VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

Part 3

Recommendations and Findings

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Table of Contents

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Technical Report Summary

This is the third of three parts that comprise the technical report of the Virginia Air Transportation System Plan (VATSP). Part 3 takes the analysis and findings of Part 2 and uses them to develop airport recommendations, estimated costs, and steps for implementing the changes recommended for the continued success of the Commonwealth's aviation system.

Part 3 contains the following chapters:

- Chapter 8: Recommended Aviation System
- Chapter 9: Costs and Funding
- Chapter 10: Implementation Plan

Chapter 8 – Recommended Aviation System provides potential improvements that were developed in response to the specific airport and system shortfalls identified in Part 2. These improvements are grouped by the process from which they were developed, looking at system coverage, facilities, equipment, and services, licensing and safety standards, and NAVAID maintenance and improvements. Improvements to address shortfalls are made for individual airports, with those airports facing development constraints noted.

Chapter 9 – Costs and Funding evaluates the financial side of the Virginia aviation system and its recommended improvements. It starts with a look at the various sources of capital funding available to the airports of Virginia. From there, it documents the funding levels of these sources, providing details as to how these funds are allocated between different types of airports. The chapter continues with an explanation of how costs were estimated for the recommended projects and summarizes those costs by airport role and by planning period. These cost estimates are then used as part of the funding analysis that starts by assessing what state and federal capital improvement funds Virginia's airports are expected to have available out to 2044. These funds are then compared to the estimated costs of the recommendations by year to determine an accumulated funding gap. Finally, the chapter looks at how Virginia stacks up against peer states in terms of airport funding and provides some information on non-traditional funding possibilities.

Chapter 10 – Implementation Plan provides some background and steps for planning for the implementation of the recommended improvements to the Virginia aviation system. It begins with an overview of the legislative framework that governs state administration of Virginia's airports. It then discusses the funding gap and possible approaches Virginia could consider to address that gap. These approaches range from potential new revenue sources to revisions in the ways that Virginia decides what projects are pursued in an environment with limited funding. The chapter concludes with a broad phased approach to implement the recommended improvements and steps to allow Virginia to track progress towards accomplishing its goals.

Source: John Jeniec.

Chapter 8: Recommended Aviation System

The Virginia Air Transportation System Plan (VATSP) conducted an extensive inventory of the Virginia aviation system and then tailored the analysis of that data to address specific needs identified by the Virginia Department of Aviation (DOAV). These analyses looked at the performance of the overall aviation system, subcomponents of the system, and individual system airports. From these analyses, specific system and airport shortfalls were identified and potential improvements were developed that could address those shortfalls. These improvements are explained in this chapter and grouped by the process from which they were developed, as listed under the section headings. There are four broad categories that were used to group the recommended system improvements into sections. These sections and their content are summarized below.

System Coverage

This section provides the recommendations that were developed based on the Commonwealth's existing system coverage, and discusses the following:

- Flight support coverage
- Recommended improved coverage in Southwest Virginia
- Proposed airports.

Facilities, equipment, and services

Improvements at Virginia system airports could enhance their ability to effectively fulfill their assigned roles. This section provides recommendations for facilities, equipment, and services that can be implemented at each airport based on their role, and is organized by the following types of improvement:

- Runway-Related Items
- Taxiway-Related Items
- Weather Reporting
- Navigational Aids/Improved Approach
- Remote Towers
- Terminal Improvements
- Hangar Improvements
- Maintenance Equipment
- Parking
- Utilities
- Average Airport Pavement Improvements

Licensing and safety standards

Various state and federal regulations influenced the recommendations included in this section, which are broken down into the following:

- Virginia Airport Licensing Standards
- Virginia Basic Airport Unit
- FAA Design Standards

Navigation Aids (NAVAID) maintenance and improvements

The inventory evaluated the NAVAIDs at each airport and the need to replace or upgrade aviation equipment. This section includes the recommendations for improving the NAVAID system based on this evaluation. The specific equipment types covered are:

- Weather Reporting
- Runway Lighting Improvements
- Approach Equipment Improvements
- Obstruction Removal.

The recommended improvements are explained in more detail for each category in the following sections. As these recommendations are based on a system-level analysis of Virginia's airports, these recommended improvements will need independent analysis at the individual airport level. Any airport improvement would need to be on an approved airport layout plan and have sufficient justification documented to be eligible for state or federal funding assistance. Inclusion in this system plan can aid in the justification argument but is generally insufficient on its own.

Source: DOAV.

System Coverage

The analysis of system coverage showed that Virginia has a well-developed, mature aviation system that provides extensive coverage to both flight operations and access to Virginia's population. As a result, only a handful of recommendations were developed from this analysis.

Flight Support Coverage

As prior analysis demonstrated, the flight support services[1] provided coverage across nearly all of Virginia. For example, all Virginia airports but a few offer some type of aviation fuel, so coverage by airports providing fuel is available across Virginia. It is only when parsing the analysis to look at flight support coverage by airports providing jet fuel that opportunities for expanding coverage are found. **Table 8-1** lists the airports – Lee County (0VG) and William M. Tuck (W78) – where jet fuel services are recommended to expand the flight support coverage, assuming demand for jet fuel is sufficient in these markets. This appears to be the case at Lee County, where the airport is in the process of adding a jet fuel farm, expected to be operational no later than 2023.

The analysis of coverage by airports with instrument approach procedures (IAP) was similar since every system airport has an IAP – further evidence of the deliberate development efforts of DOAV. Extending the analysis to airports with IAPs with vertical guidance resulted in one small area of Virginia lacking this flight support coverage. As shown in **Table 8-1**, it is recommended that the IAP at Luray Caverns (LUA) be improved to include vertical guidance.

Table 8-1: Recommended Flight Support Improvements

ID	Airport	Add Jet Fuel Farm	Improve IAP to Include Vertical Guidance
0VG	Lee County	Yes	-
W78	William M. Tuck	Yes	-
LUA	Luray Caverns	-	Yes

Source: Mead & Hunt.

[1] Flight support services consist of aviation fueling, instrument approaches, and automated weather reporting.

Improved Coverage in Southwest Virginia

When a more granular approach was used to analyze Virginia's aviation system coverage, it was found that certain regions could benefit from airport improvements that would increase access to the aviation system. Southwest Virginia was identified as a region that stood to gain from additional airport facilities. The recommended system highlights two enhanced airport facilities – the construction of Grundy Replacement Airport and a runway extension at Twin County Airport (HLX), as detailed in **Table 8-2**.

These two improvements would increase the access of southwest Virginia's population to airports with 5,000-foot runways. These two airports would also improve the ability of air ambulance operators to access this part of the state, since both airports would meet the criteria outlined in the analysis of airports capable of serving fixed-wing air ambulance operations (4,500-foot runway, an instrument approach with vertical guidance, automated weather reporting and jet fuel available 24 hours per day). While these airports would not meet the criteria established for serving business aircraft (falling short of the 5,500-foot runway criteria), these improvements would help address density altitude concerns in mountainous region by providing more airports with runways of at least 5,000 feet where feasible.

Table 8-2: Improvements to Enhance Southwest Virginia

ID	Airport	Recommended Improvement
GDY	Grundy Replacement Airport	• Planned runway of 5,100 feet • Planned IAP with vertical guidance and minimums of 200' and ¾ mile • Planned jet fuel and avgas available 24 hours/day • Planned AWOS*
HLX	Twin County Airport	• Extend runway to 5,000 feet

Note: Runway extensions recommended in the VATSP are for high level analysis and cannot be used for justification purposes during the master planning process.
*AWOS = Automated Weather Observing System
Source: Mead & Hunt.

Proposed airports

Even with the extensive coverage provided by the Virginia aviation system, there are ways to incrementally improve the system, especially when considering the coverage provided by subcomponents of the system. Three of the four new general aviation airports that were proposed in the 2016 system plan are included in this recommended plan. These airports aim, in part, to improve Virginia's population access by addressing shifting population density across the state. These airports are referred to as:

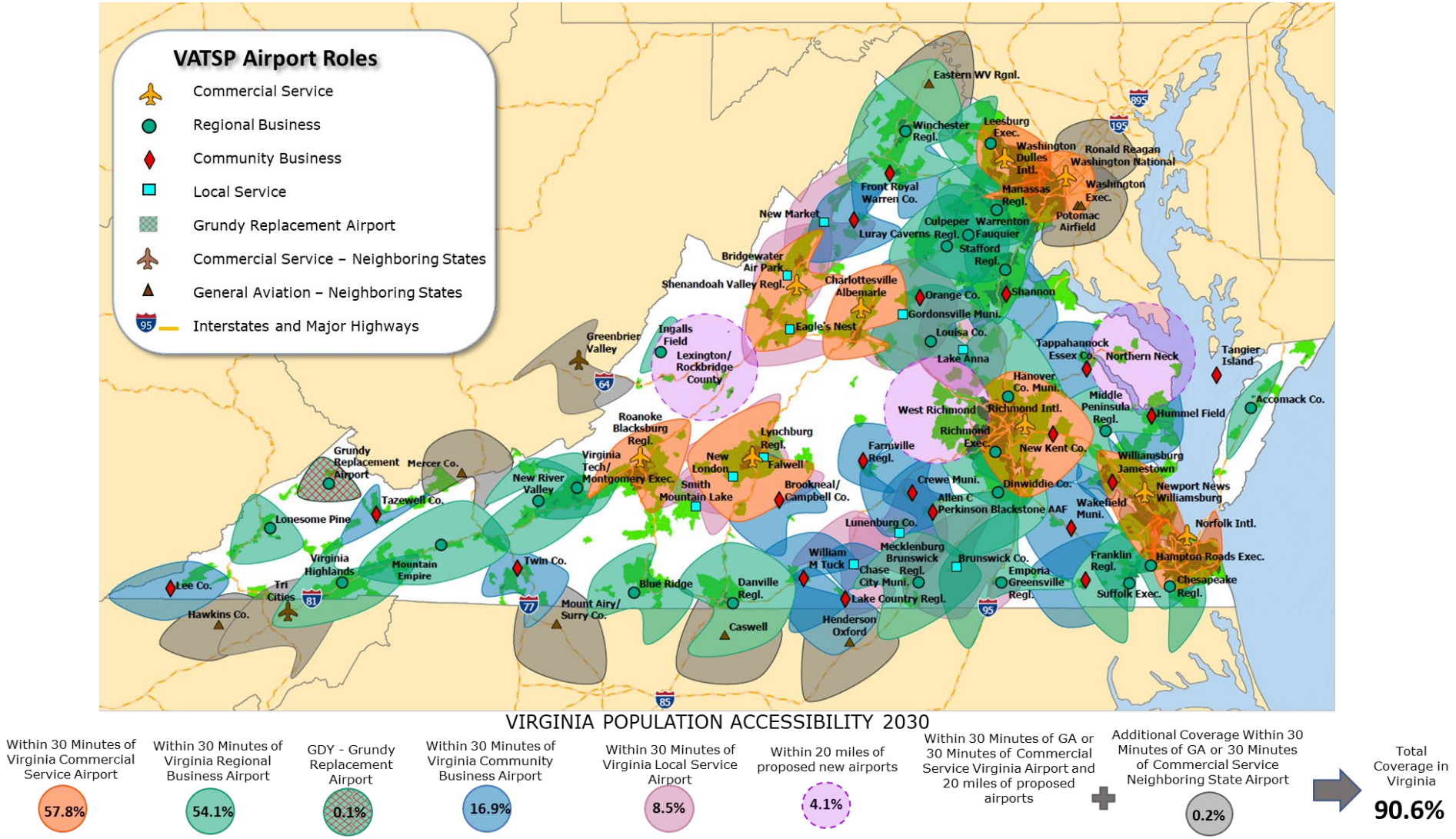
- Lexington/Rockbridge County
- West Richmond
- Northern Neck

Figure 8-1 shows the general location of the proposed airports and indicates that these airports could improve the percentage of Virginia's population that has 30-minute access to general aviation airports by 4 percent.

These airports would provide other benefits to the system beyond increased general accessibility. They would provide access for business aircraft to areas of Virginia with growing population centers with potential to develop into growing business centers. In addition, the locations of these proposed airports are such that they would provide back up for non-National Plan of Integrated Airport Systems (NPIAS) and privately-owned general aviation system airports. It is assumed that if new system airports are developed, they would come into the system as Regional Business Airports that are included in the NPIAS, making them eligible for Federal Aviation Administration (FAA) funding. Airports included in the NPIAS provide greater long-term stability for the system. Furthermore, as Regional Business Airports, these airports have the facilities that will improve access for business aircraft and for air ambulance aircraft, enhancing these services for the people of Virginia.

Under the current DOAV funding programs, inclusion in the NPIAS is imperative for a new airport to be fully developed. It is also important to note that local support is the driving factor for new airport development under the current programs.

Source: Andrew Crider.



Source: Cignus, LLC.

Figure 8-1: Virginia's Aviation System Population Coverage with Proposed New Airport Locations

Facilities, Equipment and Services

The analysis of the system airports based on their roles showed that numerous improvements could enhance the ability of these airports to effectively fulfill their roles. In the following section, the various facilities, equipment, and services that are recommended for each airport based on its role are explained and detailed in tables organized by the type of improvement. Based on a review by DOAV, some recommended improvements are denoted with an asterisk (*) to indicate that this particular improvement has considerable constraints to overcome and is less likely to be undertaken. These constraints include significant terrain challenges, limited community support, and fiscal restraints.

Runway Related Items

Table 8-3 lists those airports recommended for primary runway extensions and **Table 8-4** shows the airport recommended for a primary runway widening to allow it to function in its respective role more efficiently. Longer runways will permit the aircraft that operate at these airports to make better use of their full capabilities. It is notable that all but one runway extension (Luray Caverns) is constrained in some way. Only one airport – New London – is recommended for a wider runway.

Table 8-3: Recommended Primary Runway Extensions

ID	Airport	Existing Runway Length (ft.)	Recommended Runway Length (ft.)
LKU	Louisa County/Freeman Field	4,300	5,000*
W81	Crewe Municipal	3,300	3,500*
FRR	Front Royal-Warren County	3,008	3,500*
W75	Hummel Field	3,220	3,500*
LUA	Luray Caverns	3,126	3,500
OMH	Orange County	3,200	3,500*
EZF	Shannon	2,999	3,500*
TGI	Tangier Island	2,426	3,500*
JGG	Williamsburg-Jamestown	3,204	3,500*

Note: * Considerable constraints to improvement; Runway extensions recommended in the VATSP are for high level analysis and cannot be used for justification purposes during the master planning process.
Source: Mead & Hunt.

Table 8-4: Recommended Primary Runway Widenings

ID	Airport	Existing Runway Width (ft.)	Recommended Runway Width (ft.)
W90	New London	40	50*

Note: * Considerable constraints to improvement; Runway extensions recommended in the VATSP are for high level analysis and cannot be used for justification purposes during the master planning process.
Source: Mead & Hunt.

Table 8-5 shows the airports that are recommended for primary runway strengthening improvements. For those airports that do not indicate an existing runway strength, data was not available. It is recommended that the runway strengthening projects in **Table 8-5** be undertaken the next time that the runway is rehabilitated rather than as stand-alone projects. Recommended runway instrumentation improvements are listed in **Table 8-6**.

Table 8-5: Recommended Primary Runway Strengthening

ID	Airport	Existing Runway Strength (thousands of lbs.)	Recommended Runway Strength (thousands of lbs.)
MFV	Accomack County	SW 26.0	SW 30.0
PTB	Dinwiddie County	SW 25.0	SW 30.0
GDY	Grundy Replacement Airport	-	SW 30.0
LKU	Louisa County/Freeman Field	SW 12.5	SW 30.0
AVC	Mecklenburg-Brunswick Regional	SW 25.0	SW 30.0
MKJ	Mountain Empire	SW 20.0	SW 30.0
W81	Crewe Municipal	SW 12.0	SW 12.5
FKN	Franklin Regional	-	SW 12.5
OMH	Orange County	SW 12.0	SW 12.5
EZF	Shannon	-	SW 12.5

Notes: SW = Single wheel; - = Data not available
Source: Mead & Hunt.

Table 8-6: Recommended Instrumentation for Primary Runway

ID	Airport	Install Precision Approach Path Indicator	Install Runway End Identifier Lights	Install Medium Intensity Runway Lights
GDY	Grundy Replacement Airport	Yes	-	-
BKT	Allen C Perkinson Blackstone AAF	Yes	Yes	-
W81	Crewe Municipal	Yes	Yes	-
FKN	Franklin Regional	-	Yes	-
FRR	Front Royal-Warren County	Yes	Yes	-
W75	Hummel Field	Yes	Yes	-
W63	Lake Country Regional	Yes	Yes	-
EZF	Shannon	-	Yes*	-
TGI	Tangier Island	Yes*	Yes*	Yes*
AKQ	Wakefield Municipal	Yes	Yes	-
JGG	Williamsburg-Jamestown	Yes	Yes	-

Note: * Considerable constraints to improvement
Source: Mead & Hunt.

Taxiway Related Items

Projects are recommended at 12 airports for improvements to their taxiway systems, as shown in **Table 8-7**. Four of these airports are identified as having considerable constraints that could impact the feasibility of improving their taxiway systems.

Table 8-7: Recommended Taxiway System Improvements

ID	Airport	Recommended Taxiway System Improvement
MFV	Accomack County	Expand Partial Parallel to Full Parallel
LNP	Lonesome Pine	Expand Partial Parallel to Full Parallel*
BKT	Allen C Perkinson Blackstone AAF	Expand Stub Taxiway to Partial Parallel
0V4	Brookneal/Campbell County	Expand Stub Taxiway to Partial Parallel
W81	Crewe Municipal	Expand Stub Taxiway to Partial Parallel*
FVX	Farmville Regional	Expand Stub Taxiway to Partial Parallel
W75	Hummel Field	Expand Stub Taxiway to Partial Parallel
W63	Lake Country Regional	Expand Stub Taxiway to Partial Parallel*
LUA	Luray Caverns	Expand Stub Taxiway to Partial Parallel
TGI	Tangier Island	Expand Stub Taxiway to Partial Parallel*
JFZ	Tazewell County	Expand Stub Taxiway to Partial Parallel
AKQ	Wakefield Municipal	Expand Stub Taxiway to Partial Parallel

Note: * Considerable constraints to improvement
Source: Mead & Hunt.

Source: DOAV.

Weather Reporting

One more indication of the degree to which the aviation system has been well-developed by DOAV is that the only airport recommended for installing automated weather reporting equipment (AWOS) is the Grundy Replacement Airport, as shown in **Table 8-8**. Automated weather reporting equipment is common throughout the Virginia aviation system, which is why the replacement airport is the sole recommendation. Several Virginia airports will need AWOS upgrades or replacements as well over the next 20 years. These projects are noted later.

Table 8-8: Recommended Automated Weather Reporting Improvements

ID	Airport	Install AWOS
GDY	Grundy Replacement Airport	Yes

Source: Mead & Hunt.

Navigational Aids/Improved Approach

Table 8-9 lists the recommended visual guidance improvements for Virginia's system airports. Four airports need a rotating beacon, while four other airports would benefit from lighted windcones. Finally, Lake Anna has no wind indicator of any type and would be improved with the installation of a windcone.

Table 8-9: Recommended Visual Guidance Improvements

ID	Airport	Install Rotating Beacon	Install Lighted Windcone	Install Windcone
GDY	Grundy Replacement Airport	Yes	Yes	-
JYO	Leesburg Executive	-	Yes	-
W63	Lake Country Regional	-	Yes	-
TGI	Tangier Island	-	Yes*	-
CXE	Chase City Municipal	Yes	-	-
W24	Falwell	Yes	-	-
7W4	Lake Anna	-	-	Yes
W90	New London	Yes	-	-

* Considerable constraints to improvement
Source: Mead & Hunt.

Source: Mead & Hunt.

Since every Virginia system airport has an IAP, DOAV focused on improving the utility of the existing IAPs. **Table 8-10** lists the airports where an improvement to the IAP – either in terms of a lower cloud ceiling minimum, or lower flight visibility minimum – is recommended based on the airport's role.

Table 8-10: Recommended Instrument Approach Procedure Improvements

ID	Airport	Existing IAP Ceiling and Visibility	Recommended IAP Ceiling and Visibility
ROA	Roanoke-Blacksburg Regional/Woodrum Field	250 feet and 0.75 miles	Improve ceiling to 200 feet and visibility to 0.5 mile
CJR	Culpeper Regional	294 feet and 1 mile	Improve ceiling to 250 feet
HSP	Ingalls Field	300 feet and 0.875 miles	Improve ceiling to 250 feet
LNP	Lonesome Pine	278 feet and 1 mile	Improve ceiling to 250 feet
MKJ	Mountain Empire	577 feet and 2 miles	Improve ceiling to 250 feet and visibility to 1 mile
FRR	Front Royal-Warren County	1,116 feet and 1.25 miles	Improve ceiling to 500 feet and visibility to 1 mile
W75	Hummel Field	1,010 feet and 3 miles	Improve ceiling to 500 feet and visibility to 1 mile
LUA	Luray Caverns	557 feet and 1 mile	Improve ceiling to 500 feet
TGI	Tangier Island	555 feet and 1 mile	Improve ceiling to 500 feet
AKQ	Wakefield Municipal	1,010 feet and 3 miles	Improve ceiling to 500 feet and visibility to 1 mile
JGG	Williamsburg-Jamestown	1,011 feet and 3 miles	Improve ceiling to 500 feet and visibility to 1 mile

Source: Mead & Hunt.

The following airports did not meet their IAP target minimums but are not recommended for improvements to their IAP because they were within 20 feet of their target IAP ceiling. The marginal improvement in IAP ceiling was insufficient for justifying the effort needed to improve the IAP ceiling.

- Suffolk Executive (SFQ)
- Virginia Tech/Montgomery Executive (BCB)
- Lake Country Regional (W63)
- Orange County (OMH)

The controlling feature that limits an IAP's minimums can vary substantially. It may be an obstruction in the approach path, an obstruction on the way to the missed approach, a limit of the airport's facilities, or other factors. It is recommended that each airport identify what factor(s) is preventing improved IAP minimums, so airport management understands the effort necessary to improve its IAP.

Remote Towers

Virginia is home to one of only two remote towers currently in operation in the U.S. DOAV is interested in the prospects for expanding the use of this technology and the analysis identified two distinct opportunities. One opportunity is the replacement of federal contract towers (FCT), of which there are two in Virginia, as listed in **Table 8-11**. The other opportunity consists of non-towered airports with jet operations, also listed in **Table 8-11**. The airports listed in **Table 8-11** are for initial consideration. Further study is warranted to decide which, if any, of these airports could benefit from a remote tower.

Table 8-11: Recommended Remote Tower Consideration

ID	Airport	Possible Remote Tower Location	Possible Remote Tower Replacement of FCT
CHO	Charlottesville-Albemarle	-	Yes
LYH	Lynchburg Regional/Preston Glenn Field	-	Yes
SHD	Shenandoah Valley Regional	Yes	-
PVG	Hampton Roads Executive	Yes	-
OFP	Hanover County Municipal	Yes	-
FCI	Richmond Executive-Chesterfield County	Yes	-
VJI	Virginia Highlands	Yes	-
BCB	Virginia Tech/Montgomery Executive	Yes	-

Source: Mead & Hunt.

Terminal Improvements

Table 8-12 lists the recommended terminal facility expansions intended to meet DOAV targets for general aviation terminal size. Consideration should be given to undertaking these terminal expansions in conjunction with planned terminal refurbishments, especially for the smaller sized expansions.

Table 8-12: Recommended Terminal Improvements

ID	Airport	Recommended Terminal Improvements
GDY	Grundy Replacement Airport	Build new terminal
SFQ	Suffolk Executive	Expand terminal by 126 square feet*
0V4	Brookneal/Campbell County	Expand terminal by 958 square feet
W63	Lake Country Regional	Expand terminal by 181 square feet*
LUA	Luray Caverns	Expand terminal by 817 square feet
TGI	Tangier Island	Expand terminal by 1,609 square feet
AKQ	Wakefield Municipal	Expand terminal by 781 square feet
JGG	Williamsburg-Jamestown	Expand terminal by 2,839 square feet

Note: * Considerable constraints to improvement
Source: Mead & Hunt.

Hangar Improvements

Aircraft storage space was identified as one of the most needed infrastructure items in the Virginia aviation system. The analysis identified shortfalls in aircraft storage in 2022, as well as in 2044 based on forecasted based aircraft. **Table 8-13** provides the recommended increase in aircraft hangar space for airports that have or are expected to have a shortfall of aircraft storage space. These recommendations considered that there are economies of scale when investing in hangar space. Any need for hangar space for less than 10 aircraft was ignored.

Table 8-13: Recommended Hangar Space Improvements

ID	Airport	Recommended Hangar Improvements for 2022	Recommended Hangar Improvements for 2044
CHO	Charlottesville-Albemarle	-	Add hangar space for 17 additional aircraft
LYH	Lynchburg Regional/Preston Glenn Field	Add hangar space for 69 additional aircraft	Add hangar space for 23 additional aircraft
ORF	Norfolk International	Add hangar space for 39 additional aircraft	Add hangar space for 10 additional aircraft
ROA	Roanoke-Blacksburg Regional/Woodrum Field	Add hangar space for 91 additional aircraft	-
SHD	Shenandoah Valley Regional	Add hangar space for 31 additional aircraft	-
CPK	Chesapeake Regional	Add hangar space for 27 additional aircraft	Add hangar space for 48 additional aircraft
CJR	Culpeper Regional	Add hangar space for 13 additional aircraft	Add hangar space for 46 additional aircraft
OFP	Hanover County Municipal	Add hangar space for 49 additional aircraft	Add hangar space for 25 additional aircraft
JYO	Leesburg Executive	Add hangar space for 134 additional aircraft	-
LNP	Lonesome Pine	Add hangar space for 15 additional aircraft	-
HEF	Manassas Regional/Harry P Davis Field	Add hangar space for 250 additional aircraft	Add hangar space for 36 additional aircraft
AVC	Mecklenburg-Brunswick Regional	-	Add hangar space for 11 additional aircraft
FYJ	Middle Peninsula Regional	Add hangar space for 27 additional aircraft	Add hangar space for 11 additional aircraft
MKJ	Mountain Empire	Add hangar space for 13 additional aircraft	-
PSK	New River Valley	Add hangar space for 15 additional aircraft	-
RMN	Stafford Regional	Add hangar space for 19 additional aircraft	Add hangar space for 27 additional aircraft
BCB	Virginia Tech/Montgomery Executive	Add hangar space for 23 additional aircraft	-
HWY	Warrenton-Fauquier	Add hangar space for 11 additional aircraft	Add hangar space for 11 additional aircraft
OKV	Winchester Regional	Add hangar space for 44 additional aircraft	Add hangar space for 10 additional aircraft
W75	Hummel Field	Add hangar space for 19 additional aircraft	-
W96	New Kent County	Add hangar space for 11 additional aircraft	-
OMH	Orange County	Add hangar space for 13 additional aircraft	Add hangar space for 14 additional aircraft
EZF	Shannon	Add hangar space for 10 additional aircraft	-
XSA	Tappahannock-Essex County	-	Add hangar space for 15 additional aircraft
VBW	Bridgewater Air Park	Add hangar space for 40 additional aircraft	-
W13	Eagle's Nest	Add hangar space for 14 additional aircraft	-
W24	Falwell	Add hangar space for 10 additional aircraft	-

Source: Mead & Hunt.

Maintenance Equipment

Table 8-14 lists the recommended maintenance equipment for the airports shown.

Table 8-14: Recommended Maintenance Equipment Improvements

ID	Airport	Snow Removal Equipment	Debris Sweeper	Front End Loader	Truck	Tractor	Vehicle Attachments
MFV	Accomack County	-	Yes	Yes	-	-	Yes
MTV	Blue Ridge	-	Yes	-	-	-	-
CJR	Culpeper Regional	-	Yes	Yes	Yes	-	-
DAN	Danville Regional	-	-	Yes	-	-	-
PTB	Dinwiddie County	-	Yes	-	Yes	-	Yes
EMV	Emporia-Greensville Regional	-	Yes	Yes	-	-	Yes
HSP	Ingalls Field	-	Yes	Yes	-	-	Yes
JYO	Leesburg Executive	-	Yes	-	-	-	-
LNP	Lonesome Pine	-	Yes	Yes	-	-	Yes
LKU	Louisa County/Freeman Field	Yes	Yes	Yes	Yes	-	Yes
HEF	Manassas Regional/Harry P Davis Field	-	Yes	Yes	-	-	-
AVC	Mecklenburg-Brunswick Regional	Yes	Yes	Yes	Yes	-	Yes
FYJ	Middle Peninsula Regional	-	Yes	-	-	-	-
MKJ	Mountain Empire	-	Yes	-	-	-	-
PSK	New River Valley	-	Yes	Yes	-	-	Yes
RMN	Stafford Regional	-	Yes	-	-	-	-
SFQ	Suffolk Executive	Yes	Yes	-	-	-	Yes
BCB	Virginia Tech/Montgomery Executive	-	Yes	Yes	-	-	Yes
OKV	Winchester Regional	-	Yes	Yes	-	-	-
BKT	Allen C Perkinson Blackstone AAF	-	Yes	Yes	-	-	-
FVX	Farmville Regional	-	Yes	Yes	-	-	Yes
W75	Hummel Field	-	Yes	Yes	-	-	Yes
LUA	Luray Caverns	-	Yes	-	-	-	Yes
OMH	Orange County	-	Yes	-	-	-	Yes
EZF	Shannon	-	Yes	-	-	-	-
TGI	Tangier Island	-	-	Yes	-	-	-
XSA	Tappahannock-Essex County	-	-	Yes	-	Yes	Yes
JFZ	Tazewell County	-	Yes	-	-	-	Yes
JGG	Williamsburg-Jamestown	-	Yes	Yes	-	-	Yes

Source: Mead & Hunt.

Parking

The analysis for non-revenue parking identified more than two dozen airports that are recommended for additional parking. The greatest need was identified at Ronald Reagan Washington National Airport, where, due to space constraints as noted in **Table 8-15**, it will be challenging to meet the anticipated demand. Additionally, local planning efforts can better assess if the demand can be met through alternative means such as mass transit or other solutions that can lower the need for parking spaces.

Table 8-15: Recommended Non-Revenue Parking Improvements

ID	Airport	Recommended Additional Non-Revenue Parking Spaces
CHO	Charlottesville-Albemarle	Add 93 parking spaces
LYH	Lynchburg Regional/Preston Glenn Field	Add 185 parking spaces
ORF	Norfolk International	Add 467 parking spaces
RIC	Richmond International	Add 914 parking spaces
DCA	Ronald Reagan Washington National	Add 1,640 parking spaces*
MFV	Accomack County	Add 22 parking spaces
MTV	Blue Ridge	Add 48 parking spaces
CPK	Chesapeake Regional	Add 127 parking spaces
CJR	Culpeper Regional	Add 119 parking spaces
PTB	Dinwiddie County	Add 43 parking spaces
EMV	Emporia-Greensville Regional	Add 10 parking spaces
OFP	Hanover County Municipal	Add 77 parking spaces
JYO	Leesburg Executive	Add 278 parking spaces
LKU	Louisa County/Freeman Field	Add 48 parking spaces
HEF	Manassas Regional/Harry P Davis Field	Add 316 parking spaces
FYJ	Middle Peninsula Regional	Add 42 parking spaces
PSK	New River Valley	Add 34 parking spaces
FCI	Richmond Executive-Chesterfield County	Add 60 parking spaces
SFQ	Suffolk Executive	Add 74 parking spaces
VJI	Virginia Highlands	Add 54 parking spaces
HWY	Warrenton-Fauquier	Add 52 parking spaces
OKV	Winchester Regional	Add 127 parking spaces
BKT	Allen C Perkinson Blackstone AAF	Add 72 parking spaces
FRR	Front Royal-Warren County	Add 59 parking spaces
W75	Hummel Field	Add 26 parking spaces
W96	New Kent County	Add 25 parking spaces
OMH	Orange County	Add 82 parking spaces
JGG	Williamsburg-Jamestown	Add 41 parking spaces
W13	Eagle's Nest	Add 22 parking spaces
W24	Falwell	Add 16 parking spaces
GVE	Gordonsville Municipal	Add 18 parking spaces

Note: * Considerable constraints to improvement
Source: Mead & Hunt.

Source: Mead & Hunt.

Airport revenue parking needs at several of the commercial service airports were identified during the analysis portion of the study. **Table 8-16** lists those commercial service airports where additional revenue parking spaces are recommended. As parking tends to be an important revenue generator for commercial service airports, airport management typically focuses adequate attention on this need at the local level.

Table 8-16: Recommended Revenue Parking Improvements

ID	Airport	Recommended Additional Revenue Parking Spaces
CHO	Charlottesville-Albemarle	Add 232 parking spaces
LYH	Lynchburg Regional/Preston Glenn Field	Add 39 parking spaces
RIC	Richmond International	Add 389 parking spaces
DCA	Ronald Reagan Washington National	Add 2,976 parking spaces*
SHD	Shenandoah Valley Regional	Add 17 parking spaces

Note: * Considerable constraints to improvement
Source: Mead & Hunt.

Utilities

Recommended utility improvements are shown in **Table 8-17**. This includes two-way telecommunications, which can be met with a traditional public phone, or through cell phone coverage or web-enabled calls. Public water and public sewer recommendations were based on information provided by airports that responded to the study survey. Recommendations for airports that did not respond were not identified due to the lack of available data.

Table 8-17: Recommended Utility Improvements

ID	Airport	Two-Way Telecommunications	GA Terminal Public Restroom	GA Terminal Internet Access	Public Water	Public Sewer
MFV	Accomack County	Yes	-	Yes	-	-
MTV	Blue Ridge	-	-	-	Yes	Yes
CPK	Chesapeake Regional	-	-	-	Yes	-
DAN	Danville Regional	Yes	-	-	-	Yes
EMV	Emporia-Greensville Regional	Yes	-	-	Yes	Yes
LNP	Lonesome Pine	-	-	-	-	Yes
AVC	Mecklenburg-Brunswick Regional	Yes	-	-	-	Yes
HWY	Warrenton-Fauquier	Yes	-	-	-	-
BKT	Allen C Perkinson Blackstone AAF	-	-	-	Yes	Yes
0V4	Brookneal/Campbell County	Yes	-	Yes	Yes	Yes
FVX	Farmville Regional	Yes	-	Yes	Yes	Yes
FRR	Front Royal-Warren County	Yes	-	-	Yes	Yes
W75	Hummel Field	Yes	-	-	Yes	Yes

Table 8-17: Recommended Utility Improvements (continued)

ID	Airport	Two-Way Telecommunications	GA Terminal Public Restroom	GA Terminal Internet Access	Public Water	Public Sewer
W63	Lake Country Regional	Yes	-	Yes	-	-
0VG	Lee County	Yes	-	-	-	-
W96	New Kent County	Yes	-	-	-	-
EZF	Shannon	Yes	-	-	Yes	Yes
TGI	Tangier Island	Yes	-	Yes	Yes	Yes
XSA	Tappahannock-Essex County	Yes	-	-	Yes	Yes
JFZ	Tazewell County	Yes	-	-	-	-
AKQ	Wakefield Municipal	-	-	Yes	-	-
VBW	Bridgewater Air Park	Yes	Yes	Yes	-	-
CXE	Chase City Municipal	Yes	-	Yes	-	-
GVE	Gordonsville Municipal	Yes	Yes	-	-	-
7W4	Lake Anna	Yes	Yes	Yes	-	-
W90	New London	Yes	-	Yes	-	-
8W2	New Market	Yes	-	-	-	-

Source: Mead & Hunt.

Source: Heather Ream.

Average Airport Pavement Improvements

Earlier analysis established that many Virginia airports fell short of DOAV's target of maintaining an average airport pavement condition index (PCI) above 70. **Table 8-18** lists those airports where it is recommended that steps be taken to bring the airport's overall PCI above the 70 threshold.

Table 8-18: Recommended Pavement Improvements

ID	Airport	Recommended Pavement Improvements
PHF	Newport News-Williamsburg	Raise PCI to 70 or higher
ORF	Norfolk International	Raise PCI to 70 or higher
PTB	Dinwiddie County	Raise PCI to 70 or higher
OFP	Hanover County Municipal	Raise PCI to 70 or higher
HSP	Ingalls Field	Raise PCI to 70 or higher
JYO	Leesburg Executive	Raise PCI to 70 or higher
LNP	Lonesome Pine	Raise PCI to 70 or higher
HEF	Manassas Regional/Harry P Davis Field	Raise PCI to 70 or higher
FCI	Richmond Executive-Chesterfield County	Raise PCI to 70 or higher
HWY	Warrenton-Fauquier	Raise PCI to 70 or higher
W81	Crewe Municipal	Raise PCI to 70 or higher
FKN	Franklin Regional	Raise PCI to 70 or higher
FRR	Front Royal-Warren County	Raise PCI to 70 or higher
W75	Hummel Field	Raise PCI to 70 or higher
TGI	Tangier Island	Raise PCI to 70 or higher
AKQ	Wakefield Municipal	Raise PCI to 70 or higher
VBW	Bridgewater Air Park	Raise PCI to 70 or higher
LVL	Brunswick County	Raise PCI to 70 or higher
CXE	Chase City Municipal	Raise PCI to 70 or higher
W24	Falwell	Raise PCI to 70 or higher
GVE	Gordonsville Municipal	Raise PCI to 70 or higher
W31	Lunenburg County	Raise PCI to 70 or higher
W90	New London	Raise PCI to 70 or higher
8W2	New Market	Raise PCI to 70 or higher
W91	Smith Mountain Lake	Raise PCI to 70 or higher

Source: Mead & Hunt.

Licensing and Safety Standards

The recommendations stemming from licensing and safety standards are based on various state and federal regulations. The Code of Virginia § 5.1-7 *Licensing of airports and landing areas*, authorizes airport licensing standards, most of which are spelled out in the Virginia Administrative Code under 24VAC5-20-120 *Licenses*, 24VAC5-20-140 *Minimum requirements for licensing* and, 24VAC5-20-145 *Waiver of minimum requirements*.

Virginia Airport Licensing Standards

Virginia also establishes minimum facilities for new airports under its Basic Airport Unit definition established by the Virginia Aviation Board and detailed in the DOAV Airport Program Manual. In addition to these standards, the FAA also stipulates safety standards for airports through runway safety areas (RSA), runway object free areas (ROFA), and runway protection zones (RPZ). Based on reports from airports that responded to the study survey, the recommendations in the following tables were developed to enhance Virginia's airport adherence to these standards. **Table 8-19** shows the recommended improvements intended to meet Virginia's airport licensing standards.

Table 8-19: Recommended Improvements Based on Virginia Airport Licensing Standards

ID	Airport	Runway Width	Runway Safety Area (RSA)	Runway Object Free Area (ROFA)	FAR Part 77 Approach Surface Clear
MKJ	Mountain Empire	-	-	ROFA improvements	Mitigate Part 77 approach obstructions
SFQ	Suffolk Executive	-	-	-	Mitigate Part 77 approach obstructions
W75	Hummel Field	-	-	-	Mitigate Part 77 approach obstructions
W96	New Kent County	-	-	-	Mitigate Part 77 approach obstructions
EZF	Shannon	-	RSA improvements	ROFA improvements	-
VBW	Bridgewater Air Park	-	RSA improvements	ROFA improvements	Mitigate Part 77 approach obstructions
W13	Eagle's Nest	-	RSA improvements	ROFA improvements	Mitigate Part 77 approach obstructions
7W4	Lake Anna	-	RSA improvements	ROFA improvements	Mitigate Part 77 approach obstructions
W90	New London	Widen to 50'*	-	-	-

Note: * Considerable constraints to improvement
Source: Mead & Hunt.

Virginia Basic Airport Unit

Table 8-20 addresses the recommended improvements needed to meet Virginia's Basic Airport Unit. It should be noted that the Basic Airport Unit is applicable to new airports, not existing airports. Nevertheless, the Basic Airport Unit definition provides a baseline against which existing airport facilities can be measured to identify areas that DOAV urges existing airports to develop in an effort to meet Basic Airport Unit criteria. It is also important to point out that since the Basic Airport Unit established a public phone as part of its definition, cell phone use and coverage has expanded significantly. Because of this, the recommendation of "Improve communications" is intended to address this aspect of the Basic Airport Unit, either through cell phone coverage, internet communications, or other means of communication.

Table 8-20: Recommended Improvements to Meet Virginia Basic Airport Unit Standards

ID	Airport	Runway Lighting	Visual Navigation	GA Terminal Electric Lighting	GA Terminal Telecommunications	GA Terminal Public Restroom	Fuel Facility
MFV	Accomack County	-	-	-	Improve communications	-	-
DAN	Danville Regional	-	-	-	Improve communications	-	-
EMV	Emporia-Greensville Regional	-	-	-	Improve communications	-	-
GDY	Grundy Replacement Airport	-	Add rotating beacon	-	-	-	-
AVC	Mecklenburg-Brunswick Regional	-	-	-	Improve communications	-	-
HWY	Warrenton-Fauquier	-	-	-	Improve communications	-	-
0V4	Brookneal/Campbell County	-	-	-	Improve communications	-	-
FVX	Farmville Regional	-	-	-	Improve communications	-	-
FRR	Front Royal-Warren County	-	-	-	Improve communications	-	-
W75	Hummel Field	-	-	-	Improve communications	-	-
W63	Lake Country Regional	-	-	-	Improve communications	-	-
0VG	Lee County	-	-	-	Improve communications	-	-
W96	New Kent County	-	-	-	Improve communications	-	-
EZF	Shannon	-	-	-	Improve communications	-	-
TGI	Tangier Island	Add runway lights*	-	-	Improve communications	-	Add fuel facility*
XSA	Tappahannock-Essex County	-	-	-	Improve communications	-	-
JFZ	Tazewell County	-	-	-	Improve communications	-	-
AKQ	Wakefield Municipal	-	-	-	-	-	-
VBW	Bridgewater Air Park	-	-	-	Improve communications	Add restroom	-
LVL	Brunswick County	-	-	-	-	-	Add fuel facility*
CXE	Chase City Municipal	Add runway lights	Add rotating beacon	-	Improve communications	-	Add fuel facility*
W24	Falwell	-	Add rotating beacon	-	-	-	-
GVE	Gordonsville Municipal	-	-	-	Improve communications	Add restroom	Add fuel facility*
7W4	Lake Anna	-	-	-	Improve communications	Add restroom	Add fuel facility*
W90	New London	Add runway lights	Add rotating beacon	-	Improve communications	-	Add fuel facility*
8W2	New Market	-	-	-	Improve communications	-	-

Note: * Considerable constraints to improvement; The Basic Airport Unit standards apply to new airports but are being used as targets for existing airports for this analysis.
Source: Mead & Hunt.

FAA Design Standards

Table 8-21 addresses runway safety recommendations not covered by Virginia's licensing standards. These are primarily recommendations for airports to obtain greater control over their RPZs and ROFA through either purchase of land or easements over the land in question as recommended by the FAA and as reported by each airport in its survey.

Table 8-21: Recommended Improvements Based on other Safety Standards

ID	Airport	Runway Protection Zone Land Use	Runway Protection Zone (RPZ) Control	Runway Object Free Area (ROFA) Control
LYH	Lynchburg Regional/Preston Glenn Field	-	Improve RPZ control	-
ORF	Norfolk International	-	Improve RPZ control	-
SHD	Shenandoah Valley Regional	-	Improve RPZ control	-
JYO	Leesburg Executive	-	Improve RPZ control	-
MKJ	Mountain Empire	-	Improve RPZ control	Improve ROFA control
BKT	Allen C Perkinson Blackstone AAF	-	Improve RPZ control	-
0V4	Brookneal/Campbell County	-	Improve RPZ control	Improve ROFA control
FRR	Front Royal-Warren County	-	Improve RPZ control	-
W75	Hummel Field	Improve land use control	Improve RPZ control	-
EZF	Shannon	Improve land use control	Improve RPZ control	Improve ROFA control
TGI	Tangier Island	-	Improve RPZ control	-
VBW	Bridgewater Air Park	Improve land use control	-	-
W13	Eagle's Nest	Improve land use control	-	-
7W4	Lake Anna	Improve land use control	Improve RPZ control	-

Source: Mead & Hunt.

Navigational Aid (NAVAID) Maintenance and Improvements

The inventory of NAVAIDs evaluated the need to replace or upgrade various aviation equipment throughout the Virginia aviation system. The following tables list the recommended improvements to the NAVAID system based on that inventory. Tables group similar equipment.

Weather Reporting

Table 8-22 shows the recommended weather equipment improvements.

Table 8-22: Recommended Weather Equipment Improvements

ID	Airport	Automated Weather Reporting	Segmented Circle	Runway Visual Range (RVR) Equipment
CHO	Charlottesville-Albemarle	-	-	Install RVR (RW 03 and RW 21)
PHF	Newport News-Williamsburg	-	-	Install RVR (RW 07 and RW 25)
ORF	Norfolk International	-	-	Install RVR (RW 05 and RW 23)
RIC	Richmond International	-	-	Install RVR (RW 02)
ROA	Roanoke-Blacksburg Regional/Woodrum Field	-	-	Install RVR (RW 06 and RW 34)
SHD	Shenandoah Valley Regional	Upgrade AWOS	-	Install RVR (RW 05)
MFV	Accomack County	Upgrade AWOS	-	-
MTV	Blue Ridge	Replace AWOS	-	-
CPK	Chesapeake Regional	Upgrade AWOS	-	-
CJR	Culpeper Regional	Upgrade AWOS	-	-
DAN	Danville Regional	-	-	Install RVR (RW 02)
PTB	Dinwiddie County	Replace AWOS	-	-
EMV	Emporia-Greensville Regional	Upgrade AWOS	-	-
GDY	Grundy Replacement Airport	Install AWOS	-	-
PVG	Hampton Roads Executive	Replace AWOS	-	-
OFP	Hanover County Municipal	Upgrade ASOS	-	-
HSP	Ingalls Field	Replace AWOS	-	Install RVR (RW 25)
JYO	Leesburg Executive	Upgrade AWOS	-	-
LNP	Lonesome Pine	Replace AWOS	-	-
LKU	Louisa County/Freeman Field	Upgrade AWOS	Replace Segmented Circle	-
HEF	Manassas Regional/Harry P Davis Field	Replace AWOS	-	Install RVR (RW 16L)
AVC	Mecklenburg-Brunswick Regional	Upgrade AWOS	-	-
FYJ	Middle Peninsula Regional	Upgrade AWOS	-	-
MKJ	Mountain Empire	Replace AWOS	-	-
PSK	New River Valley	Replace AWOS	-	-

Table 8-22: Recommended Weather Equipment Improvements (continued)

ID	Airport	Automated Weather Reporting	Segmented Circle	Runway Visual Range (RVR) Equipment
FCI	Richmond Executive-Chesterfield County	Upgrade AWOS	-	-
RMN	Stafford Regional	Upgrade AWOS	-	-
SFQ	Suffolk Executive	Upgrade AWOS	-	-
VJI	Virginia Highlands	Replace AWOS	Replace Segmented Circle	-
BCB	Virginia Tech/Montgomery Executive	Upgrade AWOS	-	-
OKV	Winchester Regional	Replace AWOS	-	-
0V4	Brookneal/Campbell County	Replace AWOS	-	-
FVX	Farmville Regional	Upgrade AWOS	-	-
FKN	Franklin Regional	Upgrade AWOS	-	-
OMH	Orange County	Upgrade AWOS	-	-
EZF	Shannon	Upgrade AWOS	-	-
JFZ	Tazewell County	Replace AWOS	-	-
HLX	Twin County	Upgrade AWOS	-	-
JGG	Williamsburg-Jamestown	Upgrade AWOS	-	-
W91	Smith Mountain Lake	Install AWOS	-	-

Source: Mead & Hunt.

Runway Lighting Improvements

Recommended improvements to runway lighting are listed in **Table 8-23**.

Table 8-23: Recommended Runway Lighting Improvements

ID	Airport	Runway Edge Lights	Runway Centerline Lights	Touchdown Zone Lights
CHO	Charlottesville-Albemarle	-	Replace Centerline Lights (RW 03/21)	Install Touchdown Zone Lights (RW 03)
PHF	Newport News-Williamsburg	-	Install Centerline Lights (RW 07/25)	Install Touchdown Zone Lights (RW 07 and RW 25)
ORF	Norfolk International	-	-	Install Touchdown Zone Lights (RW 23)
RIC	Richmond International	-	-	Install Touchdown Zone Lights (RW 16)
ROA	Roanoke-Blacksburg Regional/Woodrum Field	-	Install Centerline Lights (RW 06/24 and RW 16/34)	Install Touchdown Zone Lights (RW 06, RW 24, and RW34)
PTB	Dinwiddie County	Replace MIRL (RW 05/23)	-	-
FRR	Front Royal-Warren County	Replace MIRL (RW 10/28)	-	-
GVE	Gordonsville Municipal	Replace MIRL (RW 05/23)	-	-
8W2	New Market	Replace Nonstandard Runway Edge Lights (RW 06/24)	-	-

Source: Mead & Hunt.

Runway Approach Lighting Improvements

Table 8-24 addresses the recommended improvements to runway approach lighting systems.

Table 8-24: Recommended Runway Approach Lighting Improvements

ID	Airport	Runway End Identifier Lights	Runway Approach Lights	Visual Approach Indicators
CHO	Charlottesville-Albemarle	-	Install MALSR (RW 21)	-
LYH	Lynchburg Regional/Preston Glenn Field	-	Install MALSR (RW 22)	Upgrade PAPI (RW 22)
PHF	Newport News-Williamsburg	Install REILs (RW 02)	Upgrade to ALSF-2 (RW 07) Install MALSR (RW 25)	Install PAPI (RW 07)
ORF	Norfolk International	-	Upgrade to ALSF-2 (RW 05)	-
RIC	Richmond International	-	Install MALSR (RW 02)	-
ROA	Roanoke-Blacksburg Regional/Woodrum Field	-	-	Upgrade PAPI (RW 06)
SHD	Shenandoah Valley Regional	-	Install MALSR (RW 23)	-
MFV	Accomack County	-	Install MALS (RW 03)	-
MTV	Blue Ridge	-	Upgrade to MALS (RW 05)	-
CPK	Chesapeake Regional	-	Install MALS (RW 23)	-
CJR	Culpeper Regional	-	Install MALS or MALSR (RW 04)	-
PTB	Dinwiddie County	Replace REILs (RW 05* and RW 23)	Upgrade to MALS (RW 05)*	-
PVG	Hampton Roads Executive	Install REILs (RW 02 and RW 20)	Install MALSR (RW 10) Install MALS (RW 28)	-
OFP	Hanover County Municipal	Replace REILs (RW 16)*	Install MALSR (RW 16)* Install MALS (RW 34)	Install PAPI (RW 34)
HSP	Ingalls Field	Install REILs (RW 07)	-	-
JYO	Leesburg Executive	-	Install MALSR (RW 17) Install MALS (RW 35)	-
LNP	Lonesome Pine	-	Install MALSR (RW 24)	-
AVC	Mecklenburg-Brunswick Regional	-	Install MALSR (RW 01)	-
FYJ	Middle Peninsula Regional	-	Install MALS (RW 10)	Install PAPI (RW 10 and RW 28)
FCI	Richmond Executive-Chesterfield County	-	Install MALSR (RW 15)	-
RMN	Stafford Regional	-	Upgrade to MALSR (RW 33)	-
SFQ	Suffolk Executive	-	Install MALS (RW 04)	-
VJI	Virginia Highlands	Install REILs (RW 06 and RW 24)	-	Install PAPI (RW 06 and RW 24)
BCB	Virginia Tech/Montgomery Executive	-	Install MALSR (RW 13)	Upgrade PAPI (RW 31)
0V4	Brookneal/Campbell County	-	-	-
FVX	Farmville Regional	Install REILs (RW 03)	-	-
FKN	Franklin Regional	Install REILs (RW 09 and RW 27)	-	-

Table 8-24: Recommended Runway Approach Lighting Improvements (continued)

ID	Airport	Runway End Identifier Lights	Runway Approach Lights	Visual Approach Indicators
FRR	Front Royal-Warren County	Install REILs (RW 10 and RW 28)	-	Install PAPI (RW 10 and RW 28)
W75	Hummel Field	-	-	Install PAPI (RW 01 and RW 19)
W63	Lake Country Regional	Install REILs (RW 04 and RW 22)	-	Install PAPI (RW 04 and RW 22)
LUA	Luray Caverns	-	-	Install PAPI (RW 04 and RW 22)
EZF	Shannon	Install REILs (RW 06 and RW 24)	-	Install PAPI (RW 06 and RW 24)
TGI	Tangier Island	Install REILs (RW 02 and RW 20)	-	Install PAPI (RW 02 and RW 20)
JFZ	Tazewell County	-	-	Replace PAPI (RW 07)
AKQ	Wakefield Municipal	Install REILs (RW 02 and RW 20)	-	Install PAPI (RW 02 and RW 20)
JGG	Williamsburg-Jamestown	-	-	Install PAPI (RW 13 and RW 31)
VBW	Bridgewater Air Park	Install REILs (RW 15 and RW 33)	-	Install PAPI (RW 15 and RW 33)
CXE	Chase City Municipal	Install REILs (RW 18 and RW 36)	-	Install PAPI (RW 18 and RW 36)
W91	Smith Mountain Lake	Repair REILs (RW 05)	-	Install PAPI (RW 05 and RW 23)

Notes: * REIL replacement recommended to take place in the short term, while installation of the more sophisticated approach lighting system (MALS or MALSR) recommended to take place in the long term.
Source: Mead & Hunt.

Approach Equipment Improvements

Table 8-25 lists recommended improvements for instrument approach equipment, namely, the glideslope antenna and related components, the localizer antenna and associated gear, and distance measuring equipment.

Table 8-25: Recommended Approach Equipment Improvements

ID	Airport	Glideslope	Localizer	Distance Measuring Equipment
CHO	Charlottesville-Albemarle	-	-	Replace ILS/DME (RW 03)
DCA	Ronald Reagan Washington National	-	-	Replace ILS/DME (RW 01)
IAD	Washington Dulles International	Replace Glideslope (RW 01C, RW 19C, and RW 12)	Replace Localizer (RW 01C, RW 19C, and RW 12)	Replace ILS/DME (RW 01R) Replace ILS/DME (19L)
OFP	Hanover County Municipal	Install Glideslope (16)	-	-
JYO	Leesburg Executive	-	Replace Localizer (RW 17)	Replace DME (RW 17)
LNP	Lonesome Pine	-	-	Replace DME (RW 24)
HEF	Manassas Regional/Harry P Davis Field	Replace Glideslope (16L)	Replace Localizer (RW 16L)	-
FCI	Richmond Executive-Chesterfield County	-	Replace Localizer (RW 33)	-
VJI	Virginia Highlands	-	Replace Localizer (RW 24)	-
0VG	Lee County	-	-	Install DME (RW 25)
XSA	Tappahannock-Essex County	-	-	Install DME (RW 28)

Source: Mead & Hunt.

Obstruction Removal

The NAVAID inventory compiled a list of airports with obstructions that could interfere with approaches to the airport's runways. More than 40 airports were identified as having obstruction issues. The next chapter will detail the methods used to estimate the costs of implementing the various recommendations listed by airport in this chapter, with the exception of obstruction removal. Due to the variability in obstruction removal improvements, this study will provide an estimated cost for obstruction removal for the entire system instead of airport by airport. The variability results from the numerous factors that need to be considered for obstruction removal. A partial listing of those factors includes:

- Area size of obstruction removal
- Number of obstructions to be addressed
- What imaginary surfaces are impacted by the obstructions
- How tall are the obstructions
- Whether the obstructions are on airport-owned land
- For obstructions not on airport-owned land, what level of property owner negotiation is needed
- Whether condemnation proceedings will be necessary
- Whether legal challenges will be part of the process.

This partial list makes it clear that more detailed information is needed for each airport to properly estimate obstruction clearing costs than what is obtained in a system plan. A rough order of magnitude cost estimate will be used to address obstructions at the system level for the Virginia airport system plan.

Source: Mead & Hunt.

Summary

DOAV has shepherded the Virginia aviation system to its present, well-developed position. Through prudent planning, including frequent system planning efforts, DOAV has tracked the growth of the aviation system and focused development in areas deemed important to the state. DOAV has focused its efforts on ways the aviation system can support business development, such as refining and improving IAP minimums to better serve business-class aircraft used by firms and air ambulance operators.

These subtle refinements, such as upgrading instrument approaches in a system where every airport already has an instrument approach, have resulted in the series of recommended improvements listed in this chapter. They were developed from several different analyses, including geographic coverage provided by the system, as well as subparts of the system. Other recommendations came out of the role that airports served in the system, along with recommendations from Virginia licensing and other safety standards. Finally, the inventory of NAVAIDs provided recommendations for the replacement or upgrade of numerous navigation equipment pilots use when flying around the system.

These recommended improvements include a replacement airport in the Grundy region, three proposed new airports, 10 runway extensions, and more than 100 other improvements. These recommendations will allow the Virginia aviation system to continue operating efficiently and focus on business development. The next chapter will estimate the cost of implementing these recommendations.

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Chapter 9: Costs and Funding

The aviation system improvements recommended in the previous chapter have an associated cost. This chapter contains the cost estimates of those improvements and evaluates the expected funding available. Based on the assumptions used, state and federal funding for Virginia's aviation system are estimated to fall short of its needs by $3.2 billion over the planning period.

The chapter consists of the following sections:

- Existing Sources of Funding
- Historical Funding of Virginia Airport Projects
- Development of Cost Estimates
- Summary of Costs
- Funding Analysis
- Gap Analysis
- Peer State Analysis
- Non-Traditional Funding Options
- Impacts on Future Funding

These sections review and compare the sources and levels of funding that Virginia's airports rely on for capital improvements. A description of the methods used to estimate the costs follows the analysis and comparison. The funding analysis describes the steps involved in estimating the expected available funds for the planning period based on the types of airport projects. Comparing the estimated costs to the expected available funds leaves a projected funding gap for the planning period. The chapter concludes with a comparison to Virginia's peer states and descriptions of potential alternative funding sources to address the projected funding gap.

Existing Sources of Funding

Airports generate revenues and receive funding through multiple sources. Typically, airports fund their operating expenses through a combination of aeronautical and non-aeronautical revenues. Aeronautical revenues link directly to airline or aircraft-related activity such as landing fees or facility use fees and rentals, while non-aeronautical revenues, such as in-terminal retail sales, parking fees, or real estate rentals, do not. Commercial service airports rely heavily on non-aeronautical revenues; however, some smaller airports (both commercial service and general aviation) need to be subsidized regularly (even without any capital expenditures) to cover operating costs. In 2020, the negative impacts were severe to both aeronautical and non-aeronautical revenues as the global aviation industry halted due to COVID-19. As a result, airports have relied on external funding sources (particularly federal ones) more heavily in 2020 and 2021 than in previous years.

This section of the Virginia Air Transportation System Plan (VATSP) outlines the external funding sources available to Virginia airports, their historical use, and how COVID-19 has impacted funding. **Table 9-1** illustrates the total amount of funding Virginia's airports received from FY 2015 to FY 2020 with an average of $198 million. State funding has remained relatively consistent ranging from 10 to 14 percent of the total. For a typical year, local funding (i.e., Passenger Facility Charges [PFCs]) is the most important source across all Virginia airports accounting for 50 percent or more of the total amount received. For general aviation airports where PFCs are not collected, the most important source is federal funding.

In FY 2020, federal funding accounted for 45 percent of Virginia's airport funding, an increase of 16 percent. Virginia's total funding went from $193 million in FY 2019 to $194 million in FY 2020 due to the Coronavirus Aid, Relief, and Economic Security (CARES) Act.

Table 9-1: Funding Distribution at All Virginia Airports, FY 2015-FY 2020

	2015	2016	2017	2018	2019	2020
Local	54.3%	49.7%	58.0%	54.9%	58.9%	41.7%
State	12.6%	12.0%	10.6%	14.3%	12.8%	13.5%
Federal	33.1%	38.3%	31.5%	30.9%	28.3%	44.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Total Amount Received	**$189,149,000**	**$212,618,000**	**$187,582,000**	**$204,582,000**	**$193,471,000**	**$194,216,000**

Note: General aviation airports do not collect PFCs. State includes Commonwealth Aviation Fund (CAF) grants but not Aviation Special Fund. Federal includes Airport Improvement Program (AIP) and CARES Local Match and excludes CARES General funds.
Source: Federal Aviation Administration (FAA), Virginia Department of Aviation (DOAV), and individual airport reports.

Based on historical average annual funding, this section presents potential means to fund the airport facility development costs estimated later in this chapter. In addition, two funding scenarios reflect possible changes to available funding due to COVID-19 or other changes in federal or state policy. Potential funding gaps are identified, and methods for bridging these gaps are suggested and compared to approaches used by other states.

Typically, Virginia airports fund capital expenditures, at least in part, using external sources, including:

- Federal AIP grants
- CAF grants
- Commonwealth Aviation Special Fund grants
- Virginia Resources Authority (VRA) Virginia Airports Revolving Fund (VARF) Loan Program
- PFCs
- Local bonds

The emergence of COVID-19 in 2020 generated additional federal funding resources for U.S. airports:

- CARES Act of March 2020
- Coronavirus Response and Relief Supplemental Appropriation Act (CRRSAA) of December 2020
- American Rescue Plan Act (ARPA) of 2021

However, the supplementary federal funding because of COVID-19 will not be repeated in the future and cannot factor into funding plans. One recent federal legislation that can is the Bipartisan Infrastructure Law (BIL) of 2021 passed in November 2021, which sets out a five-year plan of infrastructure grants for airports. Each of the funding sources noted above specifies the eligible airports as shown in **Table 9-2**.

Table 9-2: Funding Program Eligibility Based on Airport Role

Program		Airport Role†				
		Air Carrier	Reliever	General Aviation (NPIAS*)	General Aviation (non-NPIAS)	General Aviation (non-NPIAS) Local Service
Federal	AIP Entitlement/Discretionary	X	X	X		
	CARES/CRRSA/ARPA**	X	X	X		
	BIL	X	X	X		
State	Entitlement	X				
	Discretionary	X	X	X	X	***
	Aviation Special Fund	X	X	X	X	***
Local	PFCs	X				
	Other	X	X	X	X	X

*National Plan of Integrated Airport Systems.
**These COVID-19 response acts apply to funding in FY 2020-2021 only.
***Local service general aviation airports are eligible only for safety and preservation projects under the State Discretionary Program and the Facilities and Equipment Program.
† The airport roles shown are given in terms based on the federal classification of airports and are described on page 3-2.
Source: DOAV Airport Program Manual, revised August 2021.

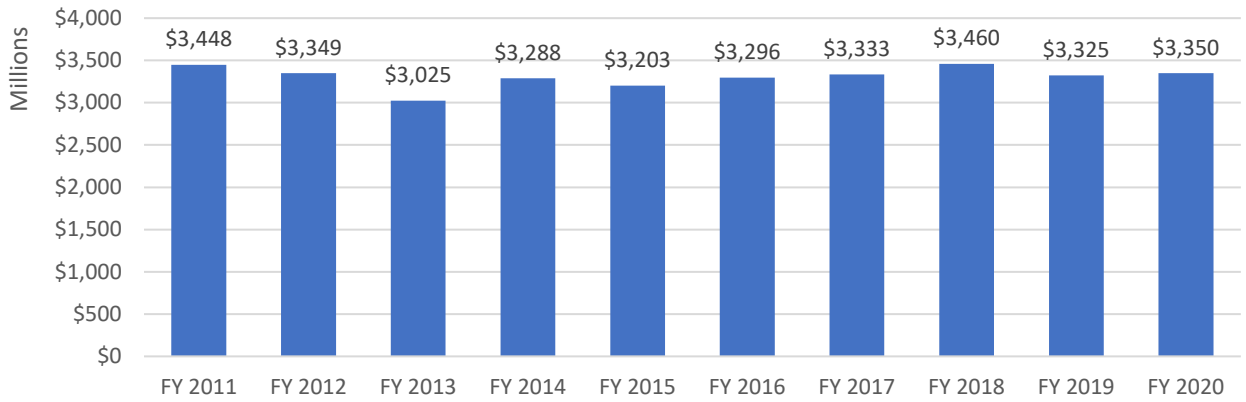
Federal Funding

Airport Improvement Program

The AIP established in 1982 is appropriated from the Airport and Airway Trust Fund (funded by excise taxes on aviation-related activities) and allocated by the FAA. The AIP consists of three different types of funds: entitlement, discretionary, and supplementary. Appropriated AIP funds are distributed into entitlement categories by formula, and the remaining funds are held in a discretionary account. Entitlement funds are distributed to airports that the FAA designates as primary according to the number of annual enplanements in the most recent calendar year. General aviation airports with more than 10,000 passengers also receive an annual entitlement. State apportionments are then available for other nonprimary airports with fewer annual passengers. Entitlement funds are reduced at airports collecting PFCs. For a full list of formulas for calculating annual entitlement distributions see **Table D-1** in **Appendix D**.

Before allocation of discretionary funds, the Small Airport Fund is calculated. It is not an official set-aside fund, but it ensures that 87.5 percent of entitlement funding for large and medium hub airports is used on smaller airports. The remainder of the annual AIP fund finances three set-aside accounts: Noise & Environmental, Military Airport Program (MAP), and Reliever (**Table D-2** in **Appendix D**). After these set-asides, the remaining funds are combined with unused entitlements from the previous fiscal year and are available as discretionary funds. **Table D-3** (**Appendix D**) shows the distribution of AIP funds according to year from FY 2015-FY 2018.[2] Slightly less than 75 percent of annual funds are typically entitlement with the remaining discretionary. The level of annual funding available for AIP grants has roughly remained the same (decline of 0.5 percent per annum) from FY 2011 to FY 2019, reaching $3.33 billion in FY 2019 (see **Figure 9-1***)*. In FY 2020, national AIP allocations were $3.35 billion; although airports began feeling the consequences of the COVID-19 pandemic in Spring of 2020, further legislation (e.g., CARES) created additional funding for US airports, not in the FY 2020 allocation.

[2] FY 2018 is the latest year available at the time of writing for this detailed distribution of AIP funds.



Note: Includes entitlement and discretionary grants. Excludes supplementary discretionary. Excludes CARES Local Match funds.
Source: FAA, https://www.faa.gov/airports/aip/grant_histories/#history.

Figure 9-1: Historical Allocations of AIP Grants, FY 2011 – FY 2020

In addition to the standard entitlement and discretionary funds, Congress began allocating additional funds to the AIP, which are called "supplemental discretionary funds," in FY 2018. In FY 2018, FY 2019, and FY 2020, Congress allocated additional funds of $1 billion, $500 million, and $400 million, respectively, on top of standard AIP funds. These supplemental funds are designated for two types of airports only:

1. nonprimary airports that are classified as Regional, Local, or Basic airports and are not located within a Metropolitan or Micropolitan Statistical Area
2. primary airports that are classified as Small or Non-hub airports

In addition, projects funded with supplemental discretionary funds are covered at a 100 percent rate (compared to the typical 90-95 percent). Project eligibility for supplementary discretionary funds follows the same guidelines as the standard discretionary funding policies. Terminal projects at larger airports do not qualify for standard AIP funding, but they are eligible for supplemental funds. In FY 2019, two Virginia airports received supplemental grants: Middle Peninsula Regional (FYJ) for an apron expansion and Farmville Regional (FVX) for an apron construction. Two more airports received supplemental grants in FY 2020: Dulles International (IAD) for a runway reconstruction and Virginia Highlands (VJI) for a runway extension.

On average, since FY 2011, Virginia airports have received $72 million[3] in AIP funding per year, with approximately 50 percent of this being entitlements (see **Table 9-3***)*. Over the last 10 years, FY 2012 was the highest level of total federal funding for Virginia airports at $97 million.

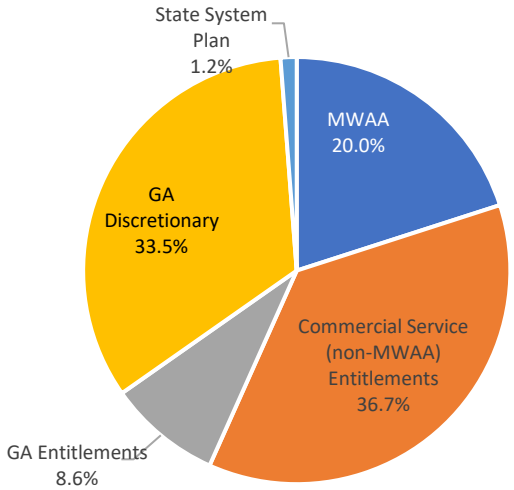
[3] FY 2020 is included in the average here as standard allocations for FY 2020 AIP were made prior to the pandemic.

Table 9-3: Virginia AIP Funding 2011-2020, USD

Fiscal Year	Entitlement	Discretionary	Supplemental Discretionary	Total
2011	$40,241,000	$22,412,000	$0	$62,654,000
2012	$40,343,000	$57,111,000	$0	$97,454,000
2013	$30,115,000	$41,738,000	$0	$71,853,000
2014	$49,671,000	$38,698,000	$0	$88,369,000
2015	$24,935,000	$37,690,000	$0	$62,625,000
2016	$34,787,000	$46,577,000	$0	$81,364,000
2017	$31,238,000	$27,792,000	$0	$59,030,000
2018	$29,046,000	$33,187,000	$897,000	$63,130,000
2019	$34,633,000	$19,690,000	$416,000	$54,739,000
2020	$43,844,000	$16,413,000	$17,846,000	$78,102,000
Total	**$358,853,000**	**$341,308,000**	**$19,160,000**	**$719,321,000**
Annual Average	**$35,885,000**	**$34,131,000**	**$1,916,000**	**$71,932,000**

Note: Fiscal Year shown refers to the year funds were awarded. Includes Metropolitan Washington Airports Authority (MWAA) airports but excludes AIP funds to the Metropolitan Washington Area and CARES funds.
Source: FAA Airport Improvement Program, FAA website, www.faa.gov/airports/aip/grant_histories.

In FY 2020, 20 percent of funds allocated to Virginia airports went to MWAA ($7.6 million in entitlements and $8.1 million in discretionary). The FAA allocated 36.7 percent to other commercial service airports, 42.1 percent to GA airports, and 1.2 percent for state system planning (**Figure 9-2**). Note that FY 2020 was a typical year for standard AIP funding as allocations were made prior to the pandemic.

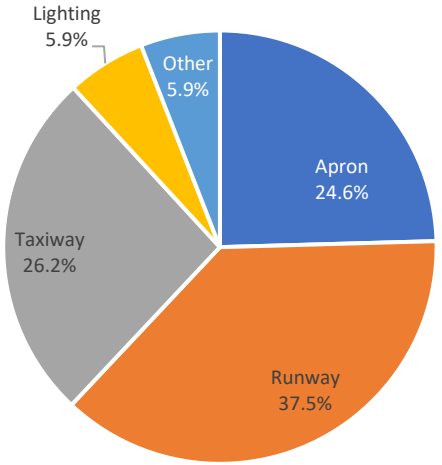


Note: No commercial service airports other than MWAA airports received Discretionary funds in FY 2020.
Source: FAA.

Figure 9-2: Virginia AIP Funding Breakdown by Area, FY 2020

In order to be eligible for an AIP grant, an airport must be in the NPIAS. Therefore, 47 of the 66 Virginia airports are eligible. To receive an AIP grant, an airport must add the project to its Capital Improvement Plan (CIP) and submit pre-planning documents to the FAA. AIP grants cover the majority share of the project cost, and the remainder must be covered by state or local funds. The level of AIP coverage differs by airport role with smaller airports receiving a larger share of projects covered. Large and medium hubs are eligible for 75 percent project coverage (80 percent for noise programs) while smaller hubs and GA airports are eligible for 90-95 percent project coverage.

Not all airport projects are eligible for AIP funding. Eligible projects include those that "enhanc[e] airport safety, capacity, security, and environmental concerns."[4] This does not include an airport's operating expenses, projects related to revenue-producing facilities, or projects related to airport operations. AIP funds can only be used for terminal building projects at smaller airports (non-hub primary, nonprimary commercial service, and reliever). Examples of eligible projects include runway construction/rehabilitation, airfield lighting, and environmental studies. In addition to meeting project eligibility requirements, projects must also conform to the FAA's standard grant assurances. In FY 2020, the largest category of projects at Virginia airports was runway-related (37.5 percent; rehabilitation, construction, or extension) as shown in **Figure 9-3**.



Note: Other includes removal of obstructions, land purchases, and equipment, among others.
Source: FAA.

Figure 9-3: AIP Funding at Virginia Airports by Area, FY 2020

[4] FAA website, *Overview: What is AIP?*, https://www.faa.gov/airports/aip/overview/

COVID-19 Relief Funding

To combat the financial strain on airports and airlines from COVID-19, the CARES Act (H.R. 748, Public Law 116-136) signed into law in March 2020 provided up to $10 billion in funds to eligible entities (such as airports) negatively impacted by the pandemic. The funds, appropriated from the U.S. Treasury's General Fund and allocated by the FAA, increased the share of 2020 capital projects funded by the AIP to 100 percent ("CARES Local Match"), removing the traditional local share component of AIP grants. This share increase amounted to five percent of the CARES allocations (see **Table 9-4**). In addition, the CARES Act provided new funds to NPIAS airports ("CARES General"), distributed by formulas shown in the table below. All commercial service airports received funds (74 percent of total grants) based on the number of enplanements in CY 2018, the amount of debt an airport had, and the amount of money the airport held in reserve. Primary commercial service airports with more than 10,000 annual passenger boardings received additional funds (20 percent) based on the number of enplanements. Lastly, GA airports received funds (one percent) based on their airport categories, such as National, Regional, Local, Basic, and Unclassified. These CARES General funds could be used to reimburse operating expenses, to pay down debt service, and (in some cases) to implement airport development projects.

Table 9-4: CARES Airport Grants (millions USD) by Allocation Category

Group No.	Group	Formula	Grants (millions USD)	Share
1	Increase of Federal Share (CARES Local Match)	• Increase to 100% the federal share of FY 2020 AIP and Supplemental grants	$500	5.0%
2	Commercial Service Airports	• 50% based on airport's percentage of total commercial service airport enplanements in CY 2018 • 25% based on percentage of debt service of total commercial service airport debt service in FY 2018 • 25% based on FY 2018 ratio of unrestricted reserves to its debt service	$7,400	74.0%
3	Primary Commercial Airports	• Based on statutory AIP primary apportionment formula with two exceptions ○ Removal of $26 million limit ○ No reduction for PFCs	$2,000	20.0%
4	General Aviation Airports	• Based on a share of the aggregate eligible development of each GA category • Evenly divided among eligible airports in the category, rounded up to nearest thousand dollars	$100	1.0%
	Total		**$10,000**	**100%**

Source: FAA, Coronavirus Aid, Relief, and Economic Security Act (CARES) Presentation, April 2020. Groups 2-4 are referred to as "CARES General."

Although no time limits were set on disbursing the funds, the FAA allocated CARES funds on an expedited basis, and the FAA urged airports to spend quickly (within four years or the funds could be reallocated). CARES funds could be used for "any purpose for which airport revenues may lawfully be used" and were not limited to eligible projects under the AIP rules. Funds could be used for airport operating expenses, paying down debt service, and/or airport development projects. In addition to standard AIP grant assurances,[5] projects under CARES grants at hub-designated airports must continue to employ 90 percent of staff[6] through December 31, 2020. Forty-seven Virginia airports received $8.9 million of CARES Local Match funds in FY 2020 as shown in **Table 9-5** below. An additional $309.8 million was available to cover operating expenses, debt financing, and airport development.

[5] Grant assurances do not apply to CARES funds used to cover airport operating expenses.
[6] Staff counts as of March 27, 2020.

Many airports cited the critical importance of the CARES funds in providing financial stability and reducing the pressure to lay off staff. MWAA used its CARES General funds to pay down debt service among other projects, while additional Virginia airports used the CARES General funds to supplement operating revenue to maintain service. It was believed that the CARES funding combined with other cost cutting measures would be sufficient to manage finances through 2020-2021. However, this outlook assumed a steady (or even robust) recovery of traffic (and all the associated revenues) through the end of 2020.

The expected traffic recovery did not occur, and the U.S. Government expanded its emergency funding to airports through subsequent legislation in FY 2021 including the Airport CRRSAA, which established the Airport Coronavirus Response Grant Program (ACRGP), and the ARPA. ACRGP funds are eligible to cover both operating expenditures and capital expenditures (as long as they relate to virus spread prevention). The ACRGP allocated an additional $2 billion to U.S. NPIAS airports to support concessions operating within those airports (by assisting with rent or meeting minimum annual guarantees). Funds were distributed across four groups: primary commercial service airports (including some cargo airports), non-primary commercial service airports and general aviation airports, airports participating in the FAA Contract Tower Program, and primary commercial service airports with concessions. In addition, CARES funds not allocated or returned earlier in FY 2020 were also allocated under the ACRGP.

The second FY 2021 act appropriated a further $8 billion for US airports, which the FAA allocated via the Airport Rescue Grants program. This program increased the federal share of FY 2021 AIP grants to 100 percent as well as allocated funds directly to primary and non-primary NPIAS airports based on annual enplanements. Similar to the ACRGP, ARPA funds are available for airport expenditures (operating and some capital) and concessions relief of rent and minimum annual guarantees. Virginia airports received $12.7 million in COVID Relief Local Match funds and $244 million in COVID Relief General funds in FY 2021.[7]

Table 9-5: CARES Funds Allocated to Virginia Airports by Program, FY 2020

Airport Role	Number of Airports	Funding	
		CARES Local Match	CARES General
Commercial Service	9	$6,208,000	$308,190,000
General Aviation	38	$2,587,000	$1,539,000
Non-Airport Specific	n/a	$106,000	$0
Subtotal VA	**47**	**$8,901,000**	**$309,729,000**
Total US	**3,000+**	**$556,300,000**	**$8,747,300,000**

Note: Includes MWAA airports.
Source: FAA.

Bipartisan Infrastructure Law, FY 2022

In FY 2022, Congress passed a substantial bill that will provide additional funding for airports. The BIL, signed on November 6, 2021, established three programs for airport funding:

1. The Airport Infrastructure Grant Program - $15 billion in grants over a five-year period
2. Air Traffic Facilities - $5 billion in federal contracts over a five-year period focused on sustainment and eventual replacement of existing Air Traffic Control facilities
3. Airport Terminal Facilities - $5 billion discretionary funds

[7] COVID Relief funds include both ACRGP and ARPA.

FY 2022 allocations to Virginia airports from the Airport Infrastructure Grant Program are shown in **Table 9-6** below. Virginia is expected to receive approximately $386 million over five years for its airports under this program.[8] Project eligibility guidelines will follow the current guidelines of the federal AIP program and state/local matching requirements will apply. Virginia Airports will also be eligible for the air traffic control and terminal facility funds.

Table 9-6: Virginia Allocation of Bipartisan Infrastructure Law, FY 2022

Airport Role	BIL Grants	
	Number of Airports	Funding
Commercial Service	9	$68,587,000
General Aviation	37*	$8,380,000
Subtotal VA	**46**	**$76,967,000**
Total US	**3,075**	**$2,889,896,000**

*Brookneal/Campbell County (an "Unclassified" GA airport) did not receive BIL funds. Note: Includes MWAA airports.
Source: FAA.

State

The goal of Virginia airport funding is to "allocate funding for airport improvements to: enhance safety; meet regulatory and policy obligations; maximize benefits to the public; and improve access to airports."[9] The Virginia Aviation Board (VAB) allocates available funds across Virginia's airports. State funding for Virginia projects is available from the CAF, which in turn is funded by 1.5 percent of the Commonwealth Transportation Fund. The CAF covers the Airport Capital Program, which funds capital expenditures. In addition to the CAF, Virginia issues grants from the Aviation Special Fund (sourced from tax levied on aviation fuel), which covers non-recurring maintenance, NAVAID communications equipment and installation, security measures, and airport promotion.

Commonwealth Aviation Fund (CAF)

The CAF finances capital expenditure projects via two types of funds: entitlement and discretionary. Similar to the federal program, CAF grants are allocated annually by formula according to airport type (formulas are shown in **Table D-4** in **Appendix D**). Specific consideration is given to MWAA airports. By law, MWAA receives $2 million annually, which is treated as an entitlement, from DOAV. MWAA is not eligible to receive discretionary funds from Virginia. Instead, MWAA relies on federal funds and the issuance of bonds to fund its capital projects.

At commercial service airports, entitlement funds can cover up to 100 percent of the portion not covered by the federal AIP (typically 10 percent of the entire project). If discretionary funds are also applied to the same project, state funds must be lower than 80 percent of the non-federal share. If an airport project is not selected for the AIP (i.e., not federally funded), then it is eligible for state funding coverage at 80 percent (with the remainder covered by local sources). "DOAV encourages sponsors to use other available federal, state, and local funding options, such as PFCs, before applying for state discretionary funds."[10] From 2011-2020, 46-59 percent of annual CAF allocations have been entitlement grants, with the remaining being discretionary (**Table 9-7**).[11] Historically, the commercial service airports' share of CAF funds has ranged from 57-85 percent.

[8] U.S. Department of Transportation. State-by-State Fact Sheets for Virginia and the District of Columbia.
[9] DOAV *Airport Program Manual*, revised August 2021, page 3-1.
[10] Ibid., page 5-3.
[11] This average includes FY 2020. Although the COVID-19 pandemic began in Spring of 2020, funding for FY 2020 was set in 2019.

Table 9-7: Historical Allocation of CAF Allocations, Based on Area

Fiscal Year	Commercial Service Entitlement Funds	Commercial Service Discretionary Funds	GA Discretionary Funds	Total CAF Funds
2011	$10,922,000	$5,258,000	$3,350,000	$19,530,000
2012	$12,005,000	$3,957,000	$5,568,000	$21,531,000
2013	$12,399,000	$3,247,000	$7,264,000	$22,910,000
2014	$12,154,000	$3,146,000	$5,214,000	$20,514,000
2015	$11,172,000	$8,930,000	$3,688,000	$23,790,000
2016	$14,900,000	$3,791,000	$6,854,000	$25,546,000
2017	$13,250,000	$1,789,000	$4,805,000	$19,845,000
2018	$13,499,000	$6,968,000	$8,704,000	$29,171,000
2019	$13,942,000	$0*	$10,738,000	$24,681,000
2020	$13,953,000	$3,636,000	$8,698,000	$26,287,000
Total	**$128,197,000**	**$40,723,000**	**$64,883,000**	**$233,804,000**
Avg. Annual	**$12,820,000**	**$4,072,000**	**$6,488,000**	**$23,380,000**
Compound Annual Growth Rate	**2.8%**	**-4.0%**	**11.2%**	**3.4%**

* No discretionary funds were allocated to commercial service airports in 2019.
Source: DOAV.

A larger group of Virginia airports is eligible for CAF grants than under the federal AIP. To be eligible, an airport must be licensed by DOAV, open to the public, and be included in the VATSP.[12] For example, 19 Virginia airports are not eligible under AIP funding but *are* eligible for state funding. Local service general aviation airports are eligible for CAF grants only for projects related to safety and preservation. As under the federal AIP, the CAF does not cover airport operating costs or revenue-producing facilities. Typical eligible projects include those funding planning and environmental studies; land acquisition; and design/construction of facilities including terminals. Virginia maintains a six-year listing of capital projects across all its airports called the Airport Capital Improvement Plan (ACIP), which serves as the list of near-term prioritized airport projects.

Aviation Special Fund

In addition to the CAF, DOAV allocates funds from the Aviation Special Fund within the following programs:

- Facilities and Equipment (F&E) Program
- Voluntary Security Program (program was in effect during the writing of this system plan, but has since been suspended)
- Maintenance Program
- Aviation and Airport Promotion Program

Each of these programs specifies the type of projects eligible and DOAV share of project costs (as shown in **Table 9-8** below). Like the CAF funds, the Aviation Special Fund cannot be used to cover airport operating expenses.

[12] Additionally, there are annual reporting requirements.

Table 9-8: Aviation Special Fund Program

Program	Eligible Airports	Eligible Projects	DOAV Share
Facilities & Equipment (F&E)	All (limited at local use airports)	• Communication, navigation, and information systems	• 100% for DOAV-owned and -maintained equipment • 80% for sponsor-owned and -maintained equipment (unless federally funded, then 8%)
Voluntary Security*	General Aviation, Public Use	• Security-related only	• 100% for security audits and plan development • 90% for design and installation
Maintenance	All	• Non-recurring or preventative maintenance	• 80-95% depending on project type; $100k maximum per airport per year
Aviation & Airport Promotion	Air Carrier/Commercial Service	• Advertising, education, public relations activities, data subscriptions, development of strategic and marketing plans	• 67% up to $35K for airports with greater than 25K enplanements • 50% up to $35K for airports with less than 25K enplanements
Aviation & Airport Promotion	General Aviation	• Advertising, education, public relations activities, data subscriptions, development of strategic and marketing plans	• 67% up to $10k for airports with more than 25 or more based aircraft • 50% up to $10K for airports with less than 25 based aircraft

Note: *The program was in effect during the writing of the system plan but has been suspended during the plan's finalization.
Source: DOAV Airport Program Manual, revised August 2021.

Other Sources of State Funding

The Virginia Department of Transportation manages the Airport Access Program, which finances the planning and construction of new or upgraded access roads located off of airport property.

Local

In addition to the local match required by federal and state (both CAF and Aviation Special Fund) grants, local sources of funding for Virginia airports include PFCs and bonds.

Passenger Facility Charge (PFC) Program

Started in 1992, the PFC program allows commercial service U.S. airports to collect a fee for each passenger using the airport. Although federally regulated, the PFC program is considered a local funding source. PFC funds can be used both for capital projects as well as servicing debt. The maximum PFC allowed to be collected has been capped at $4.50 since 2000; all Virginia airports currently charging PFCs collect at the $4.50 level. Over the last four fiscal years prior to the pandemic, the nine commercial service airports collected $441 million in PFC revenue (**Table 9-9**). As PFC revenue is directly related to passenger volumes, PFC revenue decreased by 29.1 percent in FY 2020 after increasing by 2.5 percent on average during the previous four years.

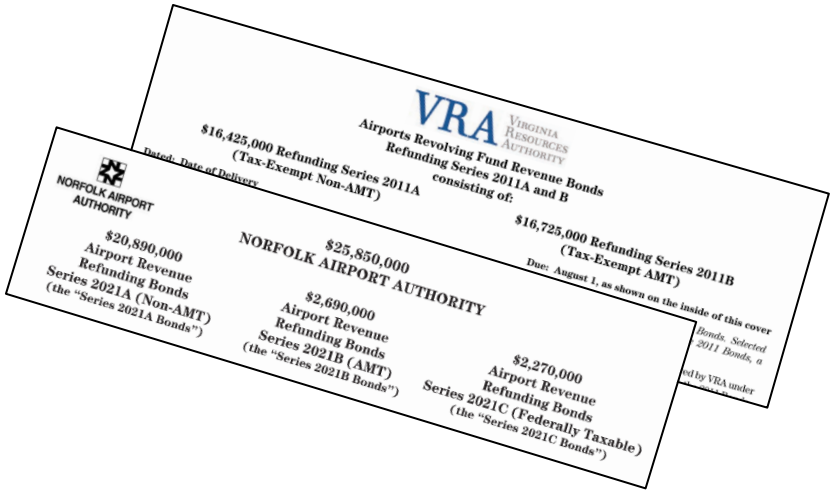
Table 9-9: Virginia Airports, PFCs Collected, FY 2016 – FY 2020

Airport	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Total*
Charlottesville-Albemarle	$1,200,000	$1,330,000	$1,448,000	$1,582,000	$1,182,000	$6,742,000
Lynchburg Regional	$318,000	$321,000	$338,000	$360,000	$325,000	$1,662,000
MWAA Total	$88,796,000	$90,977,000	$93,316,000	$92,992,000	$65,035,000	$431,116,000
Newport News-Williamsburg	$821,000	$795,000	$824,000	$833,000	$782,000	$4,055,000
Norfolk International	$6,317,000	$6,581,000	$7,201,000	$7,935,000	$5,926,000	$33,959,000
Richmond International	$7,022,000	$7,518,000	$7,876,000	$8,941,000	$6,473,000	$37,830,000
Roanoke-Blacksburg Regional	$1,209,000	$1,185,000	$1,265,000	$1,409,000	$1,271,000	$6,340,000
Shenandoah Valley	$25,000	$0	$13,000	$0	$37,000	$74,000
Total	**$105,708,000**	**$108,707,000**	**$112,281,000**	**$114,051,000**	**$81,031,000**	**$521,779,000**

*Includes FY 2020.
Source: FAA.

Other Sources of Local Funding

In addition to PFCs, Virginia airports have other sources of funds to use for the local share of capital projects. Although mandated by *state* law, the Virginia Airports Revolving Fund (VARF) is available to cover the *local* share of federal/state funded projects or for projects not eligible for federal/state funding. Established in 2000, the VARF provides loans at below-market-rates to support capital improvement projects at public use airports. VARF applications made to the Virginia Resources Authority (VRA) are endorsed by the VAB and approved by the VRA. Finally, some airports in Virginia periodically issue bonds to cover airport capital needs. Seven of Virginia's nine commercial service airports have previously issued bonds (including airport revenue bonds and those backed by PFCs).[13]

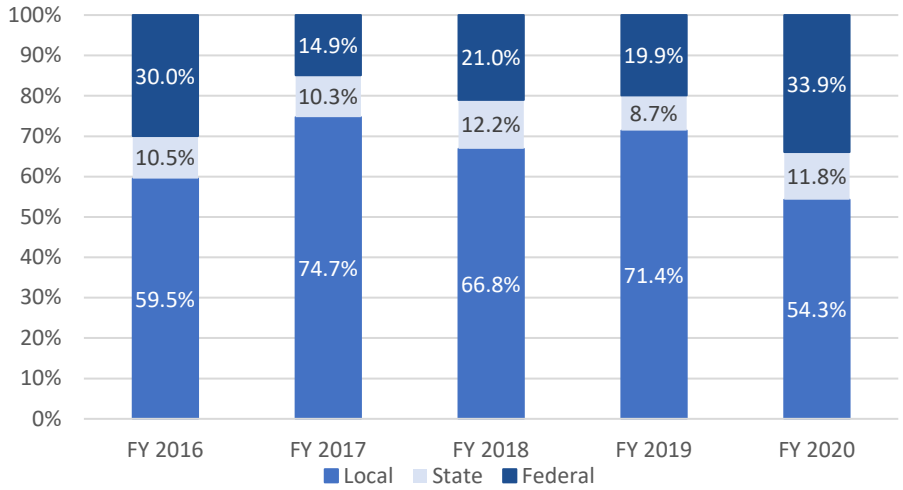


Source: Norfolk Airport Authority; Virginia Resources Authority.

[13] Excluding municipal general obligation bonds.

Historical Funding of Virginia Airport Projects

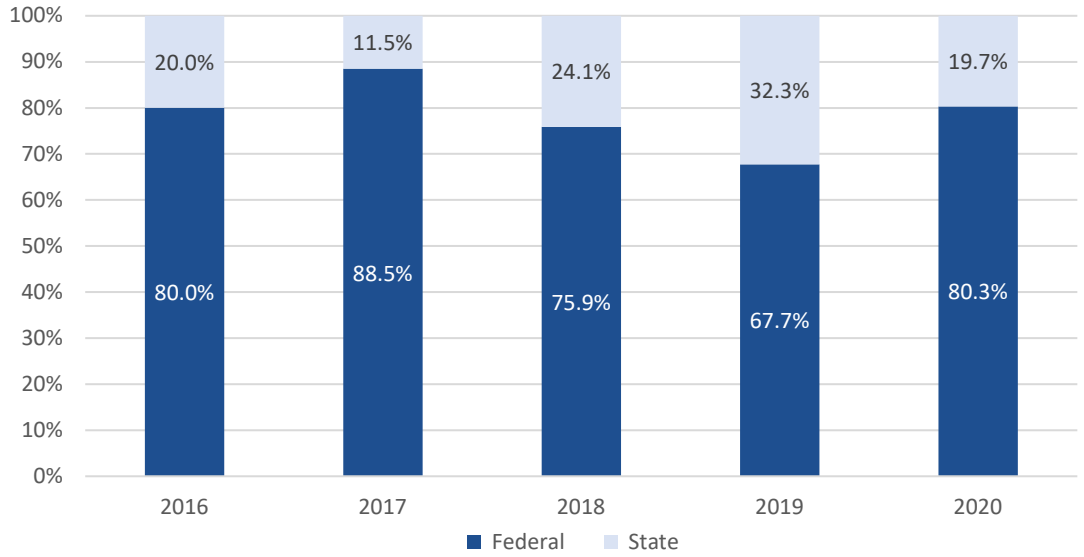
Historically, federal sources have accounted for 15-30 percent of annual funding at commercial service airports in Virginia (**Figure 9-4**); state sources accounted for 9-12 percent; and the remainder was funded by local sources. In FY 2019, the federal share accounted for 19.9 percent of total funding. Due to the addition of CARES funding in FY 2020, the federal share of total funding in FY 2020 increased to 33.9 percent. For a full list of funding distributions by commercial service airport, see **Table D-5** in **Appendix D**.



Note: Local includes PFCs but not bonds or other local sources. State includes CAF but not Aviation Special Funds. Federal includes AIP and CARES Local Match.
Source: FAA, DOAV, and individual airport reports.

Figure 9-4: Historical Funding Distribution for Virginia Commercial Service Airports

Without the ability to collect PFCs, funding for Virginia general aviation airports is split between federal and state sources (**Figure 9-5**). The federal funding share has ranged from 68-89 percent over the four fiscal years prior to the pandemic. In FY 2020, the federal share was 80.3 percent, which includes CARES Local Match funds.



Note: General aviation airports do not collect PFCs. State includes CAF but not Aviation Special Fund. Federal includes AIP and CARES Local Match.
Source: FAA, DOAV, and individual airport reports.

Figure 9-5: Historical Funding Distribution for Virginia General Aviation Airports

Development of Cost Estimates

This section establishes rough order of magnitude (ROM) cost estimates for infrastructure, facilities, and equipment needs for the 2022 to 2044 timeframe. The recommended system improvements described previously are part of these needs. To provide a full picture of the financial conditions DOAV faces over the planning period, the cost estimates of the recommended system improvements include other capital needs that consist of:

- Individual airport capital improvement projects from 2022 to 2027 not already included in the recommended system improvements. Estimates of similar projects expected from 2028 to 2044 were drawn from the list of airport capital improvement projects.
- Pavement maintenance projects from the *2020 Pavement Management Program Update*. This report provided estimates of pavement capital costs out to 2027. The study team extrapolated the pavement maintenance needs of the Virginia aviation system out to 2044 based on data from this report.
- Capital costs to maintain a minimum operating network of navigational aids (NAVAIDs).
- Entitlement money transferred annually from DOAV to the MWAA by agreement.
- Capital costs associated with bringing adequate electric power to select airports in anticipation of electric aircraft needs.
- Capital costs tied to fuel farm expansions in anticipation of unleaded and sustainable aviation fuels.
- Development of new airports.

This section describes how costs were developed, what data sources were used, and contains a detailed summary of costs for major project categories that will be required for the 22-year planning period.

Background

Cost estimates for infrastructure, facilities, and equipment needs of the system were determined using various cost information sources. This included similar projects built within the past three years or planned to be developed within the next five years at airports throughout the Commonwealth, relevant studies such as the *2020 Virginia Airport Pavement Management Program Update*, and costs data from a variety of industry data sources. Project costs were identified for the 66 Virginia system airports. The analysis identified more than 1,000 discrete projects throughout the planning period (2022-2044) according to the facility requirements analysis as part of the VATSP study. This includes capital projects for new infrastructure as well as funding for maintenance projects.

Project Classifications

Project classification occurred based on two categorization systems: Project Type and Facility Role. Project Type allocates the cost based on the expenditure and what will be accomplished or constructed.

Project types and their costs fell into these categories:

- The Aircraft Hangar category includes costs associated with construction of corporate hangars and T-hangars.
- The Airfield Pavement (Rehab or Reconstruction) category includes costs associated with preventative maintenance for runway and taxiway pavement areas.
- The Air Traffic Control Tower (ATCT) category includes costs associated with new and replacement towers.
- The Auto Parking category includes costs associated with construction of vehicle parking and roadways.
- The Aviation Fueling category includes costs associated with construction of aviation fueling storage and dispensing facilities.

Source: Mead & Hunt.

- The GA Terminal Improvements category includes costs associated with terminal construction/expansion and terminal maintenance for general aviation facilities.
- The General Capital Project category includes costs associated with equipment, entitlement funding to MWAA, and miscellaneous other projects that do not fit within other categories.
- The NAVAIDs category includes costs associated with NAVAIDs.
- The New Airports category represents new airports planned for construction.
- The Planning of Runway Protection Zones (RPZ), Runway Safety Areas (RSA), Runway Object Free Areas (ROFA), Land Use or other Improvements category includes costs associated with studies or projects such as master plans and airport layout plans, environmental entitlement projects, and projects related to acquiring land and/or clearing land areas located within protected surfaces such as the RSAs, ROFAs, or RPZs.
- The Remote Tower category includes costs associated with nontraditional ATCT enhancements.
- The Runway Construction (Extension or Widening) category includes costs associated with new runway pavement construction.
- The Taxiway Construction (Extension or Widening) category includes costs associated with new taxiway/taxilane pavement construction.
- The Vehicle Capital Cost category includes capital costs associated with acquisition of new maintenance vehicles.

Facility Role as a classification system allocates the cost based on the role played within the Commonwealth aviation system. These are the VATSP Airport Roles (i.e., Commercial Service, Community Business, Local Service, Regional Business) plus three additional categories. The three other categories are New Airports, Multiple Airports, and Minimum Operating Network. While these do not represent specific airports, classification into these roles remains necessary.

In cases where new airport construction was identified for the 22-year planning horizon, costs were categorized as New Airports. Three new airports are planned to enter service as Regional Business airports. Categorizing them as New Airports provides a useful separate category for DOAV officials to differentiate their implementation costs.

Multiple Airports categorizes projects that were not easily matched with a specific airport facility, or the recipient of the funds is not yet determined (e.g., unplanned maintenance budget). Therefore, Multiple Airports can represent projects within any VATSP airport role.

The Minimum Operating Network is a set of NAVAIDs necessary to support the lowest level of operability for aerial navigation within the Commonwealth airspace. Projects categorized as Minimum Operating Network serve the greater aviation system. Therefore, this separate category was used to capture all planned project costs.

Project Cost Data Sources

This section describes the methodology used to develop cost estimates. Project costs were prepared using several sources to ensure that the most accurate and appropriate budgetary numbers are considered in this study.

Capital cost estimate and data points from the VATSP NAVAIDs Assessment were the primary source to obtain the project cost for NAVAID infrastructure improvements. Considerations included cost of the equipment, allowances for design and construction/installation testing, and calibration costs, where appropriate.

The 2016 VATSP study was used to formulate the project costs associated with potential new airports. Considerations included planning/environmental studies, airfield pavement, NAVAIDs, landside access facilities, and a general aviation terminal facility.

The DOAV Statewide CIP was the basis of many of the projects identified in the facility requirements. The CIP lists extend through the 2028 fiscal year, so a pro forma extension of the CIP costs was prepared. This methodology included extrapolating the costs listed in the current CIP through the end of the planning period (2044) and proportionally allocating the costs to Project Type and Facility Role, where possible.

The DOAV Statewide Pavement Management and Maintenance Plan (PMMP) that was completed in 2020 was the primary source to estimate the cost of airfield maintenance projects. The PMMP included costs through fiscal year 2027, which led to the preparation of a pro forma extension of the pavement maintenance costs. This methodology is similar

to that completed for the CIP. It included extrapolating the costs listed in the current PMMP through the end of the planning period (2044) and proportionally allocating the costs to Facility Role. Where possible, the analysis accounted for expected duration of pavements considering the type of rehabilitation performed in the previous investment period.

Another primary source for cost data is the historic DOAV construction project bid tabs collected from projects bid in 2018 and 2019. This project data provided a "real-world" estimate of construction costs and associated project soft cost for varying projects bid across the Commonwealth. The data was used to identify planning-level unit costs that could apply to the study list of projects to determine future project cost. Where possible, the unit costs extracted from the construction project bid tabs were identified based on airport use (e.g., commercial service vs. general aviation airport) to ensure the applied unit costs best represented the project at hand.

Additional project cost sources included DOAV staff for general budgetary allowances. For example, DOAV identified ongoing funding for unplanned maintenance projects and DOAV entitlements for MWAA, which historically received $2 million annually from DOAV. Thus, the same amount was included as a future budgetary need.

A cost escalation factor was applied after all of the project cost estimates (in 2022 dollars), as described in the next section.

Cost Escalation

Projects Costs were escalated to the year of implementation. Escalation rates were established based on information available from industry sources such as Means Construction Costs, Turner Construction, and Construction Analytics data for Virginia. **Table 9-10** below shows the various escalation rates used for estimates.

Table 9-10: Escalation Rates

Period	Total Growth Rate
2022 to 2023	6.50%
2022 to 2024	13.40%
2022 to 2025	17.50%
2022 to 2026	18.50%
2022 to 2027	21.70%
2022 to 2028	24.99%
2022 to 2029	28.36%
2022 to 2030	31.83%
2022 to 2035	47.94%
2022 to 2040	67.38%
2022 to 2044	84.75%

Note: The recent volatility of inflation called for year-by-year projections out to 2030. Beyond 2030, when inflation is expected to return to more stable behavior, projections cover up to five-year periods.
Source: Means, Turner, Edzarenski.

Source: Jason Davis.

Summary of Costs

ROM cost estimates are for the projects set to be implemented at Commonwealth airports through 2044. ROM costs for the various projects are determined considering the time period when the projects are expected to occur within the planning period. Project ROM costs were estimated based on the cost of the project in 2022 dollars escalated to the year they occur.

Table 9-11 shows the ROM cost estimates for the 2022 Fiscal Year. Projects associated with Regional Business Airports represent the highest dollar value with costs for the Commercial Service Airports category ranked second. The Airfield Pavement (Rehab or Reconstruction) Project Type represents the largest dollar value when comparing Facility Roles to the other Project Types – representing more than half of the total budget for each Facility Role. This Project Type drives the total cost associated with Regional Business Airports and Commercial Service Airports, accounting for approximately 80 percent of the projected costs for the initial fiscal year of this planning study.

Table 9-11: Rough Order of Magnitude Project Cost Estimates – 2022, Facility Roles Broken out by Project Type

Project Type	Commercial Service	Regional Business	Community Business	Local Service	New Airports	Multiple Airports	Min. Operating Network
Aircraft Hangar	$0	$15,041,000	$770,000	$34,000	$0	$0	$0
Airfield Pavement (Rehab or Reconstruction)	$57,297,000	$65,090,000	$26,412,000	$15,728,000	$0	$0	$0
ATCT	$0	$0	$0	$0	$0	$0	$0
Auto Parking	$1,921,000	$3,495,000	$0	$0	$0	$0	$0
Aviation Fueling	$0	$0	$0	$0	$0	$0	$0
Terminal Improvements	$10,451,000	$1,752,000	$100,000	$233,000	$0	$0	$0
General Capital Project	$6,821,000	$1,845,000	$470,000	$0	$0	$5,313,000	$0
NAVAIDs	$435,000	$436,000	$900,000	$85,000	$0	$0	$0
New Airport	$0	$0	$0	$0	$0	$0	$0
Planning – (RPZ, RSA, ROFA, Land Use or other Improvements)	$3,456,000	$7,962,000	$1,484,000	$199,000	$0	$0	$0
Remote Tower	$0	$0	$0	$0	$0	$0	$0
Runway Construction (Extension or Widening)	$0	$0	$0	$0	$0	$0	$0
Taxiway Construction (Extension or Widening)	$20,455,000	$12,920,000	$0	$128,000	$0	$0	$0
Vehicle Capital Cost	$1,352,000	$0	$0	$0	$0	$0	$0
Totals	**$102,188,000**	**$108,541,000**	**$30,136,000**	**$16,407,000**	**$0**	**$5,313,000**	**$0**

Source: RS&H.

Table 9-12 presents the project costs for the 2023-2027 timeframe. Projects associated with Commercial Service Airports represent the highest dollar value with costs for the Regional Business Airports ranked second. Similar to the 2022 Fiscal Year, the Airfield Pavement (Rehab or Reconstruction) Project Type represents the largest dollar value across both of these Facility Roles compared to the other Project Types – representing more than one-third of the total budget for each Facility Role. The total cost associated with Commercial Service Airports and Regional Business Airports accounts for approximately 90 percent of the projected costs for the initial fiscal year of this planning study.

Table 9-12: Rough Order of Magnitude Project Cost Estimates – 2023-2027

Project Type	Commercial Service	Regional Business	Community Business	Local Service	New Airports	Multiple Airports	Min. Operating Network
Aircraft Hangar	$0	$8,889,000	$3,291,000	$682,000	$0	$0	$0
Airfield Pavement (Rehab or Reconstruction)	$199,043,000	$173,019,000	$24,163,000	$5,723,000	$0	$0	$0
ATCT	$0	$609,000	$0	$0	$0	$0	$0
Auto Parking	$55,036,000	$9,781,000	$1,214,000	$49,000	$0	$0	$0
Aviation Fueling	$0	$0	$0	$0	$0	$731,000	$0
Terminal Improvements	$85,017,000	$14,925,000	$5,207,000	$610,000	$0	$0	$0
General Capital Project	$84,532,000	$4,851,000	$2,819,000	$481,000	$0	$15,000,000	$0
NAVAIDs	$6,793,000	$6,865,000	$3,218,000	$73,000	$0	$0	$7,459,000
New Airport	$0	$0	$0	$0	$0	$0	$0
Planning – (RPZ, RSA, ROFA, Land Use or other Improvements)	$8,126,000	$37,645,000	$7,970,000	$197,000	$0	$0	$0
Remote Tower	$0	$0	$0	$0	$0	$0	$0
Runway Construction (Extension or Widening)	$0	$21,223,000	$3,195,000	$0	$0	$0	$0
Taxiway Construction (Extension or Widening)	$112,864,000	$108,143,000	$8,391,000	$675,000	$0	$0	$0
Vehicle Capital Cost	$9,967,000	$0	$0	$0	$0	$0	$0
Totals	**$561,378,000**	**$385,950,000**	**$59,468,000**	**$8,490,000**	**$0**	**$15,731,000**	**$7,459,000**

Source: RS&H.

Table 9-13 describes the project costs for the 2028-2032 timeframe. Within this timeframe, approximately $1.29 billion is allocated to the Multiple Airports Facility Role. New construction and anticipated preventative maintenance for airfield facilities at various airports across the Commonwealth drive these costs. The budget for the Multiple Airports category represents approximately 60 percent of the total budget for this period. Costs associated with Commercial Service Airports and Regional Business Airports Facility Roles each total approximately $400 million. Automobile parking costs account for the greatest share (approximately 56 percent) for Commercial Service Airports, while aircraft hangars account for the greatest share (approximately 26 percent) for Regional Business Airports.

Table 9-13: Rough Order of Magnitude Project Cost Estimates – 2028-2032

Project Type	Commercial Service	Regional Business	Community Business	Local Service	New Airports	Multiple Airports	Min. Operating Network
Aircraft Hangar	$34,317,000	$102,872,000	$7,711,000	$9,782,000	$0	$51,663,000	$0
Airfield Pavement (Rehab or Reconstruction)	$0	$0	$0	$0	$0	$337,323,000	$0
ATCT	$6,905,000	$10,000,000	$0	$0	$0	$0	$0
Auto Parking	$222,096,000	$73,055,000	$12,472,000	$2,231,000	$0	$42,595,000	$0
Aviation Fueling	$0	$0	$1,838,000	$3,063,000	$0	$3,948,000	$0
Terminal Improvements	$4,320,000	$6,980,000	$6,783,000	$2,955,000	$0	$154,575,000	$0
General Capital Project	$2,167,000	$33,739,000	$1,488,000	$0	$0	$110,723,000	$0
NAVAIDs	$33,000,000	$43,607,000	$5,451,000	$3,147,000	$0	$35,724,000	$4,645,000
New Airport	$0	$0	$0	$0	$0	$0	$0
Planning – (RPZ, RSA, ROFA, Land Use or other Improvements)	$18,301,000	$13,052,000	$16,838,000	$14,025,000	$0	$79,830,000	$0
Remote Tower	$2,748,000	$14,290,000	$0	$0	$0	$0	$0
Runway Construction (Extension or Widening)	$0	$44,917,000	$17,895,000	$5,545,000	$0	$0	$0
Taxiway Construction (Extension or Widening)	$71,426,000	$37,154,000	$57,878,000	$0	$0	$457,542,000	$0
Vehicle Capital Cost	$0	$18,629,000	$5,826,000	$0	$0	$13,740,000	$0
Totals	**$395,280,000**	**$398,295,000**	**$134,180,000**	**$40,748,000**	**$0**	**$1,287,663,000**	**$4,645,000**

Source: RS&H.

Table 9-14 describes the project costs for the 2033-2044 timeframe. This timeframe includes approximately $2 billion allocated to the Multiple Airports category. New construction and anticipated preventative maintenance for airfield facilities at various airport across the Commonwealth drive these costs. The costs to support the construction of the four new airports drives the New Airports category to the second ranked budgetary requirement for this period.

Table 9-14: Rough Order of Magnitude Project Cost Estimates – 2033-2044

Project Type	Commercial Service	Regional Business	Community Business	Local Service	New Airports	Multiple Airports	Min. Operating Network
Aircraft Hangar	$10,249,000	$49,196,000	$2,870,000	$0	$0	$81,353,000	$0
Airfield Pavement (Rehab or Reconstruction)	$0	$0	$0	$0	$0	$510,700,000	$0
ATCT	$0	$0	$0	$0	$0	$0	$0
Auto Parking	$0	$0	$0	$0	$0	$67,065,000	$0
Aviation Fueling	$0	$0	$0	$0	$0	$8,040,000	$0
Terminal Improvements	$0	$0	$0	$0	$0	$243,382,000	$0
General Capital Project	$0	$38,680,000	$0	$0	$0	$167,365,000	$0
NAVAIDs	$0	$2,113,000	$0	$0	$0	$56,314,000	$2,481,000
New Airports	$0	$0	$0	$0	$247,721,000	$0	$0
Planning – (RPZ, RSA, ROFA, Land Use or other Improvements)	$0	$0	$0	$0	$0	$125,913,000	$0
Remote Tower	$0	$0	$0	$0	$0	$0	$0
Runway Construction (Extension or Widening)	$0	$0	$0	$0	$0	$0	$0
Taxiway Construction (Extension or Widening)	$0	$0	$0	$0	$0	$719,656,000	$0
Vehicle Capital Cost	$0	$0	$0	$0	$0	$21,688,000	$0
Totals	**$10,249,000**	**$89,989,000**	**$2,870,000**	**$0**	**$247,721,000**	**$2,001,476,000**	**$2,481,000**

Source: RS&H.

Table 9-15 provides a summary of the project costs for the entire planning period.

Table 9-15: Rough Order of Magnitude Cost Estimate Summary

Airport Role	2022 Costs	2023-2027 Costs	2028-2032 Costs	2033-2044 Costs
Commercial Service	$102,188,000	$561,378,000	$395,280,000	$10,249,000
Regional Business	$108,541,000	$385,950,000	$398,295,000	$89,989,000
Community Business	$30,136,000	$59,468,000	$134,180,000	$2,870,000
Local Service	$16,407,000	$8,490,000	$40,748,000	$0
New Airports	$0	$0	$0	$247,721,000
Multiple Airports	$5,313,000	$15,731,000	$1,287,663,000	$2,001,476,000
Minimum Operating Network	$0	$7,459,000	$4,645,000	$2,481,000
Total	$262,585,000	$1,038,476,000	$2,260,811,000	$2,354,786,000
Grand Total	**$5,916,658,000**			

Source: RS&H.

Source: Keith Holt.

Funding Analysis

As discussed earlier in chapter 9, the funding sources available to finance airport projects costs are federal grants, Commonwealth grants, and local revenues. **Table 9-16** shows the funding allocations. Federal grants are available to NPIAS airports, while non-NPIAS airports are eligible for only state and local funding. Federal grants cover 90 percent of most projects eligible for federal funding, with state funding covering 8 percent, and the local funding share at 2 percent. For projects where federal funding is not available, the state often covers 80 percent of the project costs with local funding covering the remaining 20 percent.[14]

Table 9-16: Virginia Airport Capital Plan Funding (Federal and State Capital Improvement Programs)

Project Category	NPIAS Funding Allocations			non-NPIAS Funding Allocations	
	Federal	State	Local	State	Local
Airside	90%	8%	2%	80%	20%
Facilities Service and Equipment	90%	8%	2%	80%	20%
Landside	90%	8%	2%	80%	20%
Terminal*	59%	5%	36%	52%	48%
New Airport	90%	8%	2%	80%	20%
Planning	90%	8%	2%	80%	20%
Security	90%	8%	2%	100%	0%
F&E**	79%	19%	2%	84%	16%
Maintenance	0%	80%	20%	80%	20%
Other	0%	100%	0%	100%	0%

* Percentage of federal and state participation for terminal projects is not standard. Percentages shown reflect an assumption that 65% of a terminal building is public use space.
** Funding for F&E projects depends on ownership (FAA, DOAV, or Sponsor).
Note: There are multiple exceptions to the funding allocations shown above. Other includes the annual MWAA entitlement and Minimum Operating Costs.
Source: FAA, DOAV, VATSP Analysis.

The costs of individual projects at each airport were combined to determine the total cost of recommended projects at each airport. Funding eligibility was applied to each project as outlined in **Table 9-16** above. The airport project costs and the funding source eligibility were further summed by airport role and by project type. These costs are unconstrained and have not been reviewed or prioritized with respect to the ultimate objectives and initiatives resulting from the system plan. **Table 9-17** below includes the summary costs by role and project type for existing airports. Notable findings include:

- Development costs totaled $5.92 billion over the forecast period, with $1.25 billion allocated to the state funding source.
- The nine commercial service airports in the Virginia system, including MWAA airports, account for $2.651 billion in project costs over the forecast period, or an average of $295 million per airport. Regional business and community business airports account for an average of $84 million and $26 million per airport, respectively, while local service airports average $20 million per airport.
- Airside projects make up the largest share of project cost, accounting for 60.6 percent of the total costs, followed by Landside and Facilities, Service and Equipment, which make up 8.2 percent and 7.8 percent, respectively.

[14] As shown in Table 9-16, there are exceptions to the funding allocation method for both federal and state eligible projects.

Table 9-17: Development Cost Summary Tables

VATSP Unconstrained Summary

VATSP Service Role	Funding Source Eligibility			
	Total	Federal	State	Local
Commercial Service	$2,651,387,000	$1,956,658,000	$544,483,000	$150,246,000
Regional Business	$2,339,749,000	$1,909,509,000	$327,511,000	$102,729,000
Community Business	$460,371,000	$223,713,000	$182,752,000	$53,907,000
Local Service	$221,373,000	$0	$176,092,000	$45,282,000
New Airport	$247,721,000	$222,949,000	$19,818,000	$4,954,000
Total	**$5,920,601,000**	**$4,312,829,000**	**$1,250,656,000**	**$357,118,000**

Project Type Summary

VATSP Service Role	Funding Source Eligibility			
	Total	Federal	State	Local
Airside	$3,586,765,000	$2,949,024,000	$507,876,000	$129,865,000
Facilities Service and Equipment	$458,945,000	$312,838,000	$116,885,000	$29,221,000
Landside	$488,130,000	$318,345,000	$135,828,000	$33,957,000
Terminal	$208,617,000	$112,893,000	$18,166,000	$77,558,000
New Airport	$247,721,000	$222,949,000	$19,818,000	$4,954,000
Planning	$257,037,000	$212,969,000	$35,255,000	$8,814,000
Security	$58,505,000	$48,569,000	$8,857,000	$1,079,000
F&E	$198,416,000	$135,243,000	$58,080,000	$5,092,000
Maintenance	$355,882,000	$0	$289,305,000	$66,576,000
Other	$60,583,000	$0	$60,583,000	$0
Total	**$5,920,601,000**	**$4,312,830,000**	**$1,250,653,000**	**$357,116,000**

Source: VATSP Analysis.

Using published project eligibility guidelines, project costs were assigned to federal, state, and local categories. Over the planning period, 73.6 percent of costs are estimated to be covered by federal funds (**Table 9-18**). A federal share below 90 percent reflects the fact that some projects (e.g., those at non-NPIAS airports or maintenance projects) are not eligible for AIP grants and must be funded fully by state and local sources. The cost of projects eligible only for state and local funding or the state share of federally eligible projects account for 20.6 percent of project costs. The local share of project costs is estimated to be 5.8 percent.

Table 9-18: Development Cost for All Virginia Airports by Funding Source

Funding Source	Total Planning Period Project Costs (in thousands of $)				
	2022	2023-2027	2028-2032	2043-2044	Total
Federal	$200,227	$777,571	$971,183	$2,363,848	$4,312,829
State	$49,366	$203,519	$326,411	$671,358	$1,250,654
Local	$12,987	$57,371	$90,167	$196,593	$357,118
Total	**$262,580**	**$1,038,461**	**$1,387,761**	**$3,231,799**	**$5,920,601**

Source: VATSP Analysis.

As annual funding levels have varied, multiple years of historical federal and state funding for Virginia airports were examined to determine an average annual level of funding. A period before the pandemic was chosen for this analysis to exclude one-time grants due to pandemic relief efforts. From 2015-2019, Virginia airports received $88.8 million in federal and state funding each year on average. This $88.8 million is 64.9 percent lower than the estimated average annual funding needs of $252.8 million (see **Table 9-19**), indicating that funding gaps will occur over the planning period.

Table 9-19: Average Annual Funding Need vs. Historic Average Annual Funds

Funding Source	Historic Average Annual Funds (2015-2019)	Average Annual Funding Needs				
		2022	2023-2027	2028-2032	2033-2044	Total
Federal	$64,178,000	$200,227,000	$155,514,000	$194,237,000	$216,166,000	$197,520,000
State	$24,606,000	$49,366,000	$40,704,000	$65,282,000	$57,651,000	$55,266,000
Federal and State Subtotal	**$88,784,000**	**$249,593,000**	**$196,218,000**	**$259,519,000**	**$273,817,000**	**$252,786,000**
Local	Unavailable	$12,987,000	$11,474,000	$18,033,000	$16,809,000	$15,749,000
Total	**$88,784,000**	**$262,580,000**	**$207,692,000**	**$277,552,000**	**$290,626,000**	**$268,535,000**

Notes: State historic average annual funding includes the CAF (entitlements and discretionary) but not Special Aviation Funds due to lack of data; Federal includes AIP and grants to the Commonwealth as a whole (not a particular airport).
Source: FAA, DOAV, VATSP Analysis.

Over the planning period, Commonwealth funding required will vary by year and airport. **Table 9-20** below presents the VATSP state funding needs by airport role, source, and development time frame. A total of $788.0 million in state funding is needed over the entire planning period. Commercial service airports account for 27.6 percent of state funding needs at $217.8 million. Regional and Community Business airports account for 28.9 percent and 20.4 percent of needs, respectively. New airports are expected to require $19.8 million in state funds. The majority of state funds needed are from the CAF, with much smaller amounts from the Maintenance and F&E special funds (which are both limited by an annual budget).

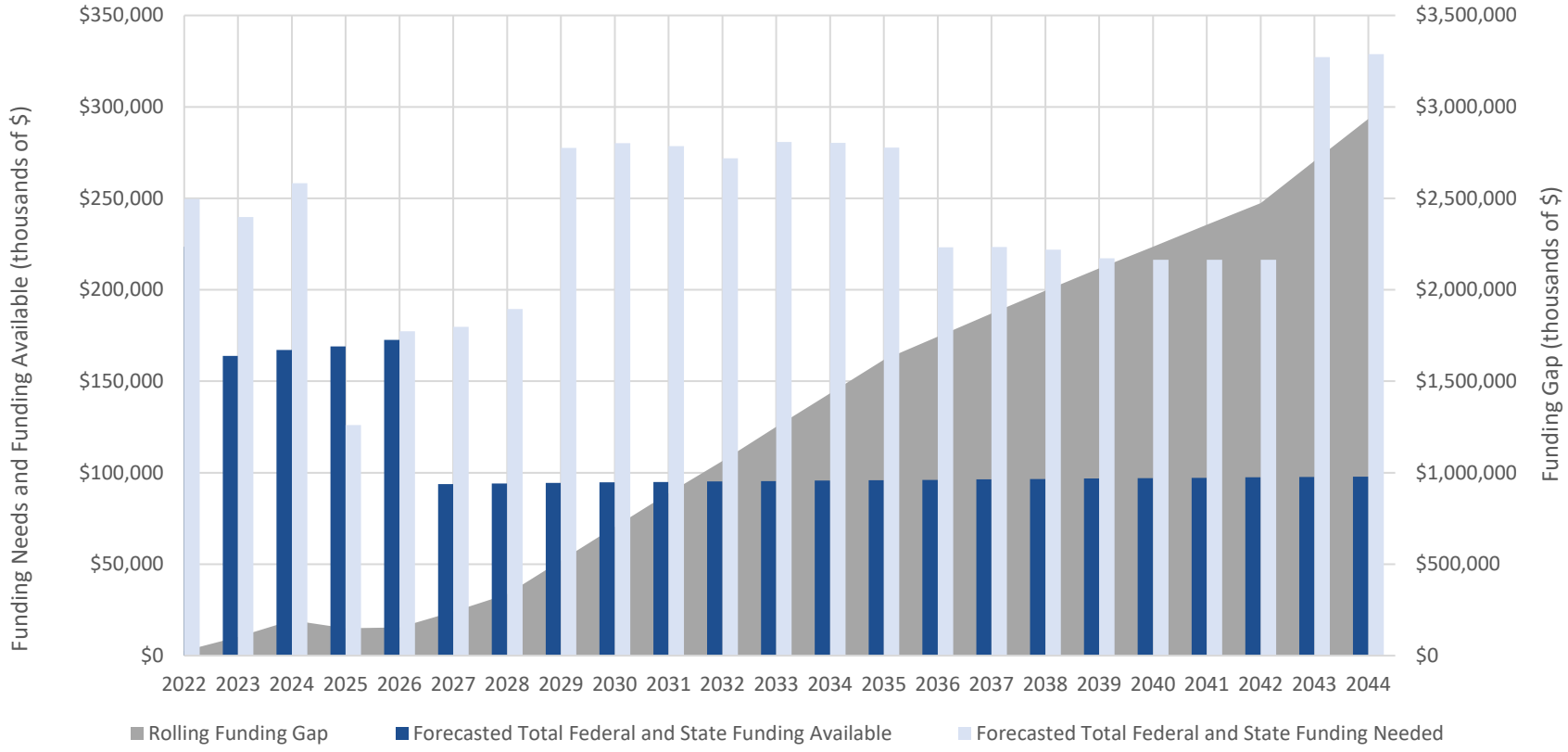
Table 9-20: State Funding Needs Over the Planning Period (2022-2044)

VATSP Service Role	Capital Funding Needs	Special Funding Needs		
		F&E	Maintenance	Total
Commercial Service	$201,930,000	$6,039,000	$9,809,000	$217,778,000
Regional Business	$211,210,000	$6,624,000	$10,186,000	$228,020,000
Community Business	$157,869,000	$1,428,000	$1,806,000	$161,103,000
Local Service	$159,501,000	$519,000	$1,200,000	$161,220,000
New Airports	$19,818,000	$0	$0	$19,818,000
Total	**$750,328,000**	**$14,610,000**	**$23,000,000**	**$787,939,000**
Plan Period Phases	**Capital Funding Needs**	**Special Funding Needs**		
		F&E	**Maintenance**	**Total**
2022	$38,667,000	$635,000	$1,000,000	$40,302,000
2023-2027	$84,684,000	$2,771,000	$5,000,000	$92,455,000
2028-2032	$206,688,000	$3,581,000	$5,000,000	$215,269,000
2033-2044	$440,746,000	$7,623,000	$12,000,000	$460,368,000

Source: VATSP Analysis.

Gap Analysis

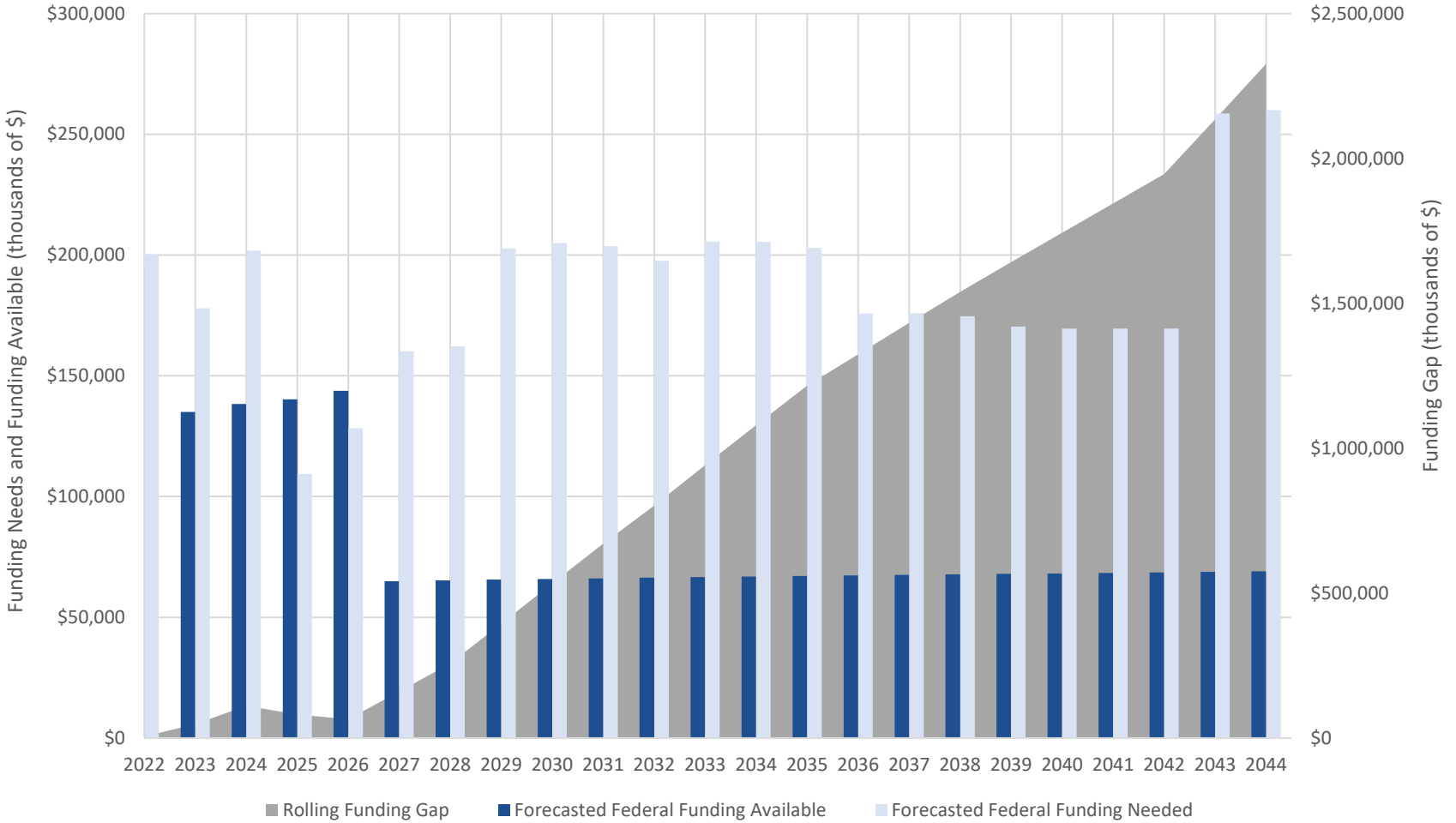
This section compares the funding available to the needs identified in the system plan and discusses the shortfall in terms of federal and state funding. A local funding shortfall is not addressed. Over the planning period, $5.6 billion in anticipated projects costs are eligible for federal and state funding out of the $5.9 billion in total needs, with approximately $2.6 billion in federal and state funding available. As shown in **Figure 9-6**, this results in a $2.9 billion funding shortfall for federal and state funds for the total planning period. After 2028, estimated costs are based on projects extrapolated from the list of airport capital improvement projects. For these projects, which have an unknown timeframe, the costs are assigned to the mid-point of the period when they were expected to take place. These costs have been distributed over the remaining time period of 2029 to 2044 to show expected funding needs. This includes funding needs in 2043 and 2044 for new airport development.



Source: FAA, DOAV, VATSP Analysis.

Figure 9-6: Federal & State Funding Available, Federal & State Funding Needed, and Rolling Funding Gap for Federal & State Funds (in thousands of dollars)

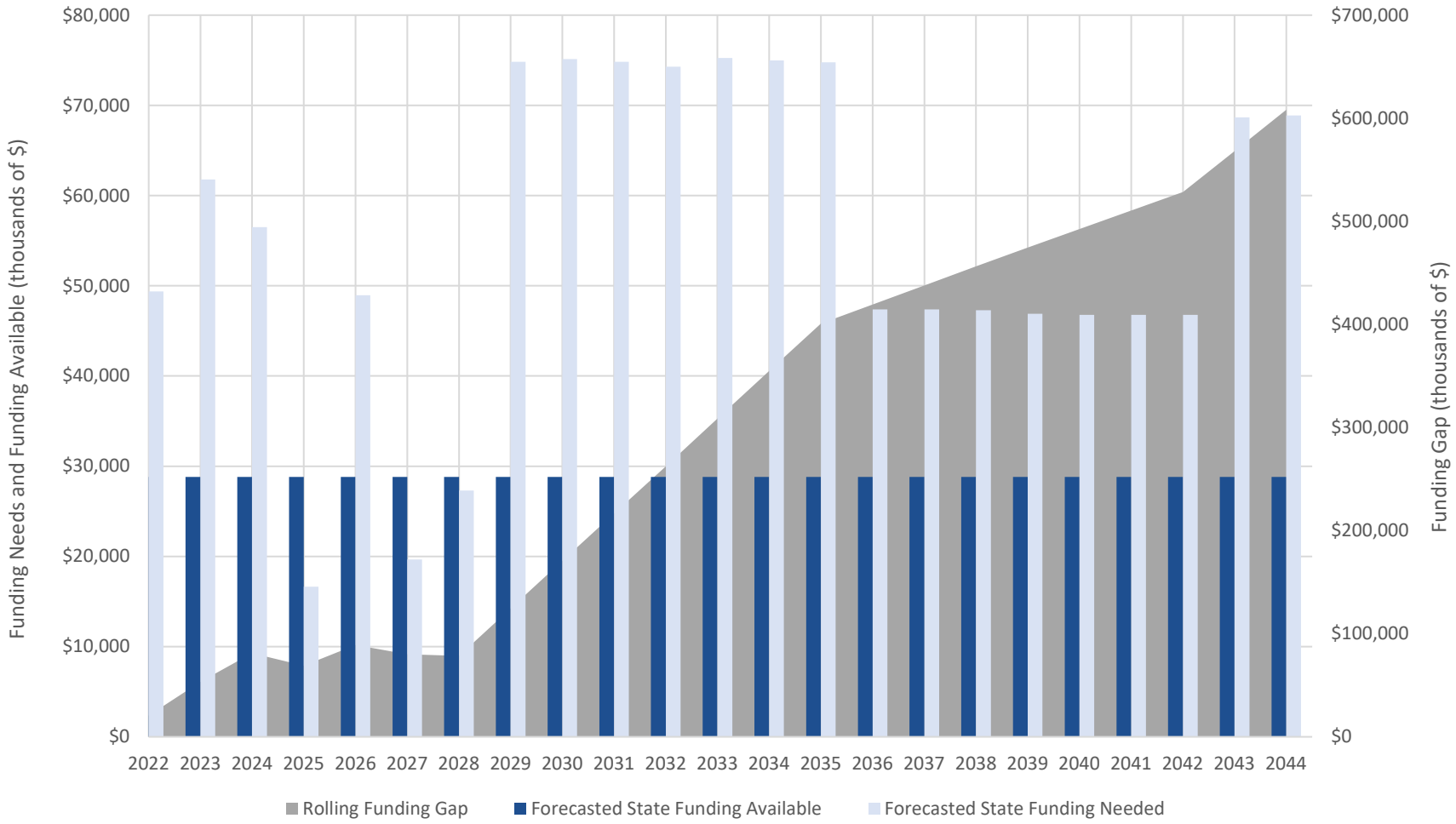
Figure 9-7 shows the forecast for available federal funding along with the federal funding needs. In the first five years, traditional federal funding of AIP grants is augmented by BIL funding. Due to this additional federal funding source that ends in FY 2026, the federal funding gap is $65.6 million, which is lower than historic levels. However, the BIL funding is only through FY 2026 with federal funding levels returning to historic levels in FY 2027 and beyond. As a result, there is an increase in the federal funding gap beginning in FY 2027 and lasting throughout the rest of the planning period. For the planning period, the federal funding shortfall is $2.6 billion.



Source: FAA, VATSP Analysis.

Figure 9-7: Federal Funding Available, Federal Funding Needed, and Rolling Funding Gap for Federal Funds (in thousands of dollars)

State funding, which consists of the CAF and Aviation Special Fund, remains relatively constant throughout the planning period. However, the level of funding needs increase, resulting in a growing funding shortfall on the state level. Throughout the planning period, there are state funding levels of $663 million with $1.3 billion state funding needs. This results in a state funding shortfall of $608 million. This is shown in **Figure 9-8.**



Source: DOAV, VATSP Analysis.

Figure 9-8: State Funding Available, State Funding Needed, and Rolling Funding Gap for State Funds (in thousands of dollars)

Peer State Analysis

As discussed in the previous section, Virginia will have a $3.2 billion funding gap. Similar to many state aviation departments, the funding shortfall will be addressed through a prioritization model that funds top priority projects and defers actions on the others to the next year. Funding prioritization models are used at all of Virginia's peer states and are a key element in allocating funds in years where funds fall short. The prioritization process reflects the combined efforts of the local sponsor initiating project funding, and the state using their model to prioritize. Virginia's model is the "Project Priority Model," which uses objective criteria to rank projects. DOAV has used the model since 1987. The project ranking allocates discretionary funds from the CAF when constrained. The intent is to ensure first priority funding for projects with the greatest impact.

The Project Priority Model has four categories:

- Project merit description
- Situational considerations
- Operational considerations
- Airport activity

Each category has elements that are assigned points, and the highest scoring projects are funded first. This methodology is similar to how Virginia's peer states prioritize projects. **Appendix A** discusses Virginia's peer states in greater depth. The peer states include: Kentucky, Maryland, South Carolina, and West Virginia. It also includes four block grant states Georgia, North Carolina, Pennsylvania, and Tennessee. The following text describes each state's prioritization methodology based on the interviews conducted during the development of **Appendix A:**

Kentucky Department of Aviation – prioritizes pavement projects as the highest priority, followed by lighting and security, obstruction clearance, maintenance, fuel services, and vertical development projects. Unlike DOAV, the Kentucky Department of Aviation funds revenue generating projects including T-hangars and terminals; however, all revenue generating projects are evaluated case by case and must be needs based.

Maryland Aviation Administration (MAA) – created a funding prioritization model in 2012 that assigns a score to four categories similar to DOAV's: Project Merit, Situational Considerations, Airport Factors, and Airport Activity. The total score of a project is then ranked with top ranking projects receiving funding priority. MAA has also implemented an interim policy of funding hard costs only until the funding increases to a level that would allow them to support both hard and soft costs. Over the past two years, MAA has been able to support and deliver on construction projects and has shifted the burden of soft cost projects to the sponsor.

South Carolina Aeronautics Division – has a funding prioritization model created in 2008 as part of the South Carolina Airport System Plan Update and used to score and rank the projects when there are budget limitations. Projects are funded starting at the top of the list and working downward until the funding is depleted. If a fiscal year ends, and not all projects have received funding, they are not carried over to the new fiscal year. The factors considered in the prioritization system are:

- Project justification (i.e., safety, safety rehab, security, economic development, planning, standards/upgrades).
- Airport classification and demand (i.e., air carrier airports/GA airports, annual operations).
- Sponsor responsibility (i.e., does sponsor have an approved security plan).
- Other relevant factors include if the FAA supports the project and provides funding.

The following text describes the prioritization model of the four block grant states:

Georgia Department of Transportation (GDOT) Intermodal – their prioritization system first requires the project to be identified in the system plan to qualify for funding. The state also uses a funding method for its block grant money based on the FAA's priority system. For GA state funding, points are given to various factors with small airports being the focus. GDOT Intermodal gives priority to airports that do not compete well for federal dollars. Projects are prioritized by:

1. Safety
2. Runway pavement
3. Taxiways
4. Aprons.

Airport projects are eligible for additional points if economic development is a factor in the development. Revenue producing projects like T-Hangars or fuel farms are not eligible.

North Carolina Department of Transportation (NCDOT)[15] – follows a project priority number system based on the Airport Development Plan system objectives within the *2015 State Aviation System Plan*. In unique cases, adjustments can be made to the priority rating system on a case-by-case basis and include the following variables:

1. Cost
2. Geography
3. Public safety
4. Airspace constraints
5. Local support
6. Transportation, industry, and regional impacts
7. Airport infrastructure
8. Based aircraft
9. Airport operations.

Pennsylvania Department of Transportation (PennDOT) – follows the federal prioritization model for airport projects approved for federal funding. With state and local projects, PennDOT prioritizes projects through four criteria that include airport role and enplanement/activity levels, project type, equity and obligation and department goals. Project elements that are prioritized are:

1. Runway/Planning
2. Taxiway
3. Terminal/Apron
4. Landside.

PennDOT allocates the funding equitably, reviewing past funding an airport has received, or evaluating the number of open grants the airport has currently. An airport that has been well-funded or has open grants is given a lower score. Besides the historic funding/open grant factor, PennDOT's prioritization of project funding is similar to the FAA. All the projects that PennDOT supports must be justifiable and feasible.

The two main project types that help meet the PennDOT's goals are System Preservation (i.e., maintaining airfield and airfield-supporting equipment) and Economic Development (defined as revenue producing facilities such as T-hangars, new fuel farms, air cargo development, terminal area projects like a restaurant, fixed-base operator, or business parks). PennDOT also prioritizes planning/intermodal projects, but this factor ranks third on the list.

Tennessee Department of Transportation (TDOT)[16] – prioritizes the funding of projects based on state priorities including:

1. Safety
2. Security
3. Pavement preservation/maintenance
4. Preservation of infrastructure
5. Compliance with current FAA standards
6. Planning
7. Increased capacity and modernization
8. Equipment
9. Landside improvements
10. Revenue producing.

Projects associated with economic development, increased capacity, or modernization are reviewed case by case. Grant issuance adheres to federal and state guidelines.

DOAV's process of handling funding shortfalls is in line with its peers' states. Their funding prioritization model prioritizes high need projects and addresses key objectives for Virginia.

[15] North Carolina Airports Program Guidance Handbook
[16] Tennessee Aviation System Plan

Non-Traditional Funding Options (including Public-Private Partnerships)

In addition to the funding mechanisms discussed, other non-traditional funding mechanisms through private parties may be considered. In general, these would include private funding of certain facilities, or joint funding of facilities using a public/private partnership (P3) structure. Airports of all sizes have used these types of arrangements, and they generally work well for projects that will generate sufficient cash flow to reimburse the investor and provide an adequate return on investment.

Examples of private investment at airports frequently include hangars developed and managed by a corporate developer, or fuel farms and fueling facilities developed and managed by an aircraft fueling company, ground handler, or fixed base operator. Fixed Base Operators; Maintenance, Repair, and Overhaul stations; and aircraft painting facilities are examples of private investments in airports by strategic operators of such businesses. In any of these types of investments, the operator may partner with a financial investor such as an infrastructure investment fund, pension fund, or other private equity fund. These investments are all self-sustaining meaning that they are fully funded by the private sector at airports in which the private sector believes there is sufficient demand for it to develop a profitable business.

P3s at airports include joint investment by airport sponsors and private parties. Although not as common in the US as in other countries, the development of passenger terminals at John F. Kennedy International and LaGuardia airports in New York have used a P3 structure involving either airlines or international terminal operators as the private party. Similar structures have been used at smaller airports as well, including Orlando Sanford, Paine Field, Austin South Terminal, and most recently, Gulf Shores International Airport. San Juan Luis Munoz Marin International Airport is the only example of a full airport P3 in the United States. These projects are substantially self-sustaining but may require some upfront investment by the airport sponsor to defray initial investment costs. Both the public and the private party are then repaid with a rate of return from the proceeds of the business.

Finally, some P3s operate on an availability payment model, essentially off-balance sheet financing. A strategic investor makes the up-front investment to construct and perhaps manage and operate a facility, but then the airport sponsor repays the investor over time including an agreed upon rate of return. This structure is typically used if an airport sponsor cannot finance the upfront payment but can commit to a repayment schedule over the useful life of the project.

DOAV addresses the issue of P3s in its *Airport Program Manual*:

> *The Public-Private Transportation Act of 1995, (PPTA) as amended, offers processes for the innovative delivery of transportation improvements; incorporating the attraction of private equity; appropriate transference of risks; incorporation of life-cycle costs; and advancement of projects in a timelier manner. The PPTA Implementation Manual and Guidelines provides a delivery framework that identifies, evaluates, develops, and delivers Virginia's Public-Private Partnership (P3) transportation projects in a consistent, transparent, timely, and cost-effective manner.*
>
> *To expand procurement and financing opportunities for airport sponsors, the VAB adopted the policies and procedures in the PPTA and incorporated the PPTA Implementation Manual and Guidelines, into the DOAV Airport Program Manual. For P3 projects, airports sponsors are eligible to request their project share from the VAB at the state funding participation rate of 80 percent. The project request will have to compete against other requests before the board.*[17]

[17] *DOAV Airport Program Manual*, page 5-24.

Impacts on Future Funding

Future funding for Virginia airports is contingent on the continuation and financing of traditional federal, state, and local sources. The FAA's ability to spend funds must be reauthorized periodically. Current authorization (via the FAA Reauthorization Act of 2018) extends through FY 2023, but the FAA must be reauthorized for FY 2024. The reauthorization process has sometimes been challenging and is not smooth. In addition, Congress must appropriate funds for the FAA annually. U.S. government shutdowns have occurred in the past causing FAA employees to be furloughed and funding processes to be paused. Similarly, funds for DOAV must be appropriated; in Virginia, this occurs biennially. At the local level, PFC revenue is directly related to the volume of passengers traveling to/from Virginia airports. As air traffic continues to recover following the COVID-19 pandemic, PFC revenues will increase proportionately. There have also been several proposals by the FAA to Congress to increase the maximum PFC level to $7-$8 (up from $4.50). However, none of these have been accepted or implemented by Congress. An increase in the national allowable PFC maximum (or removal of the limit altogether) would allow Virginia airports to increase this local revenue source.

Source: Heather Ream.

Chapter 10: Implementation Plan

The previous chapter identified a funding shortfall of $3.2 billion from all state and federal sources over the 22-year planning period. To address this shortfall, this study recommends the Virginia Department of Aviation (DOAV) undertake a two-pronged strategy. The first strategy involves increasing the funding available to airports to help reduce, but not eliminate, the funding shortfall. The second strategy consists of reorganizing how airports are characterized by role to better allocate funding. This study recommended changes to the airport roles and the method for assigning them. These changes serve to make the process more transparent, provide more focus on economic development at airports, and give DOAV an opportunity to better align their funding priorities with their goals of aviation system preservation and business development.

However, DOAV does not have the unilateral ability to impose all of the changes recommended in this study. DOAV, the Virginia Aviation Board (VAB), and Virginia's airports operate within a set of laws and regulations that reference the airport roles that this study recommends changing. The next section briefly describes the legislative framework that regulates the oversight and funding of Virginia's airports.

Key Takeaways

- Virginia's airport roles are referenced by regulations found in the Code of Virginia and Virginia Administrative Code.
- Changes to airport roles recommended in the VATSP are only advisory in nature. They cannot take effect until legislative changes are made to the Code of Virginia and Virginia Administrative Code.

In addition to describing the existing legislation, this chapter outlines the steps necessary to accomplish the implementation of the recommendations provided in Chapter 8. This information is broken into the following sections:

- Virginia's Legislation Governing Airports
- Expanding Funding for Virginia's Airports
- Prioritizing Virginia's Airport Projects
- Phased Planning and Tracking Progress

Source: DOAV.

Virginia's Legislation Governing Airports

The rules and regulations governing the oversight of Virginia's airports are generally found in the Code of Virginia and the Virginia Administrative Code. Permanent laws passed by the General Assembly and signed by the state governor are codified in the Code of Virginia. The Virginia Administrative Code contains the permanent regulations for Virginia. Regulations are similar to laws in that they have the force of law, but the General Assembly authorizes state agencies to write and administer these regulations.

Virginia addresses aviation issues in the Code of Virginia under Title 5.1 Aviation. *Code of Virginia §5.1-1.1* created DOAV. The *Code of Virginia §5.1-2.1* establishes the Virginia Aviation Board (VAB) as a continuation of the Virginia Aviation Commission. Under *Virginia Administrative Code 24VAC5*, the VAB is authorized to develop regulations that govern the construction and inspection of airports, as well as other matters necessary to promote safe aviation practices and operations. The VAB also fields questions and comments from citizens, stakeholders, and airport sponsors regarding airport issues, serving as a communication channel for DOAV.

The VAB is also tasked with allocating state aviation funds to airport sponsors. Along with this responsibility, the VAB sets the policies for airport funding programs. While the VAB has a good deal of discretion in how state aviation funds are allocated, the Virginia General Assembly has imposed some controls and restrictions on the distribution of those funds. In doing so, the Virginia General Assembly has embedded within its law certain aspects of the aviation system. The Commonwealth Aviation Fund (CAF) was codified under the *Code of Virginia §33.2-1526.6,* and within this law are funding formulas that rely on the definitions of air carrier and reliever airports.

Before the recommended changes in airport roles can be implemented, the Code of Virginia and the Virginia Administrative Code must be amended to reflect these changes in nomenclature. DOAV will need to work within this legislative framework as they undertake the efforts to improve funding for Virginia's airports and restructure the funding formulas that meet the VAB's priorities.

Expanding Funding for Virginia's Airports

The peer analysis of the aviation systems in other states compared Virginia's airport funding levels with several peer states. As shown in **Figure 10-1**, Virginia's average annual state funding for airports falls in the middle of its peer states. Compared to its peers with better funding, Virginia has about half of the state funds available to Tennessee, a third of what Pennsylvania spends, and less than a fifth of North Carolina's money.

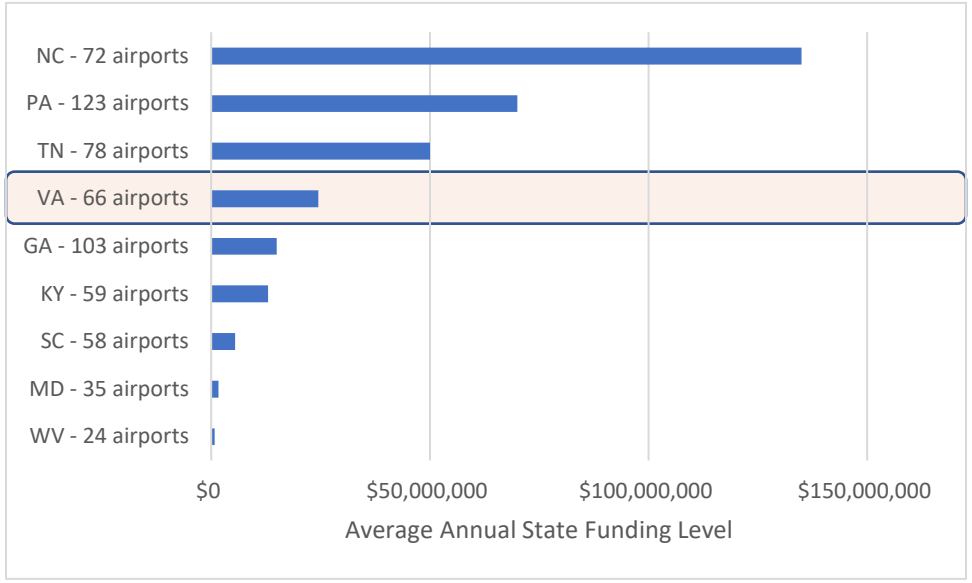
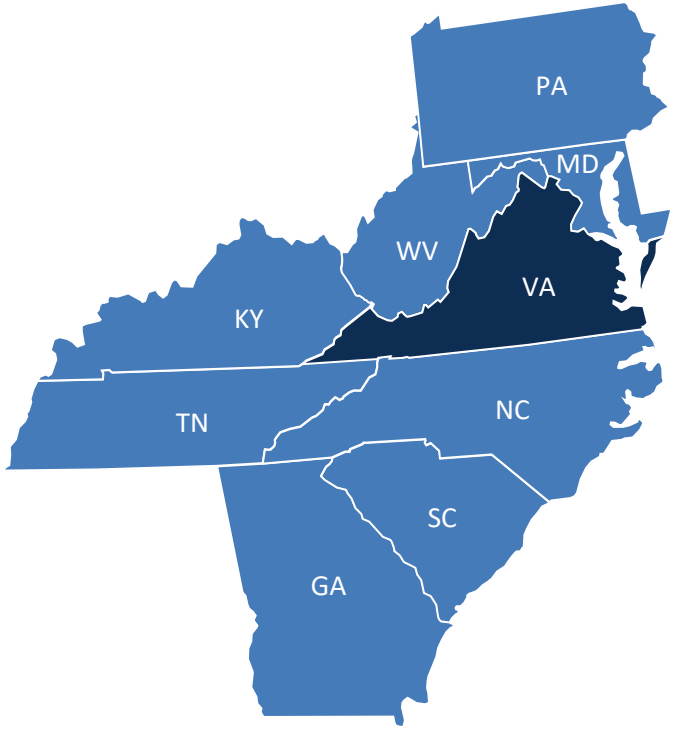


Figure 10-1: Average Annual State Funding for Airports



On a per airport basis, Virginia compares more favorably with its better funded peers. Virginia has about two-thirds the funding of Pennsylvania, 60 percent of Tennessee's funding, but still about a fifth of North Carolina's well-funded aviation system, as shown in **Figure 10-2**.

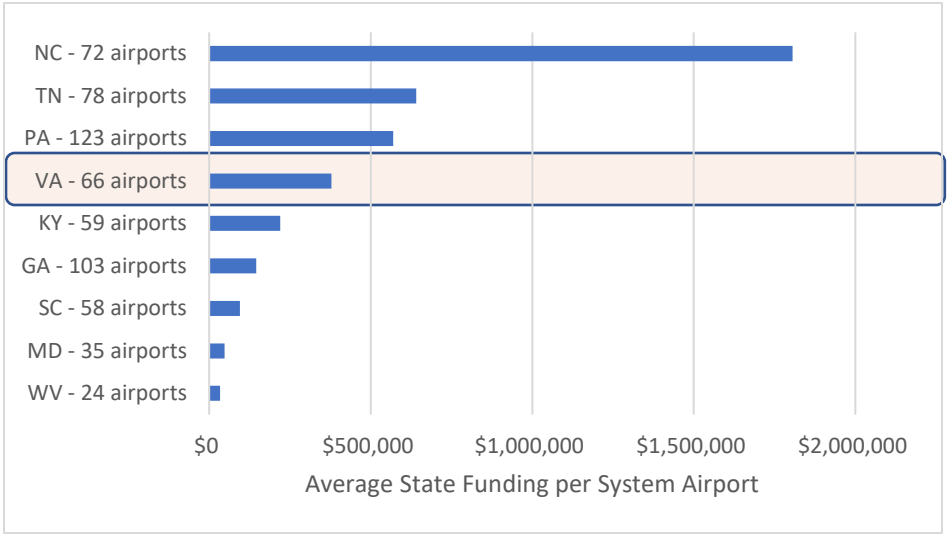


Figure 10-2: Average State Funding per System Airport

This information supports a case for more state airport funding for Virginia's airports to be more competitive with state aviation system peers. As stated in the peer analysis, additional state funding for airports in Virginia could:

- Fund identified fiscal requirements;
- Offset reductions in federal, state, or local funding; and
- Achieve aviation system strategic goals and objectives.

DOAV will likely want to explore various options that could result in more funding for Virginia's airports. The following two examples illustrate options DOAV may want to consider.

- State aviation funding appropriated by the General Assembly – In light of the $22.9 billion in economic output generated by the Virginia aviation system,[18] the General Assembly may want to consider increasing the amount of state funding available to airports so the aviation system can continue to act as an economic engine for the state.
- Expanding public-private partnerships – Virginia allows airport sponsors to request up to 80 percent funding for public-private partnership projects. DOAV may consider undertaking efforts to increase this share to attract more private equity to Virginia's airports.

[18] Virginia Department of Aviation. 2022. *Virginia Airport System Economic Impact Study Executive Summary*. (https://doav.virginia.gov/contentassets/ab031db6ded94e008f22a57a3bf082d4/doav-econ-impact-exec-summary---final----accessible-05-03-18.pdf)

Prioritizing Virginia's Airport Projects

With strong evidence from the previous chapter that funding is insufficient for all of Virginia's airport projects, DOAV, in conjunction with the Federal Aviation Administration (FAA), will need to make hard decisions about which projects get funding and which projects get deferred until later. Prioritizing projects is not necessarily a constant. As an aviation system grows and matures, development priorities can shift. Typically, in a mature system, maintaining the infrastructure takes an increasing share of capital investment. DOAV has shepherded its aviation system to a well-developed position where deferring needed capital maintenance can cost more over time than addressing the needs in a timely fashion. Typical examples are runways that will later need more costly replacement if timely, but less expensive, rehabilitation projects are not undertaken when needed. The result is that there is added pressure to address aviation system capital maintenance needs sooner rather than later to make the best use of the money available. Naturally, these demands for capital maintenance will be competing with demands for new infrastructure. DOAV, along with the FAA and individual airports within the system, will need to address these competing needs, weigh the pros and cons of each, and make reasoned decisions in allocating their funding resources.

One of the tools that can assist them in this endeavor is the guidance found in the *DOAV Airport Program Manual*. This document provides the eligibility criteria for funding projects and the priority formulas for funding projects. DOAV will need to assess their present policy regarding project funding eligibility and determine if any changes are necessary to accommodate the changes in their aviation system. For example, DOAV may determine that airport electrification is a priority for system airports to promote the development of an airport network that can support electric aircraft, and electric vertical takeoff and landing (eVTOL) aircraft, as well as electric ground service equipment and passenger vehicles. If so, then DOAV may need to reconsider the policy that limits funding for only safety or preservation projects at Local Service Airports, as shown in **Table 10-1**. Of course, these changes go hand in hand with the recommended changes to the airport roles.

Table 10-1: Funding Program Eligibility Based on Airport Role

Program		Airport Role†				
		Air Carrier	Reliever	General Aviation (NPIAS*)	General Aviation (non-NPIAS)	General Aviation (non-NPIAS) Local Service
Federal	AIP Entitlement/Discretionary	X	X	X		
	CARES/CRRSA/ARPA**	X	X	X		
	BIL	X	X	X		
State	Entitlement	X				
	Discretionary	X	X	X	X	***
	Aviation Special Fund	X	X	X	X	***
Local	PFCs	X				
	Other	X	X	X	X	X

*National Plan of Integrated Aviation systems.
**These COVID-19 response acts apply to funding in FY 2020-2021 only.
***Local service general aviation airports are eligible only for safety and preservation projects under the State Discretionary Program and the Facilities and Equipment Program.
† The airport roles shown are given in terms based on the Federal classification of airports and are described on page 3-2.
Source: *DOAV Airport Program Manual*, revised August 2021.

Project priority is assessed through a methodology explained in Appendix D of the *DOAV Airport Program Manual*. The airport's role in the system serves as one of the criteria evaluated and is a means of directing funding toward areas of focus. Similar to project eligibility, DOAV and the VAB may consider changes to project prioritization to better reflect the status of the aviation system and shifting priorities.

Phased Planning and Tracking Progress

In consideration of the preparations needed, this implementation plan assumes that the earliest opportunity to make the proposed changes to Virginia's laws and regulations would be the 2024 session of the General Assembly. This would mean that DOAV should be prepared to put into practice the recommended changes no later than fiscal year 2025, which starts on October 1, 2024. Considering the process that the Virginia government uses, it is recommended that DOAV implement the proposed changes in this study using a phased approach.

The first phase consists of DOAV determining how to best use the revised airport roles to direct funding to where policy dictates it is most needed. These efforts will entail changes to the *DOAV Airport Program Manual* and coordination with the VAB, with consideration given to input from the Virginia Airport Operators Council (VAOC). DOAV will also want to disseminate information to stakeholders about the proposed changes to Virginia's airport roles and how those changes are tied to the planned policy changes in regard to the funding of Virginia's airports. During this phase, DOAV should work closely with the VAB to draft proposed changes to the Code of Virginia and Virginia Administrative Code in preparation for presentation to the General Assembly.

The second phase involves monitoring the legislative changes to their conclusion. While this is occurring, DOAV should continue its efforts to communicate how these changes will improve the aviation system. At the same time, DOAV should be working with the VAB to implement changes to the *DOAV Airport Program Manual* to harmonize it with the legislative changes and adjust the funding eligibility criteria and project priorities to reflect the needs of the aviation system.

DOAV should also consider methods for tracking the progress of these changes and the fruits of their efforts. For the legislative changes, DOAV will want to track the legislative calendar to ensure that no deadlines are missed. In the lead up to changes to the funding allocation methods, DOAV may want to track where state funds are appropriated by airport role under the current system for easier comparisons with how the funds are distributed under the new system.

Key Elements by Phase

- Phase 1
  - Policy decisions regarding funding and priorities
  - Coordination with VAB and VAOC
  - Outreach to stakeholders
  - Suggest legislative changes to nomenclature
- Phase 2
  - Monitor legislative changes to completion
  - Continue outreach to stakeholders
  - Track progress toward desired changes

Summary

This aviation system plan developed recommendations for improving Virginia's airports, estimated the costs for doing so, and has outlined in this chapter the steps necessary to accomplish the implementation of these recommendations. DOAV, working with the VAB, will need to craft policies that guide the allocation of their limited financial resources. Changes to the airport roles recommended in this study can assist DOAV in formulating those policies. However, with certain aspects of the Virginia aviation system and its associated funding defined by legislation, DOAV will need to examine and analyze the process of amending the appropriate legislation and regulations. This is a deliberative process that takes time and careful consideration, so carefully phased implementation is recommended. The first phase focuses on the desired policy changes, along with a communication effort directed at stakeholders. The second phase focuses on making the legislative changes needed to accomplish the desired policy changes. Finally, it is recommended that DOAV establish a means of tracking its progress toward accomplishing these changes.