.

N

Township 47 N, Range 10 W
West Fulton Township
Sections 13, 23, 24 and 25
NOT TO SCALE

**Legend**

Existing Property Line -
Ultimate Paved Surfaces-

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