



## 7. RECOMMENDED PLAN

### 7.1 Introduction

Investment in airports included in the Missouri state system will be needed to meet the facility and service objectives outlined in the Missouri State Airport System Plan. This investment will elevate performance of the state airport system relative to the established objectives. Projects identified through the System Plan analyses are those considered desirable to raise the performance bar for Missouri's airport system.

Development costs presented in this chapter were estimated for each study airport by comparing existing airport facilities to System Plan objectives for facilities and services, and are associated with actions to resolve the facility and service deficiencies identified in **Chapter 6**. Objectives used in this analysis are applicable to each airport's recommended role in the state system; recommended roles for each airport are described in **Chapter 5**.

Also presented in this chapter are projects and costs identified in current airport-specific Capital Improvement Plans (CIPs), as they have been submitted to MoDOT. It is important to note that because airport-specific CIPs are updated annually, these projects will change accordingly. Projects and costs from MoDOT's most recent Statewide Pavement Management Plan are also included in this chapter. The costs from airport CIPs and the Pavement Management Plan were considered to provide a more holistic view of total funding needs over the next five years, assuming all study objectives and funding requests are met. It is important to note that CIP requests have not been reviewed for their funding eligibility, feasibility, or relative priority. Inclusion of CIP projects in this document does not signify acceptance or approval of these projects by either MoDOT or FAA.

An airport report card has been developed for each airport that summarizes projects and costs from the System Plan, the airport's current CIP, and the Statewide Pavement Management Plan; report cards are presented in **Appendix D**. For all system airports, the goal is to move projects identified by the System Plan and the Pavement Management Plan into the airport's individual CIP.

As part of this step in the system planning process, projects from the System Plan, all CIPs, and the Pavement Management Plan were reconciled to avoid duplication, as possible, of projects and costs. The final total development cost for each airport is a compilation of costs from the sources noted. The recommended plan identifies anticipated near term (five-year) financial needs for Missouri's airport system. Over the next five years, it is also likely that study airports will have the need for projects and costs not captured in this System Plan.

The System Plan is a high-level planning document that provides general recommendations for development of Missouri's airport system. Actual airport development depends on implementation by the local airport sponsor, with support from state and/or federal agencies. Cost estimates for the system planning projects have been developed to a general planning, not engineering, level of detail. Costs to implement system planning projects are based on current airport development costs that are typical in Missouri. It is possible that costs to implement projects identified in the System Plan could vary when projects are bid for construction.

It is important to note that the inclusion of a project in the System Plan does not constitute a commitment from MoDOT or the FAA to fund any of the identified projects. Projects that are eligible for funding may require additional steps before they can be implemented. For example, projects that are implemented with FAA funding must be on the airport's approved Airport Layout Plan (ALP). In some cases, system planning projects may require an environmental assessment, as required by the National Environmental Policy Act and Special Purpose Laws. Other projects may also require FAA airspace review prior to implementation. Any project recommended by the System Plan should be considered for inclusion in each airport's next master plan or CIP.



## 7.2 System Plan Recommendations Summary

This update to Missouri's State Airport System Plan has taken a comprehensive look at how the system is performing based on current conditions. The evaluation identified various actions and projects that are desirable to improve the performance of the Missouri airport system. These recommendations are summarized in this section.

### 7.2.1 NPIAS Airport Recommendations

A review of current airport roles was conducted as part of the System Plan update. This review included airports in the state system that are not included in FAA's federal airport system. Airports included in the federal airport system are included in the National Plan of Integrated Airport Systems (NPIAS).

Of the 107<sup>1</sup> airports in Missouri's state airport system, 32 airports are not included in the NPIAS. **Chapter 5** provides comprehensive information on all factors FAA considers when an airport is considered for entry into the NPIAS. There are many factors and criteria that an airport must demonstrate in order for FAA to consider the airport a NPIAS candidate.

Inclusion of an airport in the NPIAS indicates the importance of the airport to the federal airport system, and inclusion makes the airport eligible to compete for FAA funding. Basic NPIAS inclusion factors include a public sponsor, at least 10 based aircraft, and the airport needs to be 30 miles from the closest NPIAS airport. There are, however, many more detailed and complex factors that FAA considers when FAA reviews an airport for NPIAS inclusion.

The System Plan included a high-level review of Missouri airports not currently included in the NPIAS, which showed the four airports listed below currently meet both the activity and the distance criteria for NPIAS inclusion. That is not to say that these airports meet all FAA criteria for NPIAS conclusion, but on the highest level, these airports appear to warrant further review for their ability to meet all NPIAS inclusion criteria. As part of the continuous planning process, the sponsors of these airports would need to work with FAA to conduct additional review/feasibility to determine if in fact the airports are candidates for NPIAS inclusion.

- M. Graham Clark - Downtown (PLK)
- Carrollton Memorial (K26)
- Doniphan Municipal (X33)

Additionally, it has been recently reported that the number of based aircraft at the Ava Bill Martin Memorial Airport (AVO) has increased to 10, making this airport potentially eligible for NPIAS consideration.

The following airports meet the distance criteria, but currently do not meet the activity criteria (10 or more based aircraft):

- Hermann Municipal (63M)
- Stockton Municipal (MO3)
- Unionville Municipal (K43)

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<sup>1</sup> The System Plan included 107 study airports; these airports represent Missouri's public-use airports. It is important to note that there are many other airports in Missouri, but these airports are private-use and were therefore not included in the system planning analysis.



These airports should be on a “watch list” to monitor their levels of based aircraft. Should based aircraft at these airports increase to the prerequisite level, they should be reviewed again for their ability to meet all FAA NPIAS entry criteria.

## 7.2.2 Recommendations to Enhance System Performance

The Missouri airport system was evaluated using a set of comprehensive measures that helped to show how the system is currently performing in terms of accessibility to certain types of airports or airport facilities. The performance measures used to evaluate Missouri’s airport system include:

- 60-minute accessibility to an airport with scheduled commercial airline service
- 90-minute accessibility to an airport with scheduled commercial airline service
- 30-minute accessibility to an airport with any published approach
- 30-minute accessibility to an airport with an approach with vertical guidance (precision approach/LPV)
- 30-minute accessibility to an airport with weather advisory reporting
- 30 and 45-minute accessibility to an airport meeting selected National Business Aviation Association (NBAA) Business Airport characteristics

Potential changes in future system performance are discussed here.

**Accessibility to airports with scheduled commercial airline service:** The results of the system evaluation, documented in **Chapter 4**, reviewed accessibility to airports that currently have scheduled commercial airline service. This evaluation included an accessibility evaluation at both 60- and 90-minute drive times. At a 60-minute drive time, current accessibility to all airports in Missouri with scheduled airline service was measured at 80.9 percent of all residents. Current accessibility at a 90-minute drive time to Missouri airports with more than one carrier was measured at 85.5 percent.

National trends in the commercial airline industry warrant consideration for their potential to impact these accessibility ratings. To be more efficient, carriers are moving to aircraft with higher seating capacities. This trend could have impacts on smaller commercial air service markets, most often those that are served only by a single carrier. These are the markets where carriers are now typically operating aircraft that have the fewest number of seats. The trend toward larger commercial aircraft could result in carriers having operational fleets that are not “right-sized” to serve small markets. In other words, some markets may have too few enplaning passengers to make flights profitable for carriers operating larger aircraft; load factors could drop to unprofitable levels.

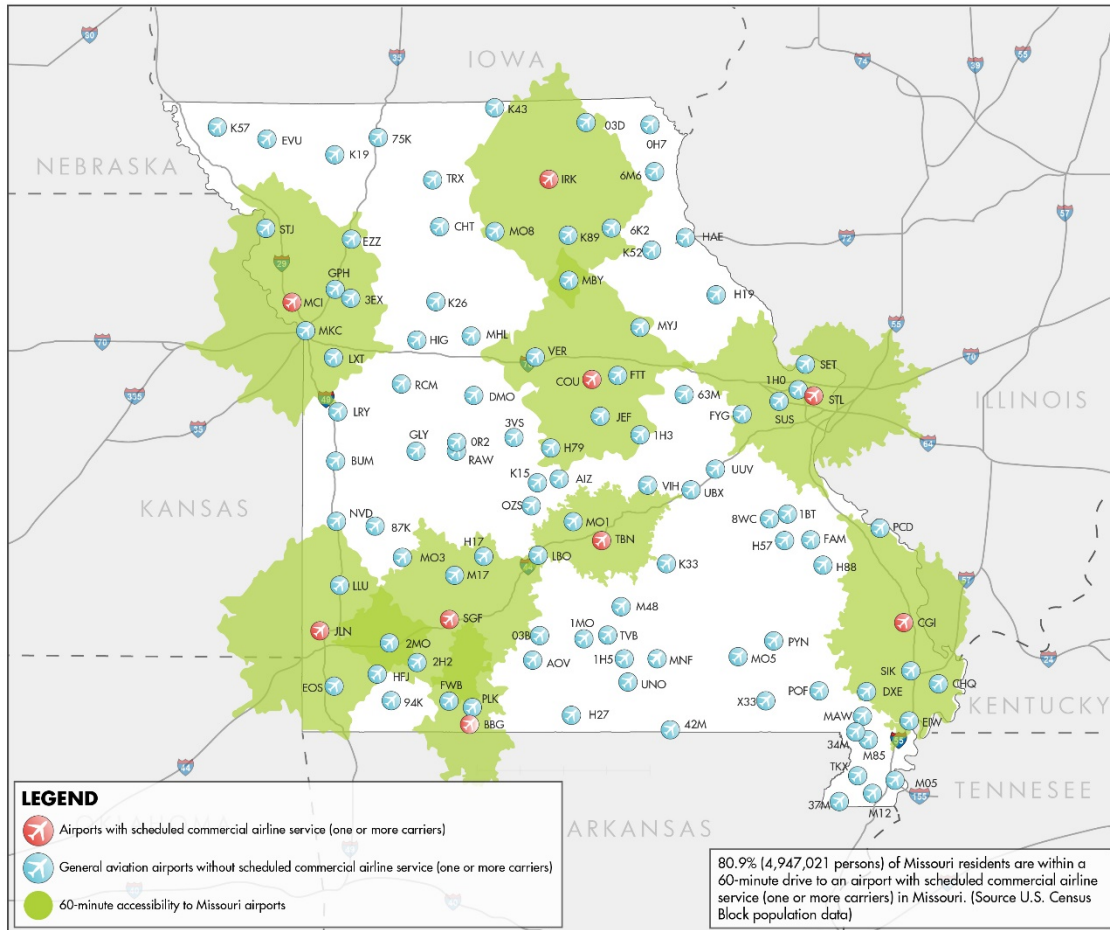
Another potentially concerning trend is a shortage in commercial airline pilots. Some industry experts believe that as older commercial pilots retire, there are not enough trained/certified commercial pilots to move into the vacated positions. If there is a pilot shortage, airlines will almost always opt to serve higher density markets where they can generate more revenue. This trend could have an adverse impact on small/single carrier markets.

In recent years, airlines have cut costs and increased their revenue streams, charging separately for items ranging from checked and carry-on bags to preferential seating assignments. There is no reason to believe that the airlines will not continue to seek cost-cutting measures, especially in light of rising fuel prices. Proportionally, carriers make less in small markets, another circumstance that could adversely impact single carrier airports/markets.



Current 60-minute drive time accessibility to Missouri airports with commercial airline service at 80.9 percent. Should commercial airports in Missouri with a single carrier lose their scheduled airline service, the accessibility rating would drop to 72.2 percent. **Figure 7-1** shows current accessibility, while **Figure 7-2** shows the impact of potential service reductions if single carrier airports lost all commercial airline service.

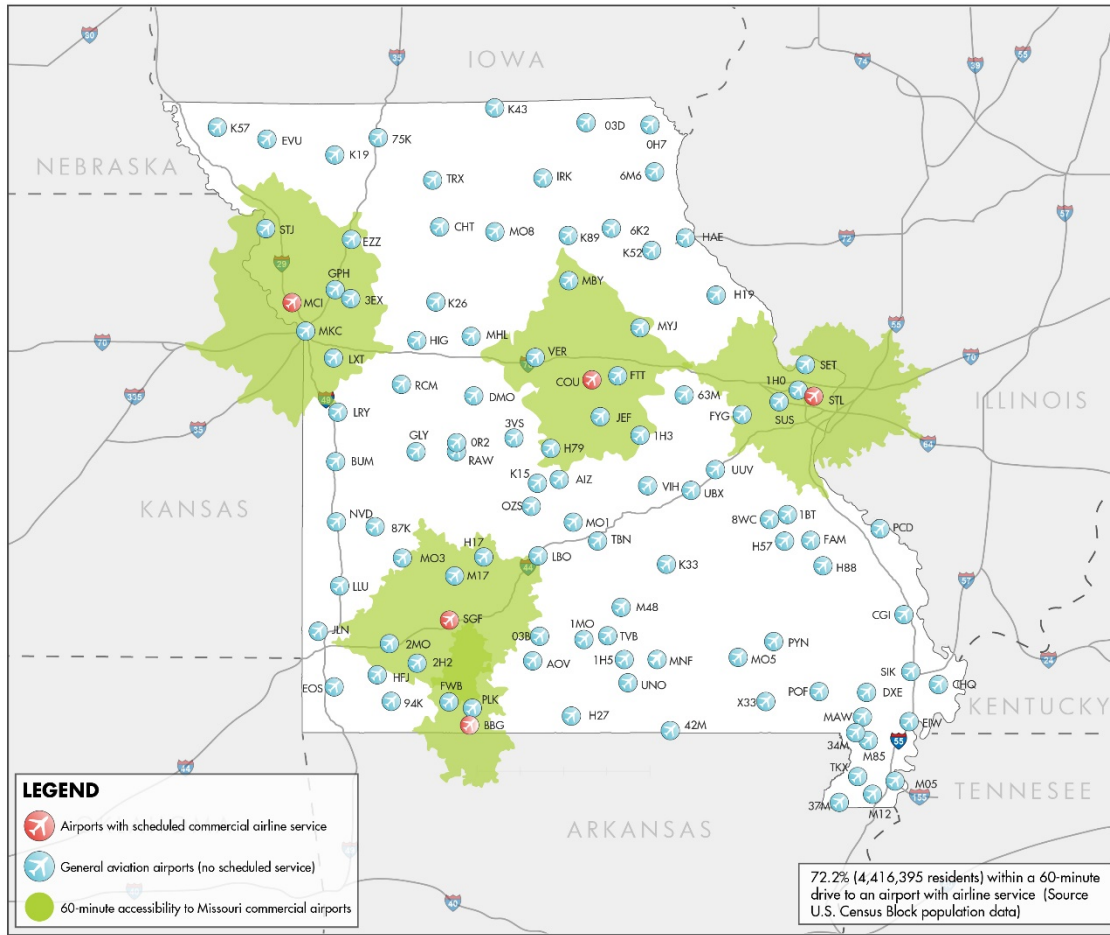
FIGURE 7-1: CURRENT ACCESSIBILITY TO MISSOURI COMMERCIAL AIRPORTS (60-MINUTE DRIVE TIME)



Source: Jviation mapping analysis



FIGURE 7-2: POTENTIAL REDUCTION IN MISSOURI COMMERCIAL AIRPORT ACCESSIBILITY WITH LOSS OF SINGLE CARRIER AIRPORTS (60-MINUTE DRIVE TIME)



Source: Jviation mapping analysis

In the deregulated commercial airline environment, there is little that the state or individual communities can do to reverse airline decisions that are based on profitability. Air service is a local/community issue; the best defense to prevent a loss of scheduled airline service is to use the existing service offered in the local community, rather than driving to a more distant commercial airport. This is the most important message related to the information shown in **Figure 7-2**.

Based on input from the study’s PAC, there are other potential outfalls from the trends of increasing size of commercial aircraft and the looming shortage of commercial airline pilots. Missouri airports that have traditionally accommodated smaller commercial aircraft may not have the airfield characteristics (runway length, runway width, and appropriate separations) needed to accommodate larger commercial aircraft. As the airlines move to larger equipment types, some airports may have the need for major improvement projects to accommodate the changing airline fleet. If this is the case, these airports could be faced with projects requiring significant financial investment. Also, the PAC noted that there is the potential for a significant “trickle down” from the pilot shortage. Corporate pilots now have a greater opportunity to move to a position with the commercial airlines, potentially resulting in a shortage of corporate pilots, which would have a negative impact on business flying. The industry needs to find a way to address the shortage in the pipeline for pilots.



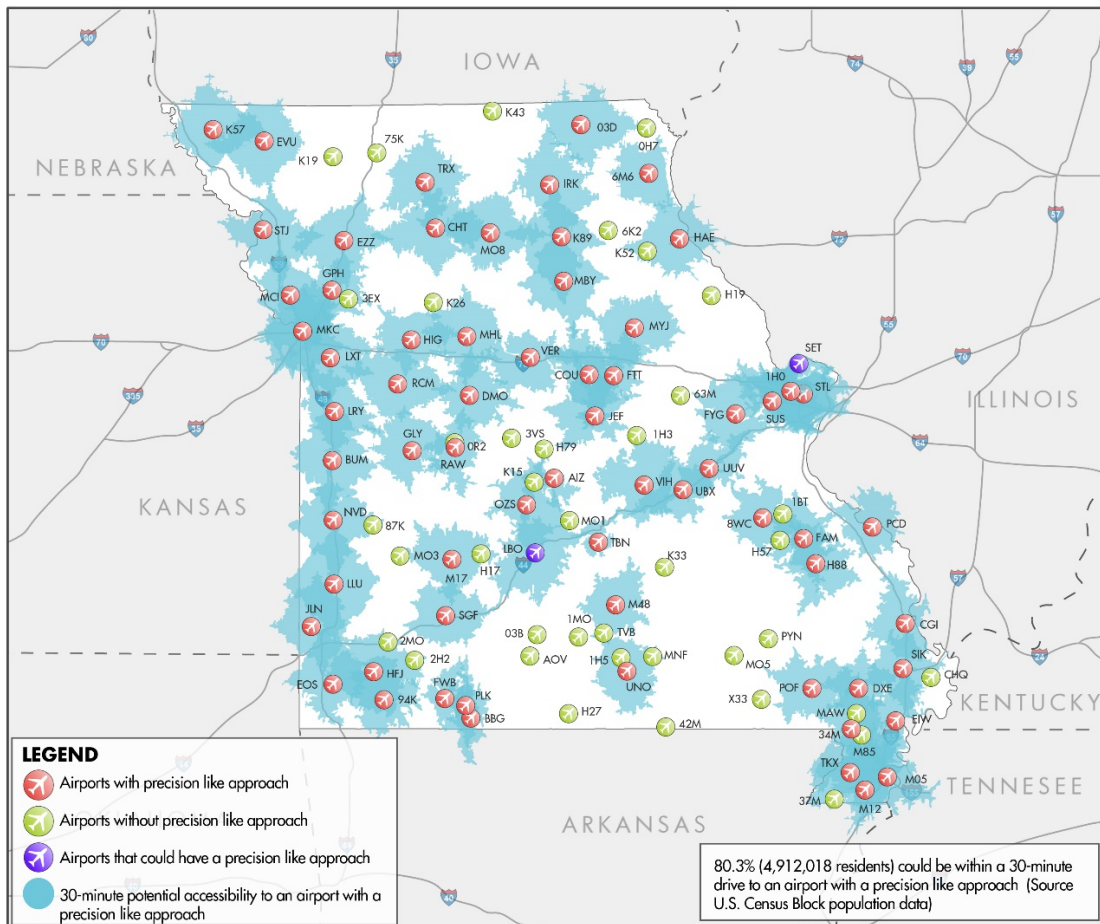


**Accessibility to an airport with a published approach:** System Plan objectives call for all Commercial, National Business, Regional Business, and Business Community airports to have some type of published approach. Analysis shows that all airports in these role categories currently have some type of published approach, and therefore meet study objectives. This is not to say that additional airports in the Community Local role will not be equipped with a published approach in the coming years, but objectives for this measure are currently satisfied.

**Accessibility to an airport served by an approach with vertical guidance (ILS or LPV):** System Plan objectives indicate that all airports assigned to the Commercial, National Business, and Regional Business roles should be served by an approach with vertical guidance. Currently, almost all airports assigned to these roles have an approach with vertical guidance; in order for all airports to meet this objective, two airports, Floyd W. Jones Lebanon and St. Charles County Smartt Field, would need an approach supported by vertical guidance.

Current accessibility at a 30-minute drive time to airports with a vertical approach was measured at 79.7 percent. If the two airports noted above meet their objective for an approach with vertical guidance, this accessibility rating would increase to 80.3 percent. **Figure 7-3** depicts additional accessibility if all airports meet their objective for an approach with vertical guidance.

FIGURE 7-3: POTENTIAL ACCESSIBILITY TO A MISSOURI AIRPORT WITH A PRECISION-LIKE APPROACH (30-MINUTE DRIVE TIME)



Source: Jviation mapping analysis

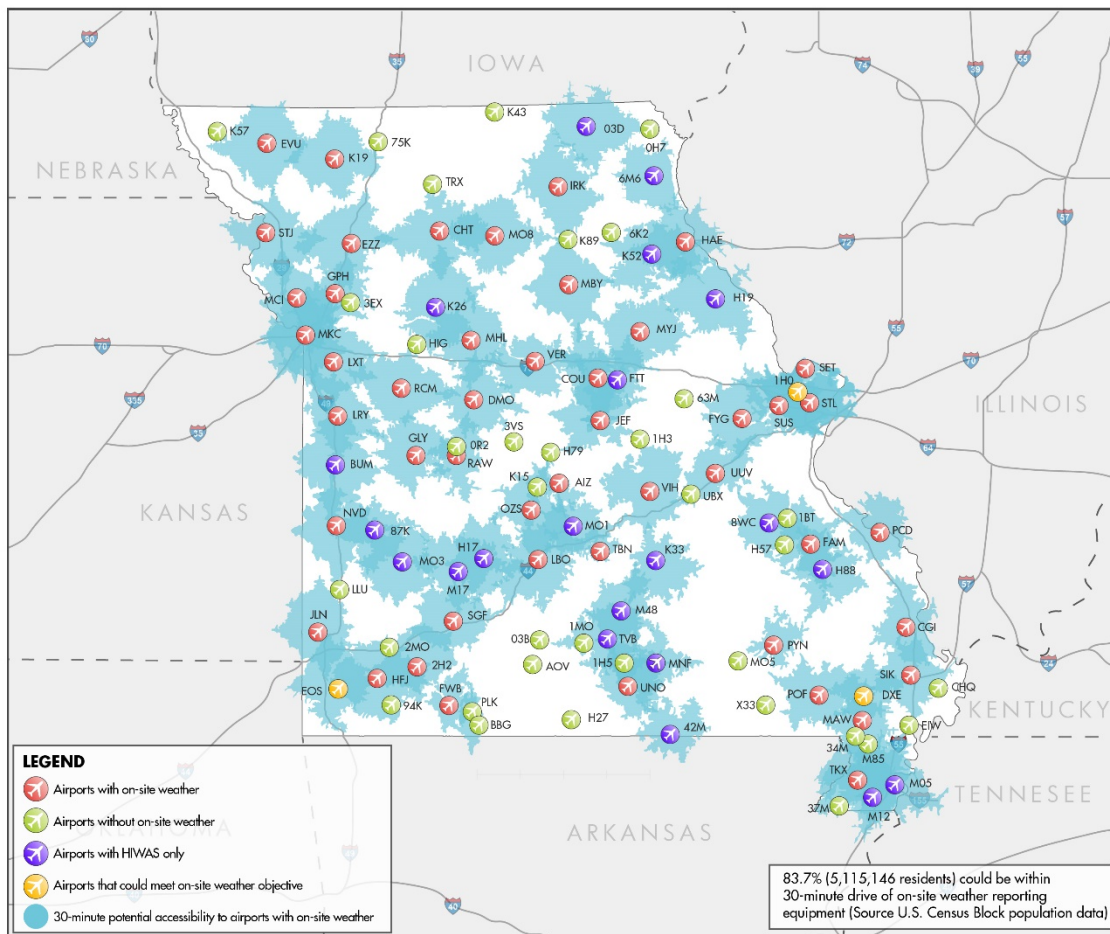


As discussed in **Chapter 6**, approach and departure capabilities for some airports in southeast Missouri are limited by insufficient communications capabilities. It is recommended that airports in the affected area and MoDOT work together with FAA to resolve the noted communications deficiencies.

**Accessibility to airports with weather advisory reporting:** System Plan objectives call for all Commercial, National Business, and Regional Business airports to be have weather reporting capabilities. Currently, almost all airports in these three categories have weather advisory reporting capabilities. Only four airports in the Regional Business category (Bolivar Municipal, Dexter Municipal, Neosho Hugh Robinson and Creve Coeur), need weather advisory reporting capabilities to meet this objective.

**Figure 7-4** depicts increased accessibility that would result should these additional airports have weather advisory reporting capabilities; accessibility would increase to 83.7 percent. Current accessibility is 82.6 percent.

FIGURE 7-4: POTENTIAL ACCESSIBILITY TO A MISSOURI AIRPORT WITH WEATHER REPORTING (30-MINUTE DRIVE TIME)



Source: Jviation mapping analysis

**Accessibility to airports meeting NBAA business airport characteristics:** Having airports that meet the needs of business users is important to the state and local economies. To determine system adequacy as it relates to business/economic support, characteristics of business airports as published by NBAA with input from their



members were used. NBAA business airport characteristics used in Missouri’s system adequacy analysis are outlined in **Chapter 4**.

Two sets of business airport characteristics were examined for the System Plan. One set considered business airport characteristics to meet the needs of light business jets, and the other considered characteristics for medium business jets, as defined in the NBAA guidelines. For both light and medium business jets, a number of factors were considered to determine if the airport currently meets NBAA business airport characteristics.

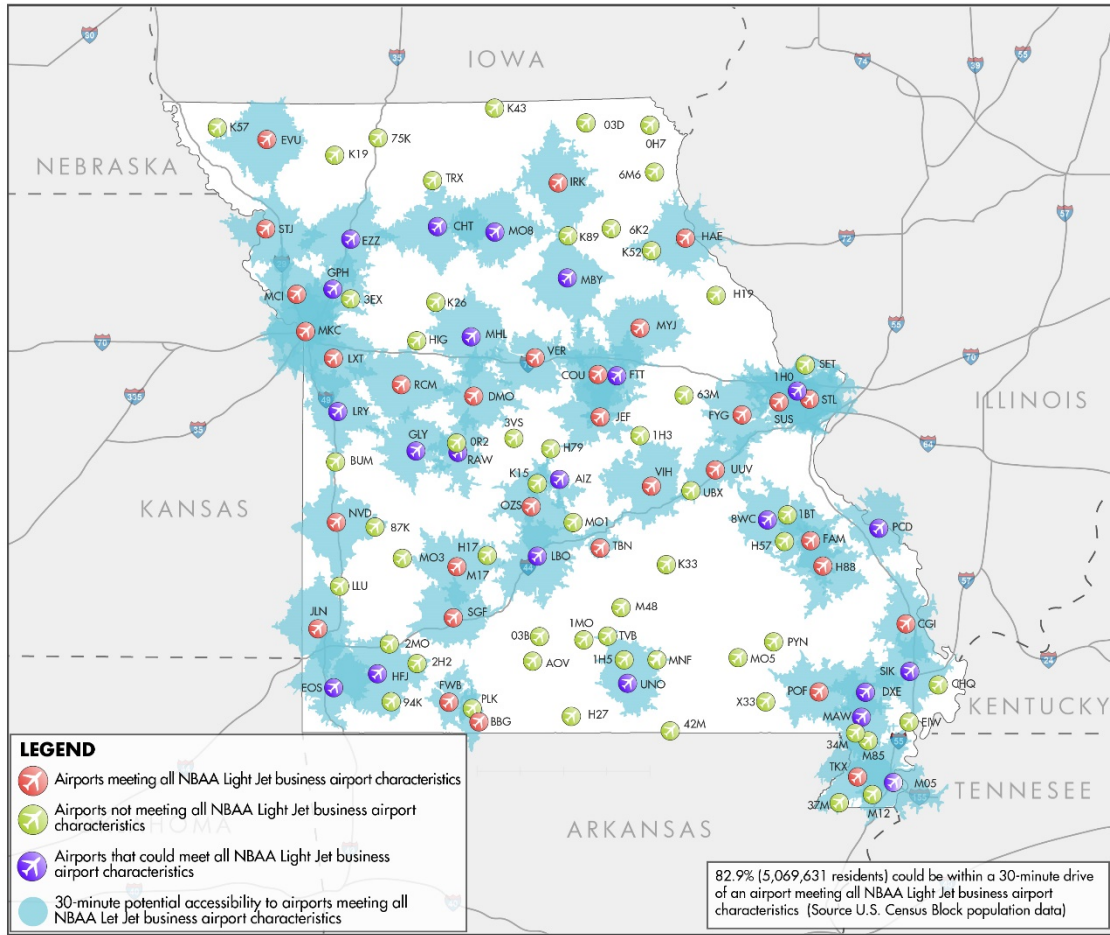
Each airport has specific facility and service objectives based on their recommended role in Missouri’s state airport system. Analysis was undertaken for the recommended plan to determine how system performance would improve if all airports in the state system would meet all of their associated facility/service objectives. This analysis involved a three-step process. First, analysis was undertaken to determine how system performance could improve related to accessibility to airports meeting light NBAA business jet characteristics; this analysis was completed at a 30-minute drive time. Then, analysis was undertaken to determine how system performance could improve related to accessibility to airports meeting medium NBAA business jet characteristics. The medium business jet accessibility analysis considered a 45-minute drive time. Finally, potential accessibility to airports meeting both light and medium business jet business airport was measured.

If all airports meet their System Plan facility and service objectives, accessibility to airports meeting NBAA business airport characteristics for light business jets could increase. For light business jets (considering a 30-minute drive time), accessibility could improve from a current accessibility rating of 70.9 percent to a future accessibility rating of 82.9 percent. **Figure 7-5** shows potential increased accessibility to airports exhibiting NBAA light business jet characteristics.





FIGURE 7-5: POTENTIAL ACCESSIBILITY TO NBAA BUSINESS READY LIGHT JET AIRPORTS (30-MINUTE DRIVE TIME)

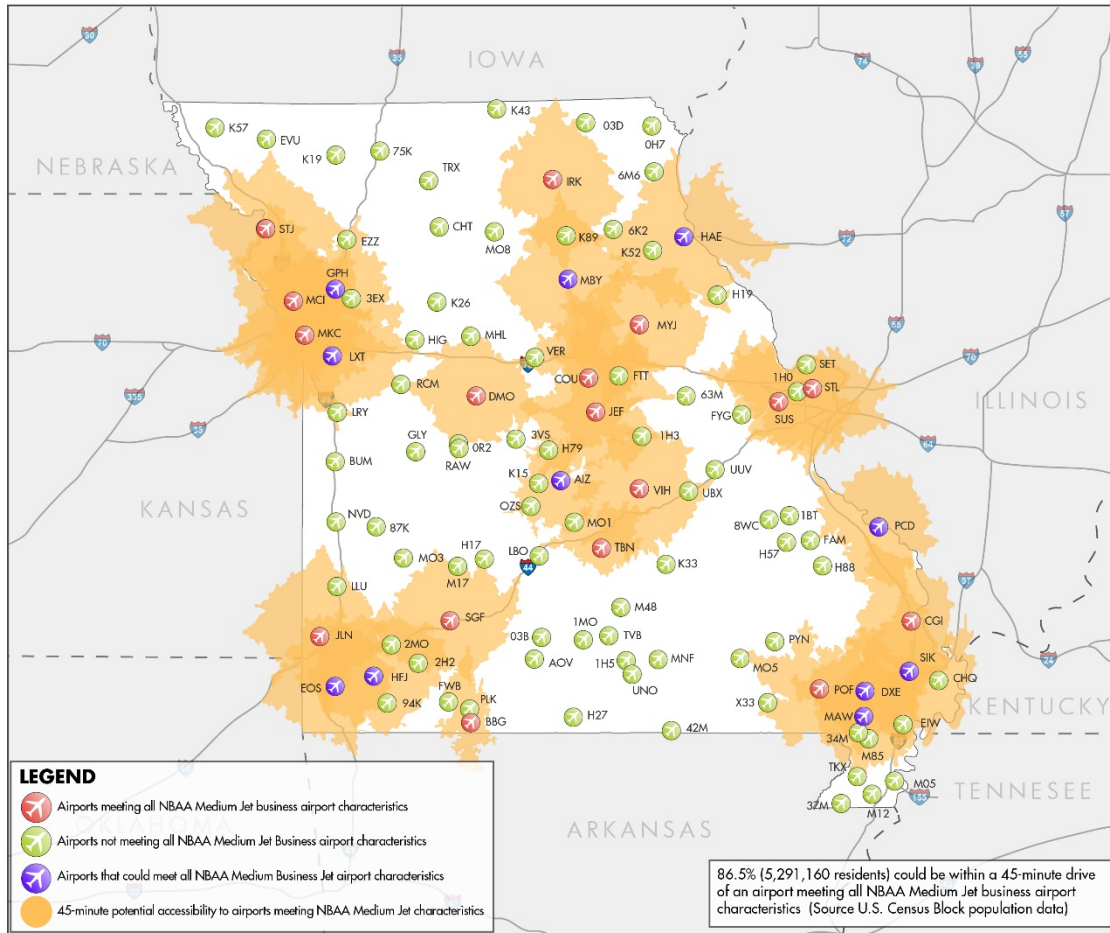


Source: Jviation mapping analysis

If all airports meet their System Plan facility and service objectives, 45-minute drive time accessibility to airports meeting NBAA business airport characteristics for medium business jets could increase from a current accessibility rating of 77.8 percent to a future accessibility rating of 86.5 percent. **Figure 7-6** shows potential increased accessibility to airports exhibiting NBAA medium business jet characteristics.



FIGURE 7-6: POTENTIAL ACCESSIBILITY TO NBAA BUSINESS READY MEDIUM JET AIRPORTS (45-MINUTE DRIVE TIME)

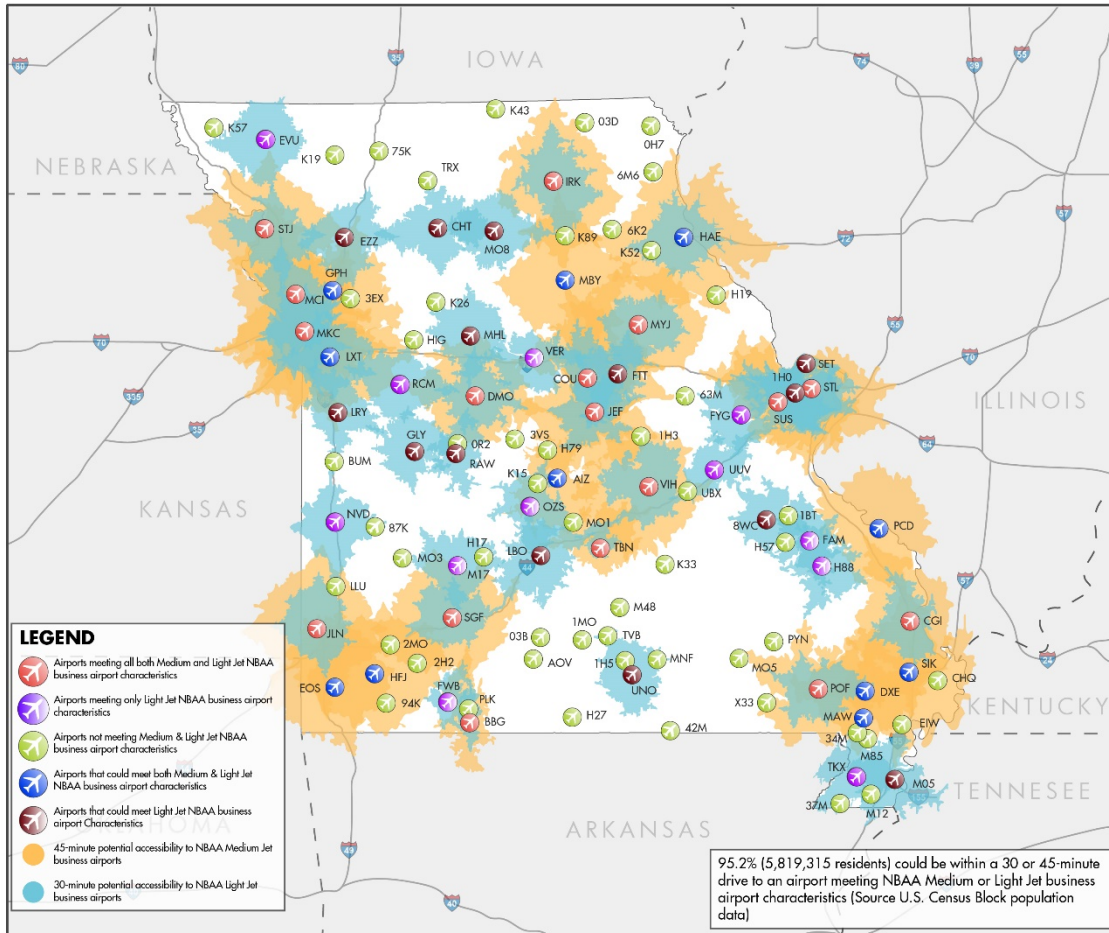


Source: Jviation mapping analysis

If all airports meet their System Plan facility and service objectives, accessibility to airports meeting NBAA business airport characteristics for both light and medium business jets could also improve from a current accessibility rating of 84.6 percent to a future accessibility rating of 95.2 percent. **Figure 7-7** shows potential increased accessibility to airports exhibiting NBAA medium and light business jet characteristics.



FIGURE 7-7: POTENTIAL ACCESSIBILITY TO NBAA BUSINESS READY LIGHT AND MEDIUM JET AIRPORTS (30- AND 45-MINUTE DRIVE TIMES)



Source: Jviation mapping analysis

Shown below are the additional airports that could meet light and medium NBAA business airport characteristics, assuming that these airports are improved to meet all applicable facility and service objectives for their respective recommended role in the state airport system.

Additional Airports Potentially Meeting NBAA Light Jet Business Airport Characteristics:

- North Central Missouri Regional
- Cameron Memorial
- Caruthersville Memorial
- Chillicothe Municipal
- Clinton Regional
- Elton Hensley Memorial
- Lawrence Smith Memorial
- Floyd W. Jones Lebanon
- Marshall Memorial Municipal



- Washington County
- St. Charles County Smartt Field
- Creve Coeur Airport
- Warsaw Municipal
- West Plains Regional

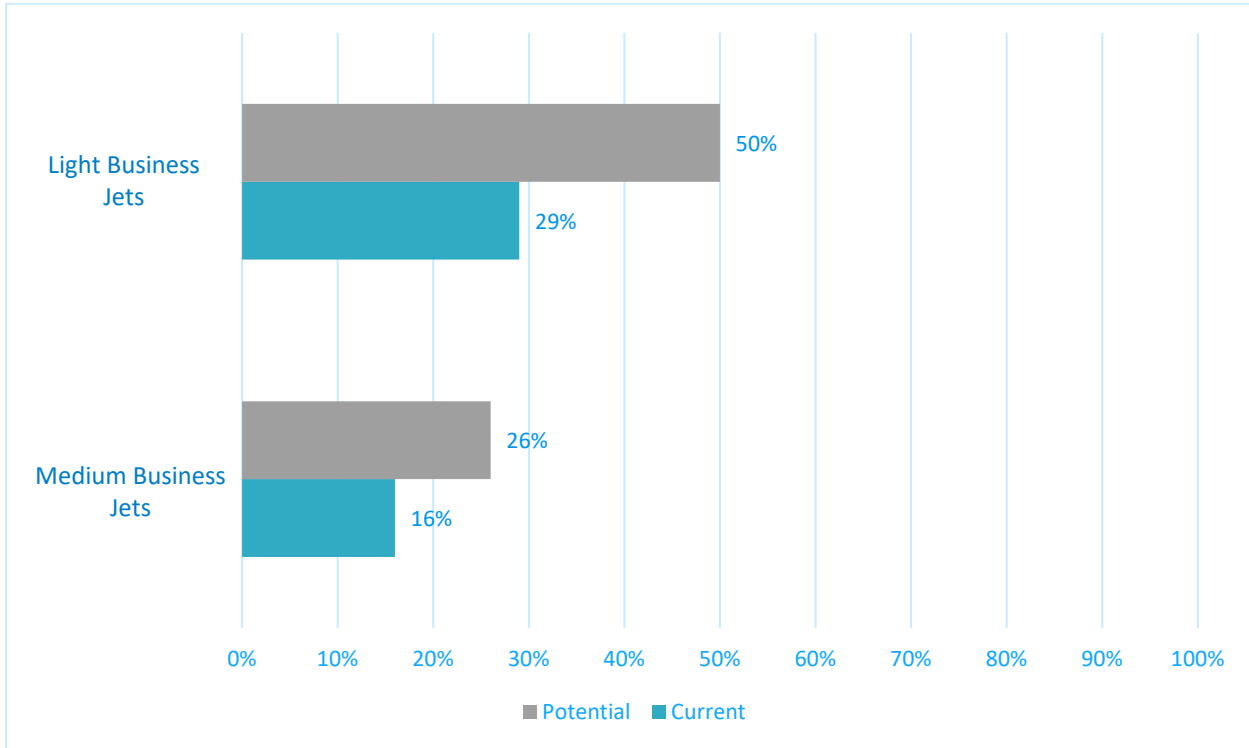
Additional Airports Potentially Meeting NBAA Medium Jet Business Airport Characteristics:

- Dexter Municipal
- Hannibal Regional
- Lee C Fine Memorial
- Lee's Summit Municipal
- Malden Regional
- Omar N Bradley
- Monett Regional
- Midwest National Air Center
- Neosho Hugh Robinson
- Perryville Regional
- Sikeston Memorial Municipal

As shown in **Figure 7-8**, 29 percent of all system airports currently meet all NBAA characteristics for a business airport for light business jets. If all airports meet their facility and service objectives, this could increase to 50 percent. For airports meeting all NBAA characteristics for medium business jets, 16 percent of all system airports currently have these characteristics. If Missouri airports are improved to meet all applicable facility and service objectives, this could increase to 26 percent.



FIGURE 7-8: POTENTIAL SYSTEM INCREASE FOR ACCESSIBILITY TO AIRPORTS THAT MEET NBAA BUSINESS AIRPORT CHARACTERISTICS



Source: Jviation analysis

As this information shows, implementing recommendations identified in this System Plan would result in notable improvement for airports capable of supporting the needs of business-related aircraft. Improving system airports to meet their applicable facility/service objectives is important to improving the role that Missouri airports play in terms of economic support.

### 7.2.3 Recommended Airport System

This System Plan placed considerable focus on determining recommended roles for all system airports. Each airport’s assigned role determines its facility/service objectives. Airports were assigned to one of the following roles:

- Commercial
- National Business
- Regional Business
- Business Community
- Community Local

The National Business role was newly created based on input from the study’s Project Advisory Committee. This role was established in recognition of the growing number of large business jets in the general aviation fleet. A full discussion of recommend airport roles is presented in **Chapter 5. Figure 7-9** shows recommended roles for all Missouri airports included in the state airport system.







percent compliant with its associated facility/service objectives in order to fulfill its recommended role in the state airport system.

In some instances, local needs may support facilities and services that exceed the minimum objectives established by the System Plan, while in others, constraints may keep airports from meeting the objectives. As practical, projects to address airport system deficiencies identified in the airport's report card should be considered and incorporated into future local master planning efforts. Projects identified in the System Plan must undergo state and FAA review for their funding eligibility. Inclusion of a project in the System Plan does not guarantee a commitment for either state or federal funding for the project.



TABLE 7-1: SUMMARY OF FACILITY AND SERVICES OBJECTIVE PERFORMANCE BY ROLE

Facility Type	Commercial		National Business		Regional Business		Business Community		Community Local	
	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective
ARC	C-II	89%	B-II	100%	B-II	92%	B-II	54%	A-I	100%
Runway Length	6,000'	100%	5,500'	91%	5,000'	56%	4,000'	67%	Maintain existing	N/A
Runway Width	100'	100%	100'	91%	75'	100%	75'	67%	60' for NPIAS - Maintain existing for Non-NPIAS	- 21% - N/A
Taxiway System	Full Parallel	89%	Full Parallel	82%	Full Parallel	80%	Turnaround both ends	88%	Turnaround both ends	89%
NAVAIDS	- Rotating Beacon	- 100%	- Rotating Beacon	- 100%	- Rotating Beacon	- 100%	- Rotating Beacon	- 100%	- Rotating Beacon	- 68%
	- Lighted Wind Cone	- 100%	- Lighted Wind Cone	- 82%	- Lighted Wind Cone	- 88%	- Lighted Wind Cone	- 100%	- Lighted Wind Cone	- 58%
	- Segmented Circle	- 100%	- Segmented Circle	- 100%	- Segmented Circle	- 100%	- Segmented Circle	- 100%	- Segmented Circle	- 100%
	- REILS	- 100%	- REILS	- 73%	- REILS	- 72%	- REILS	- 42%	- REILS	- 100%
	- VGSI (PAPI/VASI)	- 67%	- VGSI (PAPI/VASI)	- 91%	- VGSI (PAPI/VASI)	- 96%	- VGSI (PAPI/VASI)	- 67%	- VGSI (PAPI/VASI)	- 100%
Approach	Precision	100%	Precision-Like Approach (ILS or LPV)	100%	Precision-Like Approach (ILS or LPV)	92%	Non-Precision	100%	Visual	100%
Lighting	- HIRL	- 100%	- HIRL	- 55%	- MIRL	- 100%	- MIRL	100%	LIRL (MIRL for new projects)	89%
	- MITL	- 100%	- MITL	- 73%	- MITL	- 28%	MIRL	100%		
	- ALS	- 100%	AWOS/ASOS	100%	AWOS/ASOS	84%	Not an objective	N/A		
Weather	AWOS/ASOS	100%	AWOS/ASOS	100%	AWOS/ASOS	84%	Not an objective	N/A	Not an objective	N/A
<b>Other Facilities</b>										
Hangar Storage	70% of based aircraft	100%	70% of based aircraft	73%	70% of based aircraft	92%	70% of based aircraft	92%	Maintain existing	N/A
Tie-downs	30% of based & 75% of daily transient	100%	30% of based & 75% of daily transient	73%	30% of based & 75% of daily transient	80%	40% of based & 25% of daily transient	63%	Maintain existing	N/A



TABLE 7-1: SUMMARY OF FACILITY AND SERVICES OBJECTIVE PERFORMANCE BY ROLE

Facility Type	Commercial		National Business		Regional Business		Business Community		Community Local	
	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective	Objective	Percentage Meeting Objective
Airside Facilities	2,500 SF	89%	2,500 SF	55%	2,500 SF	32%	1,500 SF	29%		
	Public Restroom	100%	Public Restroom	100%	Public Restroom	96%	Public Restroom	96%		
	Conference Room	100%	Conference Room	100%	Conference Room	76%	Conference Room	46%	Maintain existing	N/A
	Pilot Lounge	100%	Pilot Lounge	82%	Pilot Lounge	84%	Pilot Lounge	88%		
GA Auto Parking	1 space for each based & 50% for employees	89%	1 space for each based & 50% for employees	55%	1 space for each based & 50% for employees	12%	1 space for each based aircraft & 25% for employees	38%	Maintain existing	N/A
Ground Communications	Public phone	100%	Public phone	100%	Public phone	68%	Public phone	63%	Public phone	16%
<b>Services</b>										
Fuel	Jet/AvGas	100%	Jet/AVGas	100%	Jet/AvGas	88%/100%	Jet/AvGas	42%/100%	Not an objective	N/A
FBO	Yes	100%	Yes	91%	Yes	80%	FBO or Maintenance	71%	Not an objective	N/A
Aircraft Maintenance	On-site	89%	On-site	55%	On-site	68%	Maintenance	50%	Not an objective	N/A
Rental Cars	On-site	78%	Available	82%	Available	92%	Not an objective	N/A	Not an objective	N/A
Ground Transportation	Courtesy Car/Shuttle	100%	Courtesy Car/Shuttle	100%	Courtesy Car/Shuttle	92%	Courtesy Car/Shuttle	96%	Not an objective	N/A

Source: Jviation



The deficiencies identified in **Table 7-1** provide the foundation for final system recommendations as well as for recommendations for individual study airports. Costs associated with projects needed to meet all facility/service objectives are subsequently presented in this chapter.

**Table 7-2, Table 7-3, Table 7-4, and Table 7-5** provide a recap of facility and service deficiencies, by project type and by airport, that should ideally be resolved in order for all system airports to be 100 percent compliant with system plan objectives.

TABLE 7-2: AIRPORTS NEEDING PROJECTS TO RESOLVE ARC, RUNWAY LENGTH, RUNWAY WIDTH, TAXIWAY SYSTEM, ROTATING BEACON, LIGHTED WIND CONE, OR REILS DEFICIENCIES

City	Airport Name	FAA ID	ARC	Runway Length	Runway Width	Taxiway System	Rotating Beacon	Lighted Wind Cone	REILs
<b>Commercial Service</b>									
Branson	Branson *	BBG				X			
Fort Leonard Wood	Waynesville-St. Robert Regional	TBN	X						
<b>General Aviation</b>									
Aurora	Jerry Sumners Sr Aurora Municipal	2H2	X	X	X				X
Ava	Ava Bill Martin Memorial	AOV	X	X	X	X			X
Bethany	Bethany Memorial	75K				X	X	X	
Bismarck	Bismarck Memorial	H57				X		X	
Bolivar	Bolivar Municipal	M17		X					X
Bonne Terre	Bonne Terre Municipal	1BT					X	X	
Boonville	Jesse Viertel Memorial	VER		X					
Bowling Green	Bowling Green Municipal	H19			X				
Branson	M. Graham Clark - Downtown	PLK		X					
Butler	Butler Memorial	BUM							X
Cabool	Cabool Memorial	TVB						X	
Camdenton	Camdenton Memorial-Lake Regional	OZS		X		X			
Cameron	Cameron Memorial	EZZ		X					
Campbell	Campbell Municipal	34M					X	X	
Caruthersville	Caruthersville Memorial	M05				X			X
Cassville	Cassville Municipal	94K	X	X	X				X
Charleston	Mississippi County	CHQ							
Chillicothe	Chillicothe Municipal	CHT		X				X	X
Clinton	Clinton Regional	GLY				X			
Cuba	Cuba Municipal	UBX	X	X	X				
Dexter	Dexter Municipal	DXE						X	X
Doniphan	Doniphan Municipal	X33					X	X	
Farmington	Farmington Regional	FAM		X					X
Fredericktown	A. Paul Vance Fredericktown Regional	H88							X
Fulton	Elton Hensley Memorial	FTT	X						





TABLE 7-2: AIRPORTS NEEDING PROJECTS TO RESOLVE ARC, RUNWAY LENGTH, RUNWAY WIDTH, TAXIWAY SYSTEM, ROTATING BEACON, LIGHTED WIND CONE, OR REILS DEFICIENCIES

City	Airport Name	FAA ID	ARC	Runway Length	Runway Width	Taxiway System	Rotating Beacon	Lighted Wind Cone	REILs
Gainesville	Gainesville Memorial	H27						X	
Gideon	Gideon Memorial	M85					X	X	
Hannibal	Hannibal Regional	HAE		X					
Harrisonville	Lawrence Smith Memorial	LRY							X
Hornersville	Hornersville Memorial	37M						X	
Kahoka	Kahoka Municipal	0H7					X	X	
Kaiser/Lake Ozark	Lee C Fine Memorial	AIZ							X
Lamar	Lamar Municipal	LLU	X						
Lincoln	Lincoln Municipal	0R2					X	X	
Linn	State Technical College of Missouri	1H3					X		
Macon	Macon-Fower Memorial	K89							X
Malden	Malden Regional	MAW	X						X
Marshall	Marshall Memorial Municipal	MHL							X
Mexico	Mexico Memorial	MYJ							X
Monett	Monett Regional	HFJ		X	X			X	
Mount Vernon	Mount Vernon Municipal	2MO					X		
Mountain Grove	Mountain Grove Memorial	1MO				X			
Mountain View	Mountain View	MNF				X			X
Nevada	Nevada Municipal	NVD				X			
New Madrid	County Memorial	EIW	X	X	X				X
Osage Beach	Grand Glaize-Osage Beach	K15	X	X	X				X
Perryville	Perryville Regional	PCD				X			
Potosi	Washington County	8WC	X		X				X
Richland	Richland Municipal	MO1					X		
Rolla/Vichy	Rolla National	VIH				X			X
Salem	Salem Memorial	K33	X	X	X				
Sedalia	Sedalia Regional	DMO				X			
Shelbyville	Shelby County	6K2					X	X	
Sikeston	Sikeston Memorial Municipal	SIK							X
St. Charles	St. Charles County Smartt Field	SET	X	X					X
St. Louis	Creve Coeur	1H0		X					
St. Louis	Spirit of St. Louis	SUS						X	
Steele	Steele Municipal	M12						X	
Stockton	Stockton Municipal	MO3						X	
Sullivan	Sullivan Regional	UUV		X					X



TABLE 7-2: AIRPORTS NEEDING PROJECTS TO RESOLVE ARC, RUNWAY LENGTH, RUNWAY WIDTH, TAXIWAY SYSTEM, ROTATING BEACON, LIGHTED WIND CONE, OR REILS DEFICIENCIES

City	Airport Name	FAA ID	ARC	Runway Length	Runway Width	Taxiway System	Rotating Beacon	Lighted Wind Cone	REILs
Thayer	Thayer Memorial	42M						X	
Van Buren	Bollinger-Crass Memorial	MO5						X	
Warrensburg	UCM-Skyhaven	RCM		X		X			
Washington	Washington Regional	FYG	X						
West Plains	West Plains Regional	UNO						X	
Willow Springs	Willow Springs Memorial	1H5					X		

Source: Jviation

\* Note: Branson Airport is privately owned and is not eligible for either state or FAA funding

TABLE 7-3: AIRPORTS NEEDING PROJECTS TO RESOLVE VGSI, APPROACH, RUNWAY LIGHTING, TAXIWAY LIGHTING, WEATHER REPORTING, HANGAR STORAGE, OR TIE-DOWN DEFICIENCIES

City	Airport Name	FAA ID	VGSI	Approach	Runway Lighting	Taxiway Lighting	Weather Reporting	Hangar Storage	Tie-down
<b>Commercial Service</b>									
Cape Girardeau	Cape Girardeau Regional	CGI	X						
Columbia	Columbia Regional	COU	X						
Joplin	Joplin Regional	JLN	X						
<b>General Aviation</b>									
Albany	Albany Municipal	K19							
Aurora	Jerry Sumners Sr Aurora Municipal	2H2	X						X
Ava	Ava Bill Martin Memorial	AOV	X						
Bolivar	Bolivar Municipal	M17				X	X		
Bonne Terre	Bonne Terre Municipal	1BT			X				
Boonville	Jesse Viertel Memorial	VER				X			
Branson	M. Graham Clark - Downtown	PLK	X						
Branson West	Branson West Municipal - Emerson Field	FWB				X			
Brookfield/ Marceline	North Central Missouri Regional	MO8				X			
Camdenton	Camdenton Memorial-Lake Regional	OZS				X			
Cassville	Cassville Municipal	94K							X
Chillicothe	Chillicothe Municipal	CHT							X
Clinton	Clinton Regional	GLY				X			
Cuba	Cuba Municipal	UBX							X
Dexter	Dexter Municipal	DXE					X		X
Eldon	Eldon Model Airpark	H79						X	
Farmington	Farmington Regional	FAM	X			X			



TABLE 7-3: AIRPORTS NEEDING PROJECTS TO RESOLVE VGSI, APPROACH, RUNWAY LIGHTING, TAXIWAY LIGHTING, WEATHER REPORTING, HANGAR STORAGE, OR TIE-DOWN DEFICIENCIES

City	Airport Name	FAA ID	VGSI	Approach	Runway Lighting	Taxiway Lighting	Weather Reporting	Hangar Storage	Tie-down
Fredericktown	A. Paul Vance Fredericktown Regional	H88							X
Fulton	Elton Hensley Memorial	FTT							X
Gideon	Gideon Memorial	M85			X				
Harrisonville	Lawrence Smith Memorial	LRY							X
Hornersville	Hornersville Memorial	37M			X				
Kaiser/Lake Ozark	Lee C Fine Memorial	AIZ				X			
Lamar	Lamar Municipal	LLU							X
Lebanon	Floyd W. Jones Lebanon	LBO		X		X		X	
Lee's Summit	Lee's Summit Municipal	LXT			X				
Macon	Macon-Fower Memorial	K89							X
Malden	Malden Regional	MAW	X						
Mexico	Mexico Memorial	MYJ	X		X	X			
Moberly	Omar N Bradley	MBY				X			
Monett	Monett Regional	HFJ			X	X			
Mosby	Midwest National Air Center	GPH							X
Mountain View	Mountain View	MNF	X						X
Neosho	Neosho Hugh Robinson	EOS				X	X		
New Madrid	County Memorial	EIW	X					X	
Osage Beach	Grand Glaize-Osage Beach	K15	X						
Perryville	Perryville Regional	PCD				X			
Poplar Bluff	Poplar Bluff Municipal	POF							X
Potosi	Washington County	8WC	X						
Rolla/Vichy	Rolla National	VIH						X	X
Sedalia	Sedalia Regional	DMO			X	X		X	
Sikeston	Sikeston Memorial Municipal	SIK			X				
St. Charles	St. Charles County Smartt Field	SET		X		X		X	
St. Louis	Creve Coeur	1H0				X	X		X
St. Louis	Spirit of St. Louis	SUS						X	X
Sullivan	Sullivan Regional	UUV				X			
Van Buren	Bollinger-Crass Memorial	MO5			X				
Warrensburg	UCM-Skyhaven	RCM				X			
Washington	Washington Regional	FYG				X			X
West Plains	West Plains Regional	UNO				X			

Source: Jviation



TABLE 7-4: AIRPORTS NEEDING PROJECTS TO RESOLVE ADMINISTRATION BUILDING SIZE, PUBLIC RESTROOM, CONFERENCE ROOM, PILOT LOUNGE, OR AUTO PARKING DEFICIENCIES

City	Airport Name	FAA ID	Administration Building Size	Public Restroom	Conference Room	Pilot Lounge	Auto Parking
<b>Commercial Service</b>							
Cape Girardeau	Cape Girardeau Regional	CGI					X
<b>General Aviation</b>							
Aurora	Jerry Sumners Sr Aurora Municipal	2H2	X			X	X
Ava	Ava Bill Martin Memorial	AOV	X		X		
Bolivar	Bolivar Municipal	M17	X		X	X	X
Boonville	Jesse Viertel Memorial	VER	X			X	X
Branson West	Branson West Municipal - Emerson Field	FWB					X
Brookfield/ Marcelline	North Central Missouri Regional	MO8	X				
Butler	Butler Memorial	BUM	X		X		X
Camdenton	Camdenton Memorial-Lake Regional	OZS	X				X
Cameron	Cameron Memorial	EZZ	X		X		X
Caruthersville	Caruthersville Memorial	M05	X		X	X	
Cassville	Cassville Municipal	94K	X		X		X
Chillicothe	Chillicothe Municipal	CHT	X				X
Clinton	Clinton Regional	GLY	X		X		X
Cuba	Cuba Municipal	UBX	X		X		X
Dexter	Dexter Municipal	DXE	X				X
Eldon	Eldon Model Airpark	H79	X	X	X	X	X
Farmington	Farmington Regional	FAM	X				X
Fredericktown	A. Paul Vance Fredericktown Regional	H88	X				X
Fulton	Elton Hensley Memorial	FTT	X		X		X
Hannibal	Hannibal Regional	HAE					X
Harrisonville	Lawrence Smith Memorial	LRY	X				X
Higginsville	Higginsville Industrial Municipal	HIG					X
Jefferson City	Jefferson City Memorial	JEF	X			X	
Kennett	Kennett Memorial	TKX	X				X
Lamar	Lamar Municipal	LLU	X		X		X
Lebanon	Floyd W. Jones Lebanon	LBO	X		X		X
Lee's Summit	Lee's Summit Municipal	LXT	X				X
Macon	Macon-Fower Memorial	K89	X		X		X
Maryville	Northwest Missouri Regional	EVU					X
Mexico	Mexico Memorial	MYJ	X				X
Moberly	Omar N Bradley	MBY	X				X
Monett	Monett Regional	HFJ	X				



TABLE 7-4: AIRPORTS NEEDING PROJECTS TO RESOLVE ADMINISTRATION BUILDING SIZE, PUBLIC RESTROOM, CONFERENCE ROOM, PILOT LOUNGE, OR AUTO PARKING DEFICIENCIES

City	Airport Name	FAA ID	Administration Building Size	Public Restroom	Conference Room	Pilot Lounge	Auto Parking
Mosby	Midwest National Air Center	GPH					X
Mountain View	Mountain View	MNF	X		X		X
Neosho	Neosho Hugh Robinson	EOS					X
Nevada	Nevada Municipal	NVD					X
New Madrid	County Memorial	EIW	X		X		X
Osage Beach	Grand Glaize-Osage Beach	K15	X				
Perryville	Perryville Regional	PCD	X				X
Poplar Bluff	Poplar Bluff Municipal	POF	X		X		X
Rolla/Vichy	Rolla National	VIH					X
Salem	Salem Memorial	K33	X		X		
Sedalia	Sedalia Regional	DMO	X				X
Sikeston	Sikeston Memorial Municipal	SIK	X				
St Joseph	Rosecrans Memorial	STJ	X			X	
St. Charles	St. Charles County Smartt Field	SET					X
St. Louis	Creve Coeur	1H0	X			X	X
Sullivan	Sullivan Regional	UUV	X				X
Trenton	Trenton Municipal	TRX	X		X		X
Warrensburg	UCM-Skyhaven	RCM	X	X	X	X	
Washington	Washington Regional	FYG					X
West Plains	West Plains Regional	UNO	X				X

Source: Jviation

TABLE 7-5: AIRPORTS NEEDING PROJECTS TO RESOLVE GROUND COMMUNICATION, FUEL, AIRCRAFT MAINTENANCE, OR RENTAL CAR DEFICIENCIES

City	Airport Name	FAA ID	Ground Communication	Fuel	FBO	Aircraft Maintenance	Rental Car
<b>Commercial Service</b>							
Cape Girardeau	Cape Girardeau Regional	CGI					X
Fort Leonard Wood	Waynesville-St. Robert Regional	TBN				X	
Kirksville	Kirksville Regional	IRK					X
<b>General Aviation</b>							
Albany	Albany Municipal	K19	X				
Aurora	Jerry Sumners Sr Aurora Municipal	2H2	X	X			
Ava	Ava Bill Martin Memorial	AOV	X	X			
Bethany	Bethany Memorial	75K	X				





TABLE 7-5: AIRPORTS NEEDING PROJECTS TO RESOLVE GROUND COMMUNICATION, FUEL, AIRCRAFT MAINTENANCE, OR RENTAL CAR DEFICIENCIES

City	Airport Name	FAA ID	Ground Communication	Fuel	FBO	Aircraft Maintenance	Rental Car
Bismarck	Bismarck Memorial	H57	X				
Bonne Terre	Bonne Terre Municipal	1BT	X				
Bowling Green	Bowling Green Municipal	H19	X				
Brookfield/ Marceline	North Central Missouri Regional	MO8			X	X	
Butler	Butler Memorial	BUM		X			
Cabool	Cabool Memorial	TVB	X				
Cameron	Cameron Memorial	EZZ		X			
Campbell	Campbell Municipal	34M	X				
Carrollton	Carrollton Memorial	K26	X				
Caruthersville	Caruthersville Memorial	M05	X	X			
Cassville	Cassville Municipal	94K		X	X	X	
Charleston	Mississippi County	CHQ	X				
Chillicothe	Chillicothe Municipal	CHT		X		X	
Clinton	Clinton Regional	GLY	X			X	
Cuba	Cuba Municipal	UBX		X			
Dexter	Dexter Municipal	DXE			X	X	
Doniphan	Doniphan Municipal	X33	X				
El Dorado Springs	El Dorado Springs Memorial	87K	X				
Eldon	Eldon Model Airpark	H79	X		X	X	
Farmington	Farmington Regional	FAM	X		X		
Fulton	Elton Hensley Memorial	FTT	X	X			
Gainesville	Gainesville Memorial	H27	X				
Gideon	Gideon Memorial	M85	X				
Harrisonville	Lawrence Smith Memorial	LRY	X	X			
Hermann	Hermann Municipal	63M	X				
Higginsville	Higginsville Industrial Municipal	HIG		X			
Hornersville	Hornersville Memorial	37M	X				
Houston	Houston Memorial	M48	X				
Jefferson City	Jefferson City Memorial	JEF					
Kahoka	Kahoka Municipal	OH7	X				
Kaiser/Lake Ozark	Lee C Fine Memorial	AIZ				X	
Kennett	Kennett Memorial	TKX					X
Lamar	Lamar Municipal	LLU	X				
Lincoln	Lincoln Municipal	OR2	X				
Linn	State Technical College of Missouri	1H3	X				



TABLE 7-5: AIRPORTS NEEDING PROJECTS TO RESOLVE GROUND COMMUNICATION, FUEL, AIRCRAFT MAINTENANCE, OR RENTAL CAR DEFICIENCIES

City	Airport Name	FAA ID	Ground Communication	Fuel	FBO	Aircraft Maintenance	Rental Car
Mansfield	Mansfield Municipal	03B	X				
Marshall	Marshall Memorial Municipal	MHL	X				
Maryville	Northwest Missouri Regional	EVU			X	X	
Memphis	Memphis Memorial	03D	X				
Mexico	Mexico Memorial	MYJ			X	X	
Moberly	Omar N Bradley	MBY	X				
Monticello	Lewis County Regional	6M6	X				
Mosby	Midwest National Air Center	GPH				X	
Mount Vernon	Mount Vernon Municipal	2MO	X				
Mountain Grove	Mountain Grove Memorial	1MO	X				
Mountain View	Mountain View	MNF		X			
Neosho	Neosho Hugh Robinson	EOS			X	X	
New Madrid	County Memorial	EIW	X	X			
Osage Beach	Grand Glaize-Osage Beach	K15		X			
Perryville	Perryville Regional	PCD	X			X	
Richland	Richland Municipal	MO1	X				
Rolla/Vichy	Rolla National	VIH				X	X
Salem	Salem Memorial	K33		X	X	X	
Sedalia	Sedalia Regional	DMO				X	
Shelbyville	Shelby County	6K2	X				
Sikeston	Sikeston Memorial Municipal	SIK				X	X
St Joseph	Rosecrans Memorial	STJ					
St. Charles	St. Charles County Smartt Field	SET	X	X			
St. Louis	Creve Coeur	1H0	X				
Stockton	Stockton Municipal	MO3	X				
Sullivan	Sullivan Regional	UUV	X		X		X
Tarkio	Gould Peterson Municipal	K57	X				
Thayer	Thayer Memorial	42M	X				
Unionville	Unionville Municipal	K43	X				
Van Buren	Bollinger-Crass Memorial	MO5	X				
Versailles	Roy Otten Memorial Airfield	3VS	X				
Warrensburg	UCM-Skyhaven	RCM	X				
Warsaw	Warsaw Municipal	RAW		X			
West Plains	West Plains Regional	UNO				X	

Source: Jviation



## 7.4 Cost Estimating

The methodology used to estimate costs for projects included in the recommended plan includes:

- Compare existing facilities at each individual airport to facility/service objectives identified for each airport's recommended system role.
- Identify specific airport projects or actions needed to reach the airport's applicable objectives.
- Estimate project quantities.
- Use estimated unit costs, applying these costs to specific airport needs/projects.

In this process, costs were first identified on an airport-by-airport basis, and then compiled at the system level by project category. Costs presented in this chapter are based on unit costs for each type of facility. Unit costs used in the System Plan's analysis were obtained from current airport construction costs in Missouri, and were increased to allow for contingency expenses. Importantly, the costs identified in this chapter will vary based on site-specific conditions that may require significant site preparation efforts or other mitigation to allow for construction.

Wherever possible, actual costs were used as a baseline in the development of unit costs. The range of airports and their specific settings in the state may cause actual costs to vary. Further, costs presented in this chapter are based on 2018 U.S. dollars without increases to reflect future inflation. If a project identified by the System Plan was already in an airport's individual CIP, the CIP cost for that project was used in this analysis.

Costs associated with System Plan recommendations are aggregated for the following categories (with detailed subcomponents included in parenthesis):

- Apron (Tie-downs)
- Auto Parking and Ground Access (General Aviation Auto Parking)
- Fuel
- Hangars (Hangared Aircraft Storage)
- Lighting, NAVAIDs, and Signage (Runway Lighting, Taxiway Lighting, ALS, Approach Type, Weather Reporting, Rotating Beacon, VGSI, Segmented Circle, Wind Cone, Airfield Signage)
- Pavement Maintenance (Primary Runway PCI)
- Runways (Runway Width, Runway Length)
- Safety (Primary Runway Safety Area, Runway to Taxiway Separation)
- Security (Fencing)
- Taxiways
- Terminal Buildings (General Aviation Terminal/Administration)

Pavement project costs associated with the information in Missouri's current Statewide Pavement Management Plan are aggregated for the following categories:

- Runways
- Taxiways
- Apron

CIP project costs are aggregated by the following categories:

- Runways



- Taxiways
- Safety
- Lighting, NAVAIDs, and Signage
- Apron
- Hangars
- Terminal Buildings
- Fuel
- Auto Parking and Ground Access
- Security
- Utilities and Drainage
- Equipment
- Other Buildings
- Other/Miscellaneous
- Acquisitions, Relocations, and Easements
- Plans and Studies

In order to present all of the above categories in a single, concise table and/or chart for combined development costs across all plans and analyses, the number of categories were collapsed into the following simplified categories:

- Acquisitions, Relocations, and Easements
- Apron
- Auto Parking and Ground Access
- Equipment
- Fuel
- Hangars
- Lighting, NAVAIDs, and Signage
- Pavement Maintenance
- Plans and Studies
- Runways and Taxiways
- Safety and Security
- Terminals and Other Buildings
- Utilities, Drainage, and Other/Misc.

For detailed cost information on a particular airport, see **Appendix D, Airport Report Cards**. The report card for each airport lists all projects and their associated costs. The report cards are organized by project source (System Plan projects, CIP projects, and Statewide Pavement Plan projects). It is worth noting that CIP projects for the Commercial airports are generally not reflected in this analysis, unless there is a potential for the project to be funded through the state's Aviation Trust Fund. Also, the pavement maintenance needs for Commercial airports (and a few general aviation airports) are not included in the statewide Pavement Management Plan so pavement maintenance/rehabilitation costs for these airports are not reflected in those shown in this System Plan's analysis.



### 7.4.1 Costs Associated with System Plan Recommendations

The System Plan cost estimates by project category and airport role are summarized in **Table 7-6** and **Table 7-7**; **Table 7-6** presents a summary of system plan costs by detailed project category, whereas **Table 7-7** presents a summary of system plan costs by reduced/collapsed project category.

TABLE 7-6: SUMMARY OF SYSTEM PLAN COSTS BY DETAILED PROJECT CATEGORY AND ROLE

Facility/Service Item	Commercial	National Business	Regional Business	Business Community	Community Local	Total	Percentage of Total
ARC	\$0	\$0	\$0	\$0	\$0	\$0	0%
Runway Length	\$0	\$22,400,000	\$53,442,329	\$21,369,900	\$0	\$97,212,229	42%
Runway Width	\$0	\$0	\$0	\$6,205,486	\$329,589	\$6,535,075	3%
Taxiway System	\$8,981,400	\$1,803,183	\$10,570,552	\$807,158	\$716,131	\$22,878,424	10%
NAVAIDs	\$0	\$0	\$0	\$0	\$0	\$0	0%
Rotating Beacon	\$0	\$0	\$0	\$0	\$1,200,000	\$1,200,000	1%
Lighting Wind Cone	\$0	\$30,000	\$45,000	\$0	\$225,000	\$300,000	<1%
– Segmented Circle	\$0	\$0	\$0	\$0	\$0	\$0	0%
– REILS	\$0	\$100,000	\$240,000	\$540,000	\$0	\$880,000	<1%
– VGSI (PAPI/VASI)	\$225,000	\$75,000	\$75,000	\$800,000	\$0	\$1,175,000	<1%
Approach	\$0	\$0	\$130,000	\$0	\$0	\$130,000	<1%
Lighting	\$0	\$0	\$0	\$0	\$0	\$0	0%
Runway Lighting	\$0	\$2,029,000	\$0	\$0	\$1,330,000	\$3,359,000	1%
– Taxiway Lighting	\$0	\$934,000	\$8,416,000	\$0	\$0	\$9,350,000	4%
– Approach Lighting System	\$0	\$0	\$0	\$0	\$0	\$0	0%
– Weather	\$0	\$0	\$1,566,000	\$0	\$0	\$1,566,000	1%
– Hangar Storage	\$0	\$2,625,000	\$2,145,000	\$1,820,000	\$0	\$6,590,000	3%
– Tie Downs	\$0	\$18,500,000	\$17,000,000	\$8,950,000	\$0	\$44,450,000	19%
– GA Admin Building	\$0	\$0	\$0	\$0	\$0	\$0	0%
– Sq. Feet	\$0	\$1,212,000	\$7,332,000	\$4,585,700	\$0	\$13,129,700	6%
– Public Restroom	\$0	\$0	\$35,000	\$0	\$0	\$35,000	<1%
– Conference Room	\$0	\$0	\$225,000	\$1,250,000	\$0	\$1,475,000	1%
Pilot Lounge	\$0	\$592,000	\$126,000	\$42,000	\$0	\$760,000	<1%
GA Auto Parking	\$520,000	\$2,860,000	\$7,770,000	\$1,940,000	\$0	\$13,090,000	6%
Ground Communications	\$0	\$0	\$0	\$0	\$0	\$0	0%
Services	\$0	\$0	\$0	\$0	\$0	\$0	0%
Jet Fuel	\$0	\$0	\$1,250,000	\$5,825,000	\$0	\$7,075,000	3%
AvGas	\$0	\$0	\$0	\$0	\$0	\$0	0%
FBO	\$0	\$0	\$0	\$0	\$0	\$0	0%
Maintenance	\$0	\$0	\$0	\$0	\$0	\$0	0%
On-site Rental Cars	\$0	\$0	\$0	\$0	\$0	\$0	0%





TABLE 7-6: SUMMARY OF SYSTEM PLAN COSTS BY DETAILED PROJECT CATEGORY AND ROLE

Facility/Service Item	Commercial	National Business	Regional Business	Business Community	Community Local	Total	Percentage of Total
Courtesy/Shuttle Service	\$0	\$0	\$0	\$0	\$0	\$0	0%
Total	\$9,726,400	\$53,160,183	\$110,367,881	\$54,135,244	\$3,800,720	\$231,190,428	100%
Percentage of Total	4%	23%	48%	23%	2%	100%	

Source: Jviation

Note: Commercial airports are currently meeting most of their System Plan-related objectives, resulting in a smaller relative percentage cost for airports in this role.

Table 7-7 presents a summary of all recommended system plan costs by reduced/collapsed project category and system role.

TABLE 7-7: SYSTEM PLAN COSTS SUMMARIZED BY PROJECT CATEGORY AND ROLE

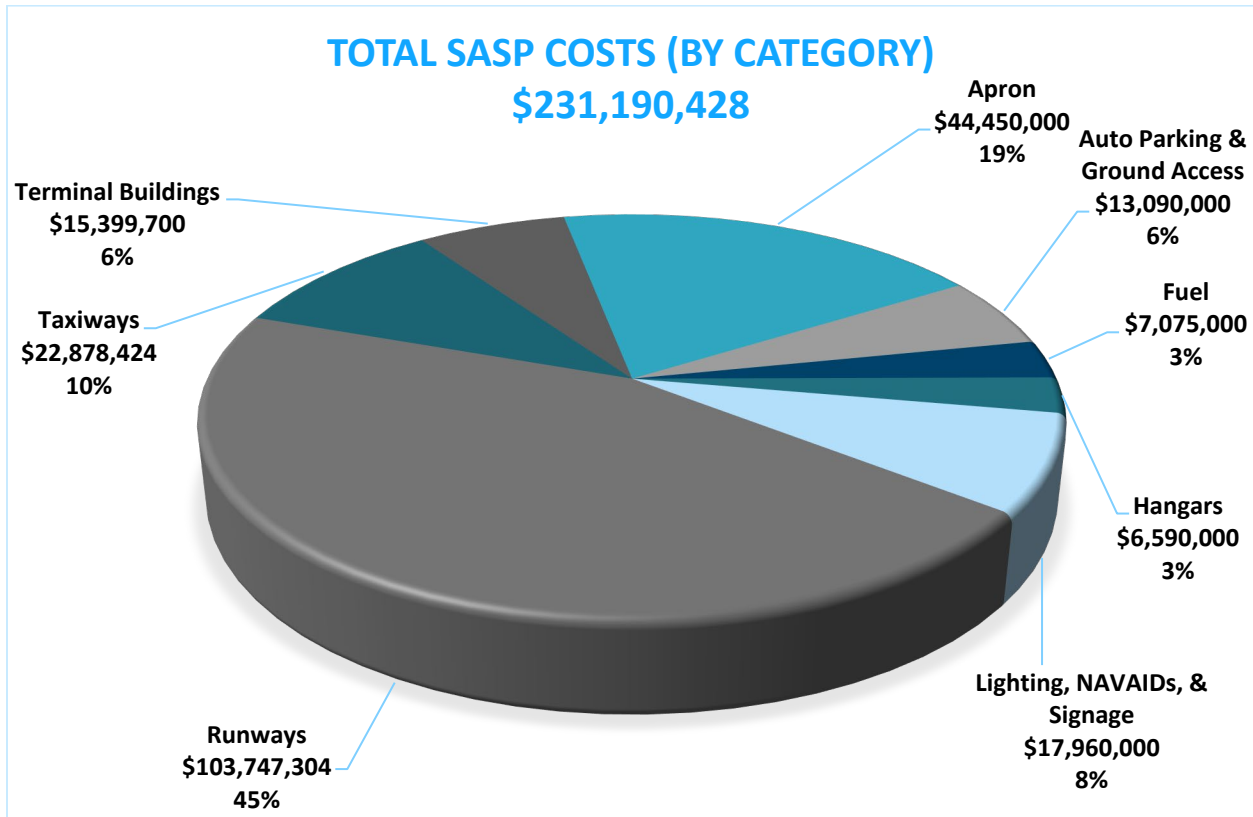
Project Category	Commercial	National Business	Regional Business	Business Community	Community Local	Total SASP Costs (by Category)	Percentage of Total
Apron	\$0	\$18,500,000	\$17,000,000	\$8,950,000	\$0	\$44,450,000	19%
Auto Parking & Ground Access	\$520,000	\$2,860,000	\$7,770,000	\$1,940,000	\$0	\$13,090,000	6%
Fuel	\$0	\$0	\$1,250,000	\$5,825,000	\$0	\$7,075,000	3%
Hangars	\$0	\$2,625,000	\$2,145,000	\$1,820,000	\$0	\$6,590,000	3%
Lighting, NAVAIDs, & Signage	\$225,000	\$3,168,000	\$10,472,000	\$1,340,000	\$2,755,000	\$17,960,000	8%
Runways	\$0	\$22,400,000	\$53,442,329	\$27,575,386	\$329,589	\$103,747,304	45%
Taxiways	\$8,981,400	\$1,803,183	\$10,570,552	\$807,158	\$716,131	\$22,878,424	10%
Terminal Buildings	\$0	\$1,804,000	\$7,718,000	\$5,877,700	\$0	\$15,399,700	6%
Total SASP Costs (by Role)	\$9,726,400	\$53,160,183	\$110,367,881	\$54,135,244	\$3,800,720	\$231,190,428	100%
Percentage of Total	4%	23%	48%	23%	2%	100%	

Source: Jviation

Altogether, the costs associated with System Plan recommendations for all project categories total approximately \$231 million. Figure 7-10 illustrates the distribution of total estimated System Plan costs by project category. As shown, the most significant costs for recommended system improvements relate to runway projects, followed by apron, taxiways, and lighting/NAVAIDs/signage. Costs, as a percentage of total, for airports in the Commercial role are comparatively less than the other role categories because most of the airports in the Commercial role category already meet facility/service objectives established in the System Plan.



FIGURE 7-10: SYSTEM PLAN COSTS BY PROJECT CATEGORY

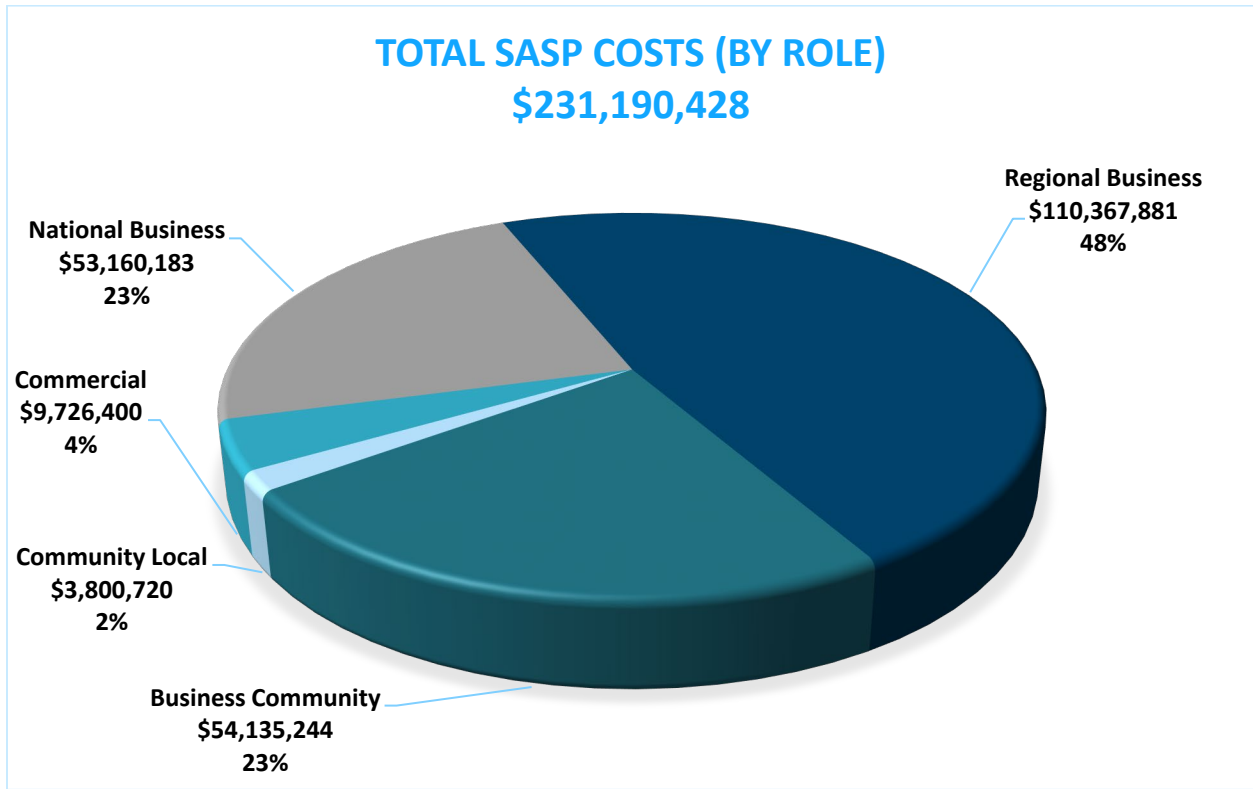


Source: Jviation

A summary of estimated costs by airport role (Commercial, National Business, Regional Business, Business Community, and Community Local) was developed and is shown in **Figure 7-11**. This graphic was developed with costs for airport-specific projects from the System Plan summarized by project category, as shown in **Table 7-7**. As shown in **Figure 7-11**, Regional Business airports have the largest share of estimated costs associated with system plan recommendations, followed by airports in Business Community, National Business, Commercial, and Community Local roles. Because Commercial airports in Missouri are developed to meet the needs of most commercial carriers, their additional development needs are more limited as they relate to meeting objectives established by the System Plan. System Plan facility objectives are focused primarily on meeting the needs of general aviation users, which accounts for the smaller percentage of total costs that are attached to Commercial airports.



FIGURE 7-11: SYSTEM PLAN PROJECT COSTS BY ROLE



Source: Jviation

### 7.4.2 Other Development Costs for System Airports

Recommended projects from the System Plan represent only a portion of the total development and maintenance costs that Missouri airports could require in the near term. In order to have a better picture of total investment needs for Missouri’s airport system, it is important to also consider projects identified in each airport’s current CIP and in Missouri’s most recent Statewide Pavement Management Plan. While CIP costs have been included for consideration in this analysis, CIP requests are unvetted and often reflect an optimistic/unconstrained level of development for each airport.

#### *Costs Associated with Pavement Maintenance Projects*

Missouri’s Statewide Pavement Management Plan identifies maintenance, repair, and rehabilitation projects needed to sustain functional pavements at Missouri airports. The pavement maintenance needs of the Commercial airports, and those of a few general aviation airports, are not addressed in the state plan. Projects in the Pavement Management Plan that have not been completed, along with their associated costs, were identified as additional costs to be considered as part of the System Plan’s recommendations. **Table 7-8** presents a summary of pavement maintenance costs for system airports by project category and by airport role. Pavement maintenance related costs for the Commercial airports, shown in this section, were derived from CIPs, but only if the Commercial airport submitted a CIP to MoDOT that requested funding for a pavement project. All pavement projects were identified independently of the System Plan.

It is worth noting that airports will have additional pavement-related projects that are not captured in the Statewide Pavement Management Plan. Therefore, actual costs related to improving and maintaining the



condition of pavement at Missouri airports is actually much higher than the \$161 million shown in the following table. With weather and use, pavement conditions at the Missouri airports continually change, and Missouri periodically updates its Statewide Pavement Management Plan to capture changing conditions.

TABLE 7-8: SUMMARY OF PAVEMENT COSTS BY PROJECT CATEGORY AND ROLE

Project Category	Commercial	National Business	Regional Business	Business Community	Community Local	Total Pavement Costs (by Category)	Percentage of Total
Runways	\$9,185,000	\$32,933,440	\$18,790,667	\$18,238,039	\$24,317,001	\$103,464,147	64%
Taxiways	\$6,749,000	\$8,069,830	\$6,609,500	\$6,555,793	\$2,100,000	\$30,084,123	19%
Apron	\$7,005,000	\$7,864,960	\$10,073,900	\$2,166,000	\$250,000	\$27,359,860	17%
Total Pavement Costs (by Role)	\$22,939,000	\$48,868,230	\$35,474,067	\$26,959,832	\$26,667,001	\$160,908,130	100%
Percentage of Total	14%	30%	22%	17%	17%	100%	

Source: Jviation

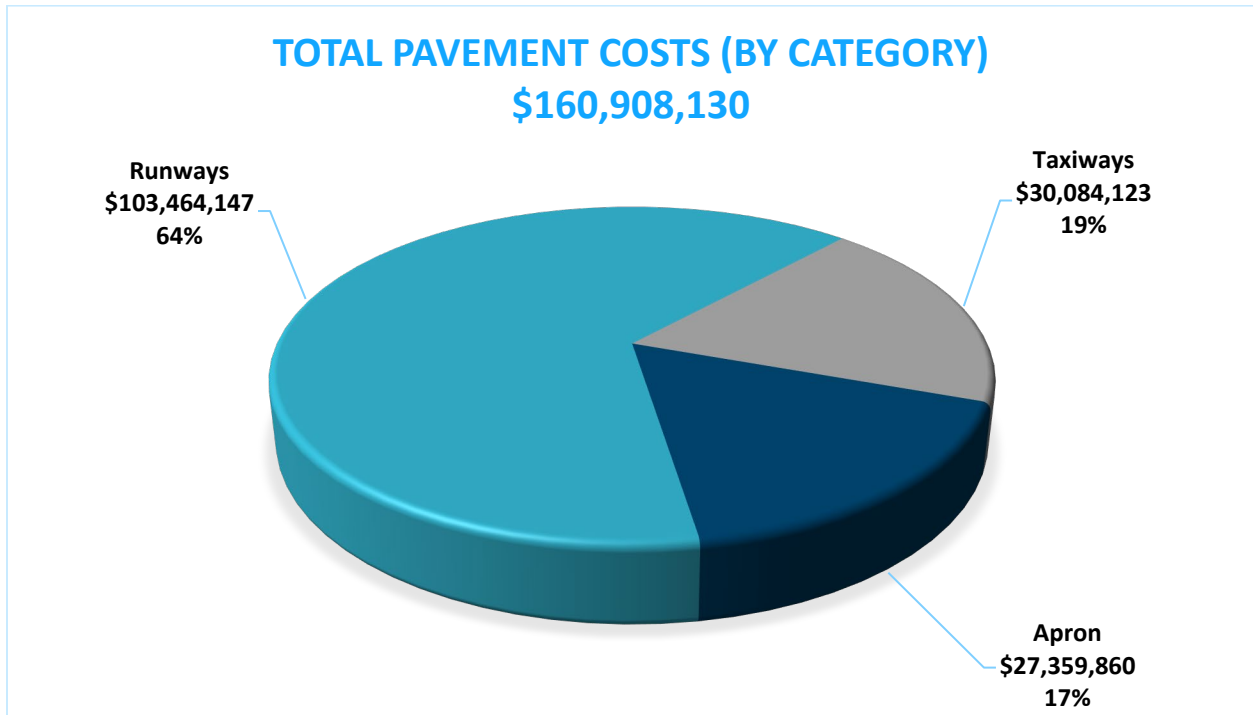
Note: Pavement costs for Commercial airports were derived from CIPs submitted to MoDOT; pavement maintenance costs for most Commercial airports, including St. Louis Lambert and Kansas City International, are not reflected in this table.

As shown in **Table 7-8**, pavement projects require significant investment, totaling nearly \$161 million. By pavement project category, runway projects account for the largest share of the pavement related costs, followed by taxiway projects and apron projects. By system role, National Business airports have the highest estimated costs, followed by Regional Business, Business Community, Community Local, and Commercial airports. It is worth noting that all pavement maintenance projects for airports in the Commercial role were not captured in the data shown in **Table 7-8**.

**Figure 7-12** and **Figure 7-13** graphically depict the share of pavement-related costs by project category and system airport role.

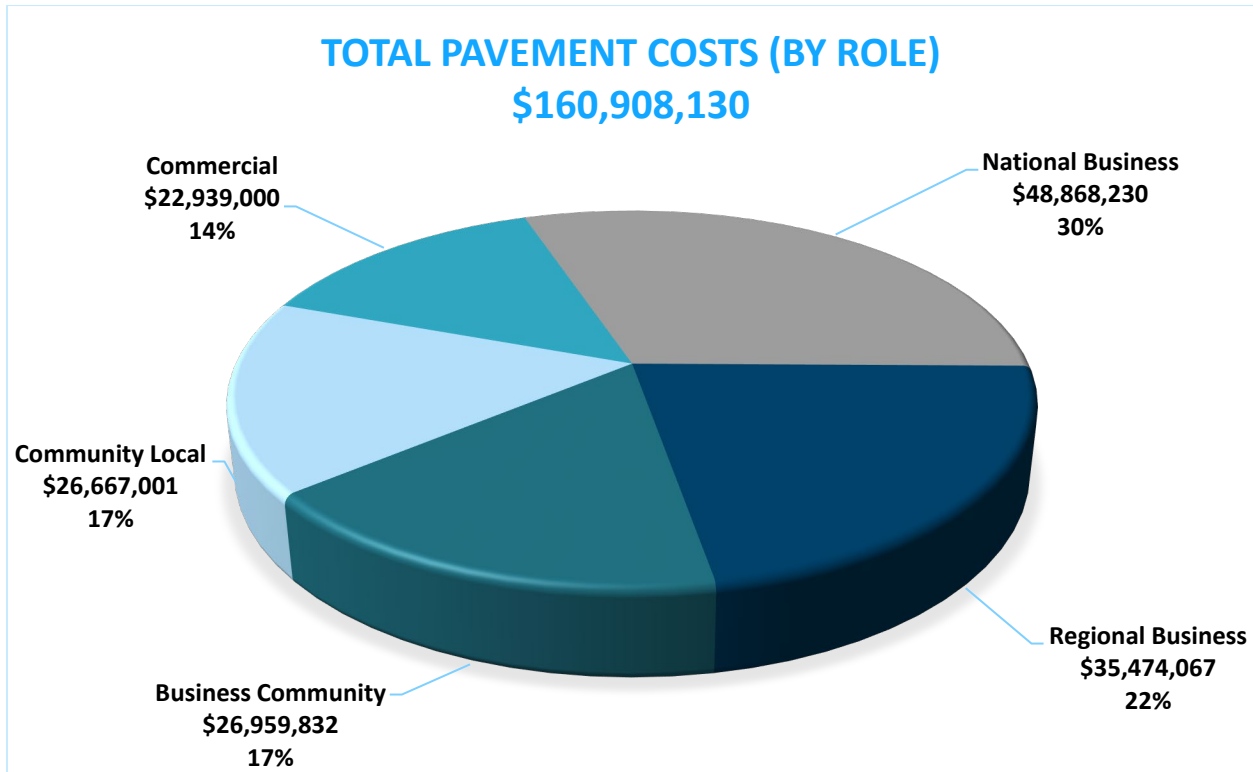


FIGURE 7-12: PAVEMENT COSTS BY PROJECT CATEGORY



Source: Jviation

FIGURE 7-13: PAVEMENT COSTS BY AIRPORT ROLE



Source: Jviation



*Costs Associated with Airport CIP Projects*

A summary of CIP project costs for all system airports, as most recently reported to MoDOT, is presented in **Table 7-9** by project category and by airport role.

TABLE 7-9: SUMMARY OF CIP COSTS BY PROJECT CATEGORY AND AIRPORT ROLE

Project Category	Commercial	National Business	Regional Business	Business Community	Community Local	Total CIP Costs (by Category)	Percentage of Total
Acquisitions, Relocations, & Easements	\$1,050,000	\$14,525,000	\$9,667,000	\$11,906,450	\$1,459,000	\$38,607,450	12%
Apron	\$1,700,000	\$6,502,000	\$6,995,965	\$17,229,600	\$1,516,667	\$33,944,232	11%
Auto Parking & Ground Access	\$2,565,000	\$2,523,000	\$225,000	\$1,756,400	\$919,000	\$7,988,400	3%
Equipment	\$750,000	\$0	\$340,000	\$650,000	\$0	\$1,740,000	1%
Fuel	\$600,000	\$0	\$2,200,000	\$1,660,700	\$216,000	\$4,676,700	1%
Hangars	\$4,780,000	\$3,826,000	\$16,027,680	\$11,459,220	\$2,820,000	\$38,912,900	13%
Lighting, NAVAIDs, & Signage	\$0	\$5,301,366	\$5,477,000	\$4,715,872	\$2,758,860	\$18,253,098	6%
Plans & Studies	\$355,000	\$825,000	\$2,446,111	\$2,792,500	\$904,000	\$7,322,611	2%
Runways	\$0	\$4,067,710	\$20,283,290	\$21,887,600	\$1,117,300	\$47,355,900	15%
Safety & Security	\$2,078,000	\$1,793,600	\$11,137,780	\$4,599,196	\$2,302,500	\$21,911,076	7%
Taxiways	\$3,000,000	\$8,536,000	\$9,484,100	\$17,868,768	\$4,138,900	\$43,027,768	14%
Terminals & Other Buildings	\$7,050,000	\$15,926,255	\$11,150,000	\$1,988,600	\$1,100,000	\$37,214,855	12%
Utilities, Drainage, & Other/Misc.	\$3,194,302	\$300,000	\$3,930,000	\$516,000	\$1,371,200	\$9,311,502	3%
Total CIP Costs (by Role)	\$27,122,302	\$64,125,931	\$99,363,926	\$99,030,906	\$20,623,427	\$310,266,492	100%
<b>Percentage of Total</b>	<b>9%</b>	<b>21%</b>	<b>32%</b>	<b>32%</b>	<b>6%</b>	<b>100%</b>	

Source: Jviation

Note: CIP costs in this table do not reflect those associated with St. Louis Lambert or Kansas City International airports. The CIP costs for the Commercial airports reflect only those projects for which airports are seeking MoDOT funding; therefore, the CIP costs for the Commercial airports shown here reflect only a small percentage of the total CIP costs for the Commercial airports.

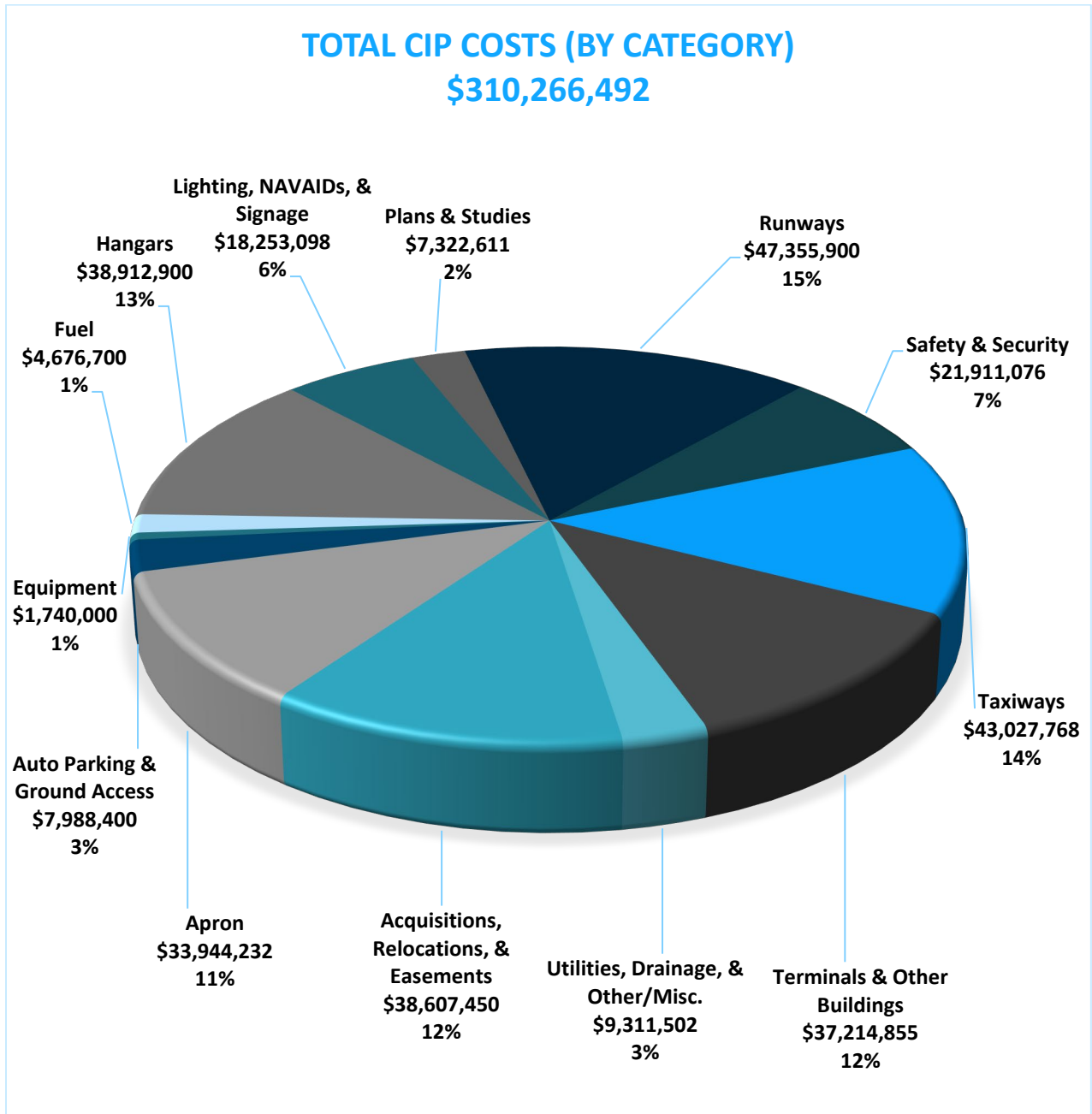
As shown in **Table 7-9**, if fully implemented, CIP projects for system airports also require a significant investment, totaling over \$310 million over the next five years; on average, \$62 million per year will be required to fund all existing CIPs as they have been submitted for MoDOT funding. By CIP project category, runway projects make up the largest share of costs, followed by taxiway projects, hangar projects, RPZ projects (acquisitions, relocations, and easements), terminals/other buildings projects, and apron projects. The remaining project categories each represent less than 10 percent of the total cost. By system role, Regional Business airports represent the largest share of CIP costs, followed by Business Community, National Business, Commercial, and Community Local airports. Only a portion of the CIP costs for the airports in the Commercial role are reflected in this analysis. Therefore, as a percentage of the total, the CIP needs reflected for the Commercial airports are under-reported.

**Figure 7-14** and **Figure 7-15** graphically depict the share of CIP-related costs by project category and system role.





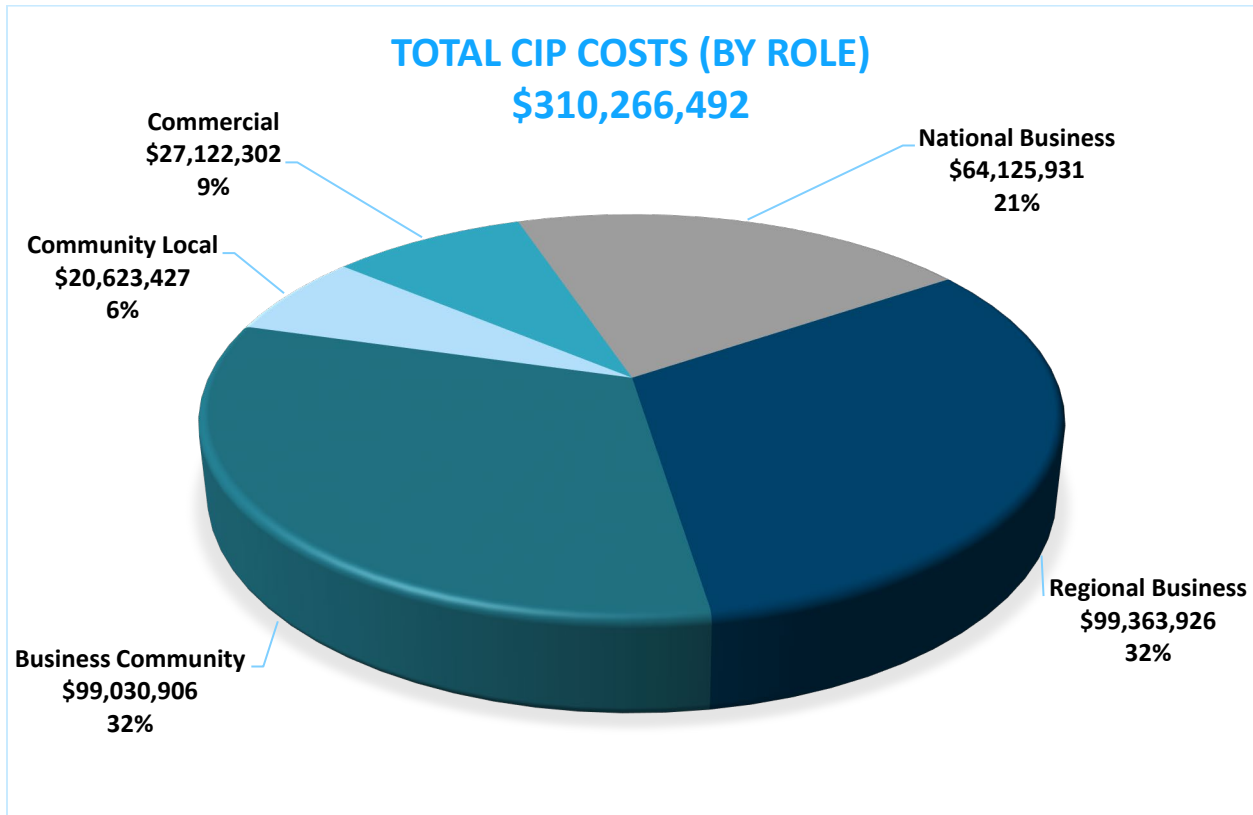
FIGURE 7-14: CIP COSTS BY PROJECT CATEGORY



Source: Jviation



FIGURE 7-15: CIP COSTS BY ROLE



Source: Jviation



### 7.4.3 Combined Estimated Development Costs

Combining all cost estimates (System Plan objectives, pavement maintenance projects, and airport CIPs) results in total development costs of over \$702 million over the next five years. **Table 7-10** presents a summary of the combined development costs by project category and airport role.

TABLE 7-10: SUMMARY OF COMBINED DEVELOPMENT COSTS BY PROJECT CATEGORY AND ROLE

Project Category	Commercial	National Business	Regional Business	Business Community	Community Local	Combined Development Costs (by Category)	Percentage of Total
Acquisitions, Relocations, & Easements	\$1,050,000	\$14,525,000	\$9,667,000	\$11,906,450	\$1,459,000	\$38,607,450	6%
Apron	\$1,700,000	\$25,002,000	\$23,995,965	\$26,179,600	\$1,516,667	\$78,394,232	11%
Auto Parking & Ground Access	\$3,085,000	\$5,383,000	\$7,995,000	\$3,696,400	\$919,000	\$21,078,400	3%
Equipment	\$750,000	\$0	\$340,000	\$650,000	\$0	\$1,740,000	<1%
Fuel	\$600,000	\$0	\$3,450,000	\$7,485,700	\$216,000	\$11,751,700	2%
Hangars	\$4,780,000	\$6,451,000	\$18,172,680	\$13,279,220	\$2,820,000	\$45,502,900	6%
Lighting, NAVAIDs, & Signage	\$225,000	\$8,469,366	\$15,949,000	\$6,055,872	\$5,513,860	\$36,213,098	5%
Pavement Maintenance	\$22,939,000	\$48,868,230	\$35,474,067	\$26,959,832	\$26,667,001	\$160,908,130	23%
Plans & Studies	\$355,000	\$825,000	\$2,446,111	\$2,792,500	\$904,000	\$7,322,611	1%
Runways & Taxiways	\$11,981,400	\$36,806,893	\$93,780,271	\$68,138,912	\$6,301,920	\$217,009,396	31%
Safety & Security	\$2,078,000	\$1,793,600	\$11,137,780	\$4,599,196	\$2,302,500	\$21,911,076	3%
Terminals & Other Buildings	\$7,050,000	\$17,730,255	\$18,868,000	\$7,866,300	\$1,100,000	\$52,614,555	8%
Utilities, Drainage, & Other/Misc.	\$3,194,302	\$300,000	\$3,930,000	\$516,000	\$1,371,200	\$9,311,502	1%
Combined Development Costs (by Role)	\$59,787,702	\$166,154,344	\$245,205,874	\$180,125,982	\$51,091,148	\$702,365,050	100%
<b>Percentage of Total</b>	<b>8%</b>	<b>24%</b>	<b>35%</b>	<b>26%</b>	<b>7%</b>	<b>100%</b>	

Source: Jviation

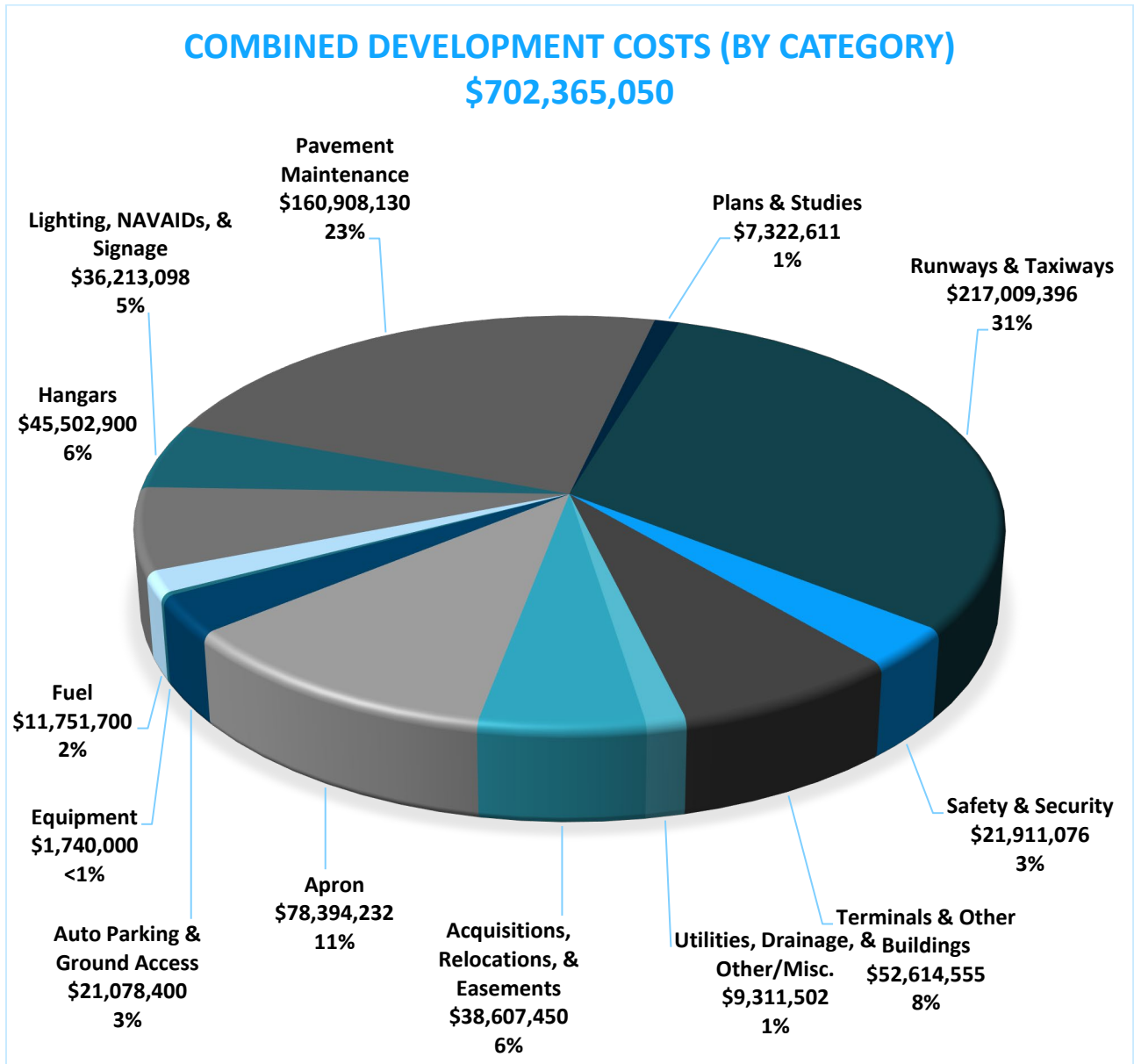
Note: Cost summaries reflected in this table do not fully capture the investment needs for Commercial airports.

As shown in **Table 7-10**, by consolidated project category the largest share of costs is for runways and taxiways; followed by pavement maintenance; apron; terminals and other buildings; hangars; RPZ projects (acquisitions, relocations, easements); and lighting/NAVAIDs/signage. The remaining project categories each represent less than five percent of the total cost. By system role, Regional Business airports represent the largest share of combined development costs, followed by Business Community, National Business, Commercial, and Community Local airports.

**Figure 7-16** and **Figure 7-17** graphically depict the share of combined development costs by project category and system role.



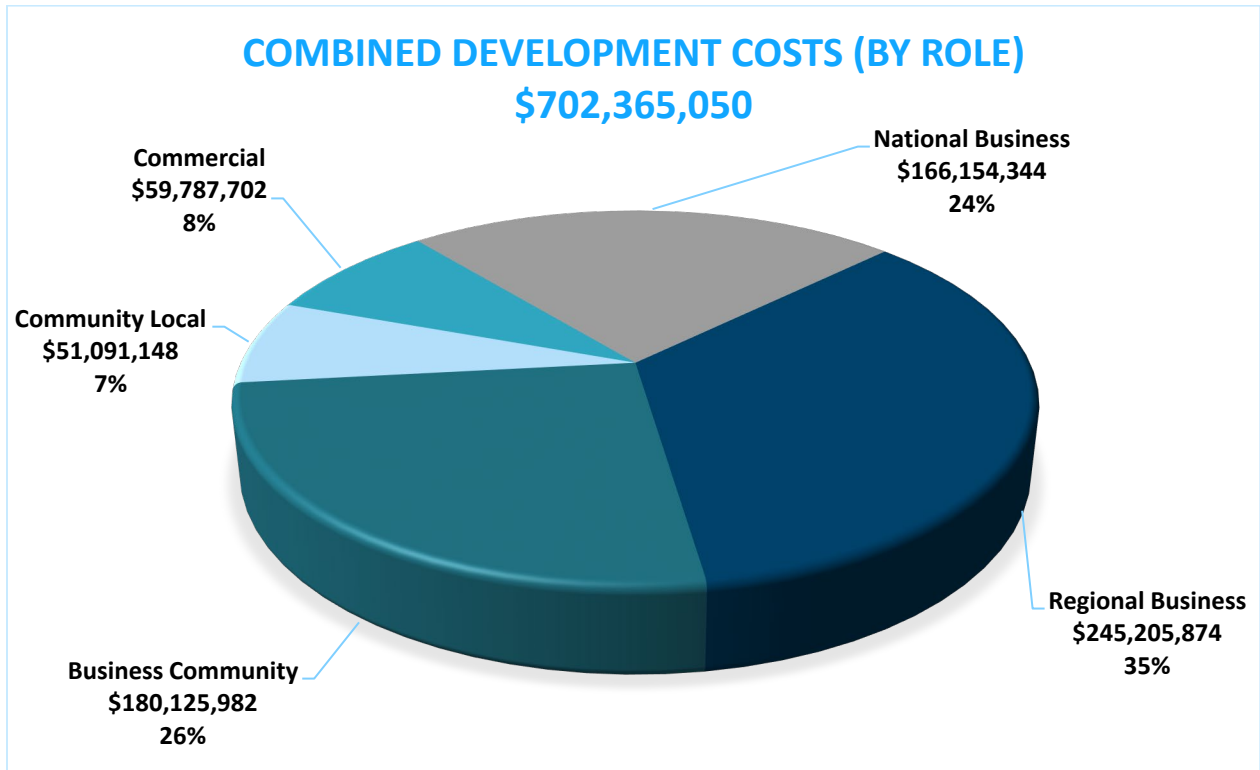
FIGURE 7-16: COMBINED DEVELOPMENT COSTS BY PROJECT CATEGORY



Source: Jviation



FIGURE 7-17: COMBINED DEVELOPMENT COSTS BY ROLE



Source: Jviation

Table 7-11 presents a summary of the combined development costs identified by role and plan, and Figure 7-18 depicts the share of development costs by plan. As shown, costs associated with System Plan recommendations make up the second largest share of total estimated development costs with 33 percent of the total. CIP project costs represent the largest share with 44 percent, while pavement maintenance projects make up 23 percent of the total estimated development costs over the next five years. When just system planning related projects are considered, total costs are estimated at \$231 million (this estimate excludes CIP projects and pavement maintenance projects).

TABLE 7-11: SUMMARY OF COMBINED DEVELOPMENT COSTS BY ROLE AND PLAN

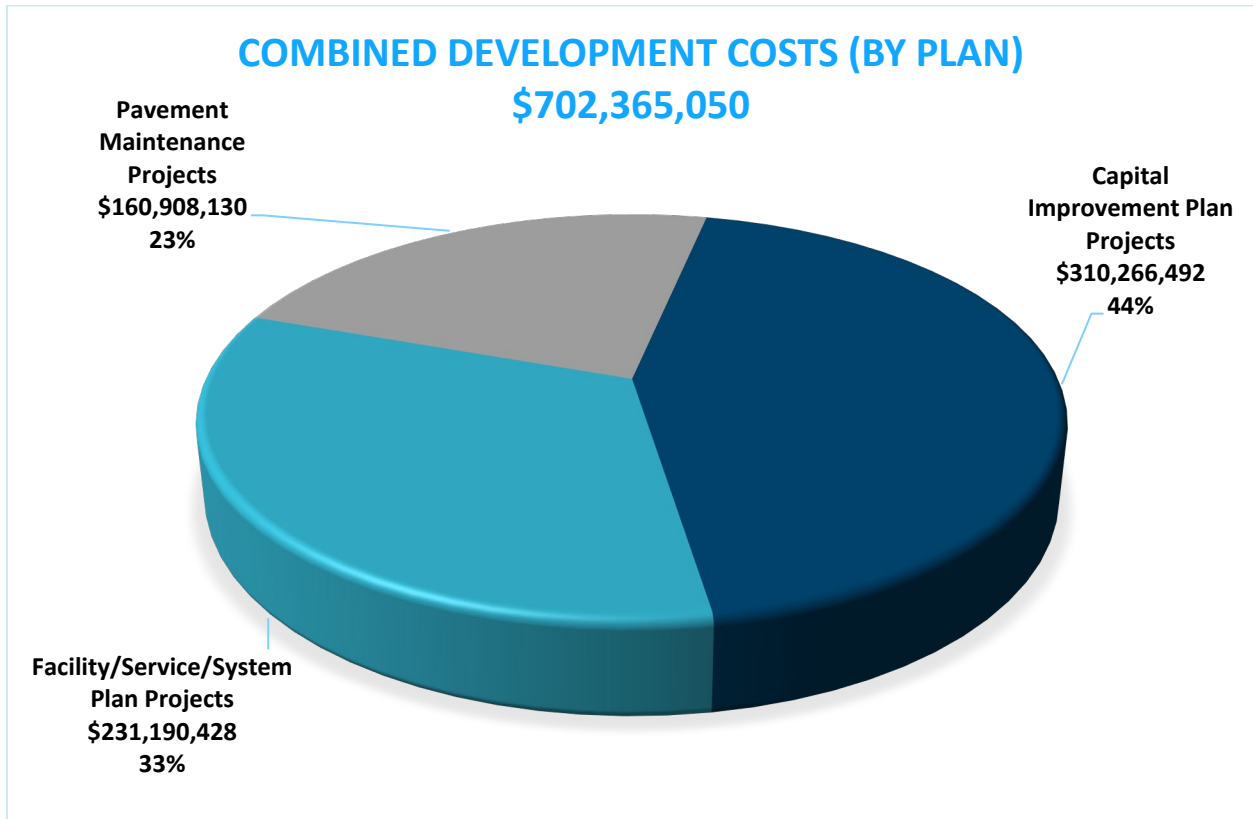
Plan	Commercial	National Business	Regional Business	Business Community	Community Local	Combined Development Costs (by Plan)	Percentage of Total
Facility/Service/System Plan Projects	\$9,726,400	\$53,160,183	\$110,367,881	\$54,135,244	\$3,800,720	\$231,190,428	33%
Pavement Maintenance Projects	\$22,939,000	\$48,868,230	\$35,474,067	\$26,959,832	\$26,667,001	\$160,908,130	23%
Capital Improvement Plan Projects	\$27,122,302	\$64,125,931	\$99,363,926	\$99,030,906	\$20,623,427	\$310,266,492	44%
Combined Development Costs (by Role)	\$59,787,702	\$166,154,344	\$245,205,874	\$180,125,982	\$51,091,148	\$702,365,050	100%
<b>Percentage of Total</b>	<b>8%</b>	<b>24%</b>	<b>35%</b>	<b>26%</b>	<b>7%</b>	<b>100%</b>	

Source: Jviation

Note: Cost summaries reflected in this table do not fully capture the investment needs for Commercial airports.



FIGURE 7-18: COMBINED DEVELOPMENT COSTS BY PLAN



Source: Jviation





### 7.4.4 Average Annual Development Cost

The combined development costs for all system airports are estimated at over \$702 million over five years. On an average annual basis, the estimated development cost for all projects is \$140 million. It is worth noting that since MoDOT does not always participate in funding for the primary Commercial airports, the actual financial need for Commercial airports in Missouri is significantly higher than the estimate presented here. **Table 7-12** presents the average annual development need by airport type and plan. It worth re-stating that these costs include not only projects identified by the System Plan’s facility/service objectives analysis, but also projects in each airport’s individual CIP as submitted to MoDOT and the Missouri’s most current pavement management plan.

TABLE 7-12: AVERAGE ANNUAL DEVELOPMENT NEED

Airports	5-Year Average Cost - System Plan	5-Year Average Cost - Pavement	5-Year Average Cost - CIP	5-Year Average Cost - Combined	Percentage of Total
General Aviation Airports	\$44,292,806	\$27,593,826	\$56,628,838	\$128,515,470	91%
Commercial Service	\$1,945,280	\$4,587,800	\$5,424,460.40	\$11,957,540	9%
<b>All Airports</b>	<b>\$46,238,086</b>	<b>\$32,181,626</b>	<b>\$62,053,298</b>	<b>\$140,473,010</b>	<b>100%</b>

Source: Jviation

Note: Cost summaries reflected in this table do not fully capture the development needs for Commercial airports.

As previously mentioned, projects contributing to the cost estimates presented in this chapter are available in **Appendix D, Airport Report Cards**. Each airport’s report card shows individual airport projects and costs by source (System Plan, CIP, and pavement maintenance). It is important to review typical sources of airport funding and to identify any gap between needed and available funds.

## 7.5 Funding

Airport projects in Missouri are accomplished through a combination of federal (FAA), state, and local funding. In general, airports that are eligible for FAA and state funding must be available for public use (i.e. not encumbered by an exclusive use agreement), and they are required to meet appropriate FAA design standards. Airports eligible for FAA funds must be included in the NPIAS. Projects that are eligible for state and federal funding are subject to both state and FAA priority rankings considerations, grant assurances, and funding availability. FAA Order 5100.38D, the Airport Improvement Program (AIP) Handbook<sup>2</sup>, presents a detailed list of projects that are and are not eligible for FAA funding.

It is important to compare development cost estimates to funds that could be available to address identified investment needs. It is also important to note that annual changes in funding needs should be expected, as should changes in federal and state funding that is available to meet those needs. This section is intended to give a general understanding of any anticipated shortfalls in funding that might be experienced.

### 7.5.1 Federal Funding and State Funding

The last three fiscal years of FAA funds granted to Missouri airports are shown in **Table 7-13**. Not counting grants administered directly by FAA to Commercial airports, on average over the past three years, the state received about \$26.6 million in Federal Airport Improvement Program (AIP) funding. State funding for airports (from the Missouri Aviation Trust Fund) over the three-year period averaged \$5.3 million. Established in 1998, the Missouri State Aviation Trust Fund is an important tool for Missouri airports. Revenue for this program is

<sup>2</sup> [https://www.faa.gov/airports/aip/aip\\_handbook/](https://www.faa.gov/airports/aip/aip_handbook/)



generated from a 4.225 percent sales tax on jet fuel and a nine-cent-per-gallon excise tax on AvGas sold in Missouri. Of the taxes generated, three percent is allocated to the Missouri State Aviation Trust Fund.

When both historic FAA and state funding are considered, on average each year there has been approximately \$32 million to address project needs at Missouri airports. This amount does not include local or private investment, or local match required to leverage state and FAA funding, and as mentioned earlier does not include AIP grant issued to Commercial service airports.

TABLE 7-13: HISTORIC FUNDING FOR MISSOURI AIRPORTS

Fiscal Year	2016	2017	2018	Three-Year Average
State Block Grant Program	\$29,697,989	\$29,577,355	\$19,349,597	\$26,208,314
Other Federal Funding *	\$201,474	\$790,716	\$212,723	\$401,638
Subtotal Federal Funding	\$29,899,463	\$30,368,071	\$19,566,320	\$26,609,952
State Aviation Trust Fund	\$4,400,950	\$4,523,086	\$7,063,769	\$5,329,268
<b>Total Funding</b>	<b>\$34,300,413</b>	<b>\$34,891,157</b>	<b>\$26,626,089</b>	<b>\$31,939,220</b>

\* FAA funding for statewide planning projects.

### 7.5.2 Anticipated Costs Versus Anticipated Funding Availability

Table 7-12 shows potential average annual funding needs for Missouri airports over the next five years. These estimates do not include costs associated with most projects at Commercial service airports that are not funded under the State Block Grant Program. Considering all system planning projects, individual airport CIPs, and pavement projects, the five-year financial need for the airports is estimated to be \$702 million.

Average annual costs to implement all System Plan-related projects are estimated at approximately \$46 million. Average annual costs to address current CIP requests are estimated at \$62 million. Average annual costs to address pavement maintenance projects as they are currently known are estimated at \$32 million. Combined, an average annual investment need is estimated at \$140 million.

When the total average annual investment need of \$140 million from the System Plan, CIPs, and pavement maintenance projects is compared to anticipated annual federal and state funds (\$32 million) that could be available to meet this need, it is clear that a significant annual funding gap can be anticipated. It is unlikely that additional state or FAA funding will be forthcoming, which means that investment decisions need to be made to help ensure that airports and projects that are most critical to the success of the Missouri airport system are funded. The System Plan provides an important decision-making information by identifying projects and actions that are important to raising the bar for future system performance. As future investment is made in the Missouri airport system, recommendations from the System Plan should be considered to inform those investment choices.

### 7.6 Need vs Benefit

As previous discussed, the combined five-year development cost (“need”) of \$702 million consists of a wide range of projects at each airport, with the average annual investment need for these projects being estimated at \$140 million.



Missouri’s last statewide economic impact study (2012) identified an economic impact, or “benefit,” quantified total annual economic activity supported by the airports. Total annual economic activity (consisting of direct, indirect, and induced impacts) resulting from all Missouri commercial and general aviation airports (excluding St. Louis Lambert or Kansas City International Airports) was estimated at \$1.5 billion. When the state’s two largest commercial airports are included, the estimate of annual economic impact increases to \$11.1 billion.

The \$1.5 billion in annual economic impact from the airports far outweighs the \$140 million average annual development cost for the system.

Missouri airports are important economic engines, valuable transportation resources, and they support countless benefits for the communities they serve. The state and communities throughout Missouri served by its airports receive a positive return for all investment that is made to improve and maintain the state airport system.



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