Chapter 10. System Needs and Recommendations

10.1. Introduction

This chapter serves as the culmination of the 2020 Colorado Aviation System Plan (CASP) and presents the final recommendations, including the financial needs related to achieving the system goals. As mentioned in **Chapter 1**, goals and performance measures (PMs) are defined as follows:

- **Goals**. Provide direction for desired results for the state system in key result areas and serve as a starting point for defining objectives and performance-related metrics
- **PMs**. Directly relate to measuring the system's performance in meeting the goals

The four goals developed in **Chapter 1. Goals and Performance Measures** are illustrated below in **Figure 10.1**.

Figure 10.1. 2020 CASP Goals

Sources: CDOT Division of Aeronautics; Kimley-Horn, 2020

In addition to the four goals, 14 PMs were developed and are presented below in **Table 10.1.**

Table 10.1. 2020 Goals and PMs

Goal	Performance Measure
Safety and Efficiency	Percent of Airports with Approaches Negatively Impacted by Obstructions
	Percent of Airports that Have Full Perimeter Wildlife Fencing
	Percent of Airports that Have Adopted Land Use/Height Controls
	Percent of NPIAS Airports that Meet Current FAA Design Standards Under AC 150/5300-13A
Access and Mobility	Percent of Airports with a Dedicated Snow Removal Equipment (SRE) Building
	Percent of Population within a 30-Minute Drive Time of an All-Weather Runway
	Percent of Airports with Adequate Terminal Capacity
	Percent of Airports with Adequate Transient Hangar Spaces
Economic Sustainability	Percent of Airports with Necessary Fuel Type, Available 24/7
	Percent of Airports that Support the Aerospace Manufacturing, Technology, and/or Testing Industry
	Percent of Airports with Adequate Utilities
System Viability	Percent of Airports with Certified On-Site Weather Reporting (AWOS or ASOS)*
	Percent of Airports with Pavement Maintenance Programs (PMPs)
	Percent of Airports with an Average Runway and Taxiway Pavement Condition Index (PCI) of 70 or Greater

**AWOS = Automated Weather Observing System; ASOS = Automated Surface Observing System*

Sources: CDOT Division of Aeronautics; Kimley-Horn, 2020

The financial needs presented in this chapter represent the development costs of recommended projects that would improve the system to the desired level. Second, performance measure recommendations, as well as additional studies and program recommendations, are documented to aid the Colorado Department of Transportation (CDOT) Division of Aeronautics in strategically leveraging planning and funding to achieve the future needs of the system and the goals established for the 2020 CASP.

Airports considered to be deficient in meeting the PMs and/or facility and service objectives (F&SOs), both in terms of the existing and future system, were reviewed to determine the recommended projects needed to satisfy those components. The financial needs identified in the CASP provide CDOT Division of Aeronautics with information that can be used in decision-making to align future project funding with the desired outcomes for the system. Following the financial needs component, the recommendations and implementation plan outlines actions that CDOT Division of Aeronautics may consider in executing 2020 CASP recommendations. The actions described incorporate best practices in strategic planning for the enhancement of the system's overall performance.

10.2. Financial Needs

Financial needs in this section are generated utilizing data from **Chapter 6. Existing System Performance, Chapter 7. Aviation Demand Forecasts**, and **Chapter 8. Future System Performance**. Recommended projects are derived from airports that did not meet PMs and/or F&SOs in accordance with future performance targets. In certain cases, where a facility and service objective or PM was driven based on the number of based aircraft or annual operations, referred to as demand driven needs, the forecasts from **Chapter** 7 were used to determine the future need. Projects related to system indicator (SI) deficiencies do not have associated projects or financial needs as these are only informational. Estimated development costs resulting from recommended projects are aimed at closing the gap between these deficiencies and strengthening the overall performance of the system.

10.2.1. Cost Estimate Methodology

Projects in this chapter identify the "difference" between the airport's current or existing condition and the needs to satisfy PMs, F&SOs, and/or future facility needs driven by aviation demand forecasts. For example, the 2020 CASP defines the facility and service objective for runway strength for GA-Local airports as 30,000 pounds for the primary runway. A GA-Local airport whose primary runway strength is only 25,000 pounds is considered deficient. The recommended project to bring this airport into compliance would be to strengthen the primary runway by at least 5,000 pounds to meet the objective. Each project's cost, by airport, were recorded to identify system financial needs by goal category, PM, facility and service objective, future needs, and system total.

Of note, while Denver International Airport (DEN) was included throughout the CASP's analysis, individual projects and project costs were not developed for DEN. Information from DEN on capital spending was obtained and is subsequently discussed to reflect a total statewide aviation system financial need, although DEN's projects are not reflected in the cost tables presented in the next section.

Capital improvement plans (CIPs) were also gathered from available airport master plans and CDOT Division of Aeronautics' 20-year CIPs. These projects were cross referenced with the 2020 CASP recommended projects to avoid duplication of financial needs. Any duplicative project costs were removed from CDOT CIP totals, however, CIP costs were presented in CASP airport-specific projects associated with the appropriate goal category, PM, or facility and service objective to be able to derive the total needs for each of these components.

Planning-level unit costs were developed based on 2019 Colorado material costs and industry knowledge and were tiered to reflect cost differentials between types and sizes of airports. The 2020 CASP airport classifications were used for this purpose. For example, a unit cost at a Denver-area GA-Regional airport may be less expensive than at a GA-Rural airport in southeastern Colorado. The unit costs were then multiplied by the necessary quantities (i.e. area, units, feet, etc.) of the proposed project to develop a cost estimate for that project. This planning-level exercise provides an order of magnitude estimate with some contingencies accounted for in the unit costs. More detailed project costs require additional analyses regarding the specific conditions found at each airport.

It is important to note that inclusion of a project in the 2020 CASP is for planning purposes only and does not convey a commitment of local, state, or federal funding for a project. Project justification

through appropriate means is still required to support funding requests. Also relevant is the fact that financial needs are presented in 2020 dollars.

10.3. System Plan Project Costs by Goal Category

Total estimated costs in the following sections pertain to 2020 CASP projects identified to improve the system performance related to each PM organized by goal category. These projects are recommended to increase the existing performance to the target performance. Some projects do not have associated costs and are denoted accordingly under each PM. Costs for recommended projects that satisfy both a PM and an existing facility and service objective are marked with an (*) in subsequent tables. For example, the PM "Percent of Airports with a Dedicated Snow Removal Equipment (SRE) Building" overlaps with the facility and service objective for maintenance/SRE building. Costs for these projects are shown twice in the costs: once under the applicable PM and once under the applicable facility and service objective. However, overlapping costs are not duplicated for total system needs. As previously stated above, individual projects and subsequent project costs were not developed for DEN in this section.

10.3.1. Safety and Efficiency Goal

Table 10.2 presents the costs for projects under the Safety and Efficiency goal by PM. The following PMs do not have an associated project cost:

- **Percent of Airports with Approaches Negatively Impacted by Obstructions** — The analysis focused on the controlling obstruction affecting the approach slope. Improving the approach slope could require multiple obstructions being lighted, trimmed, or removed. The costs vary substantially by airport and sufficient information was not available to derive a useful estimate.
- **Percent of Airports that Have Adopted Land Use/Height Controls**. There is no direct project cost associated with promoting and implementing land use/height controls.
- **Percent of NPIAS Airports that Meet Current FAA Design Standards Under AC 150/5300-13A.** The analysis identified taxiway geometry and RSA deficiencies, however, given the range of potential solutions to address these deficiencies at each airport, a project cost was not developed.

The cost estimate for safety and efficiency projects total $12,162,000, reflecting only projects to address the PM for full perimeter wildlife fencing. The full cost of mitigating obstructions and addressing taxiway geometry and RSA improvements would substantially increase this goal's costs.

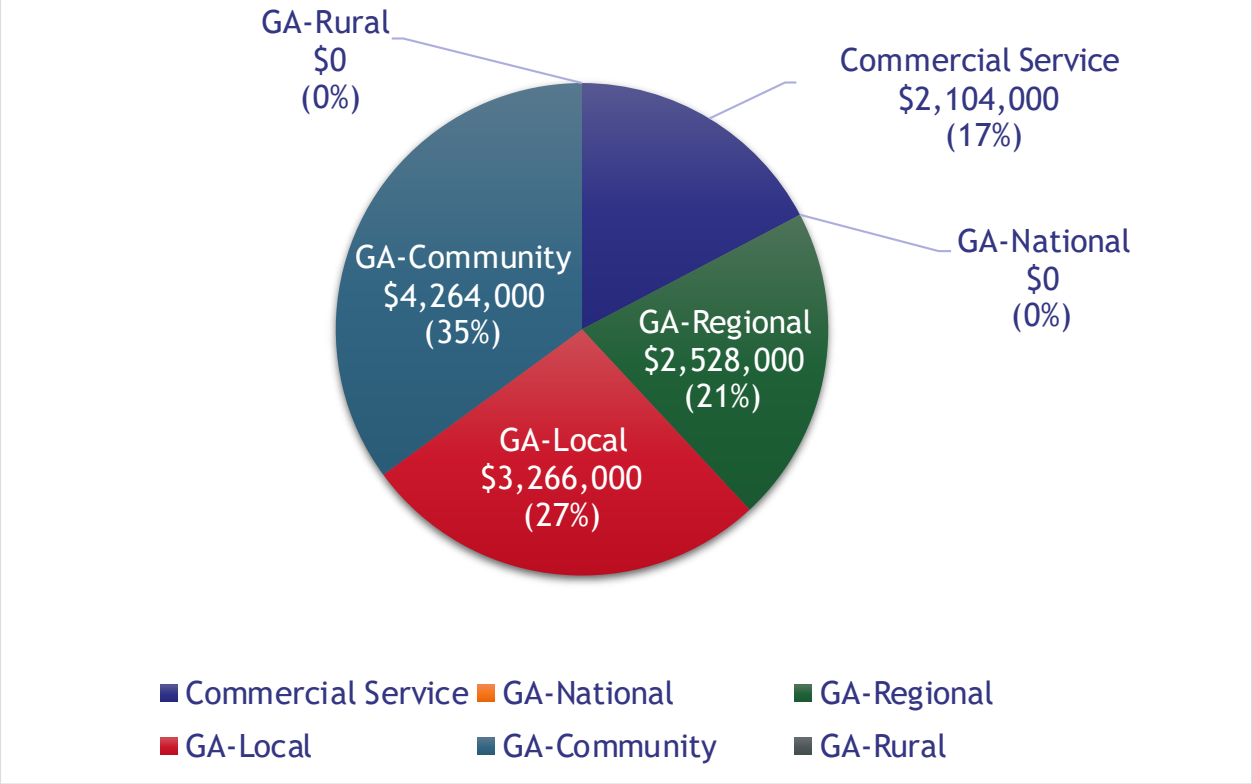
Table 10.2. Safety and Efficiency Goal: Project Costs by PM

2020 CASP Performance Measure		2018 Performance	Future Performance Target	Total Estimated Cost	% of Total
Percent of Airports with Approaches Negatively Impacted by Obstructions		35%	0%	No cost developed	0%
Percent of Airports that Have Full Perimeter Wildlife Fencing		49%	85%	$12,162,000	100%
Percent of Airports that Have Adopted Land Use/Height Controls	*Land Use*	62%	100%	No cost developed	0%
	Height	58%	100%	No cost developed	0%
Percent of NPIAS Airports that Meet Current FAA Design Standards Under AC 150/5300-13A	*Taxiway Geometry*	10%	100%	No cost developed	0%
	RSA Standards	78%	100%	No cost developed	0%
			Total Costs	**$12,162,000**	**100%**

Sources: 2018 Inventory & Data Form, Kimley-Horn, 2020

Project costs under the Safety and Efficiency goal are broken out by airport classification in **Figure 10.2.** There are no project costs for GA-National and GA-Rural airports as these airports' existing conditions currently satisfy the future performance targets for full perimeter wildlife fencing. GA-Community has the largest portion of costs at nearly $4.3 million (35 percent). GA-Local, GA-Regional, and Commercial Service follow at 27 percent, 21 percent, and 17 percent, respectively.

Figure 10.2. Safety and Efficiency Goal: Project Costs by Airport Classification



Source: Kimley-Horn, 2020

10.3.2. Access and Mobility Goal

Table 10.3 presents the project costs for the Access and Mobility goal by PM. All costs for PMs in this goal, except for GA terminal building needs, overlap with needs based on F&SOs. Project costs incurred by the PM "Percent of population within a 30-minute drive time of an all-weather runway" are for improvements to install on-site weather reporting and/or implementing instrument approach procedures (IAP) at airports as determined by their F&SOs. The majority of costs are related to commercial service terminal building needs (over $105 million) and additional transient hangar space needs (almost $95 million). Costs associated with meeting access and mobility goal PMs are nearly $221 million.

Table 10.3. Access and Mobility Goal: Project Costs by PM

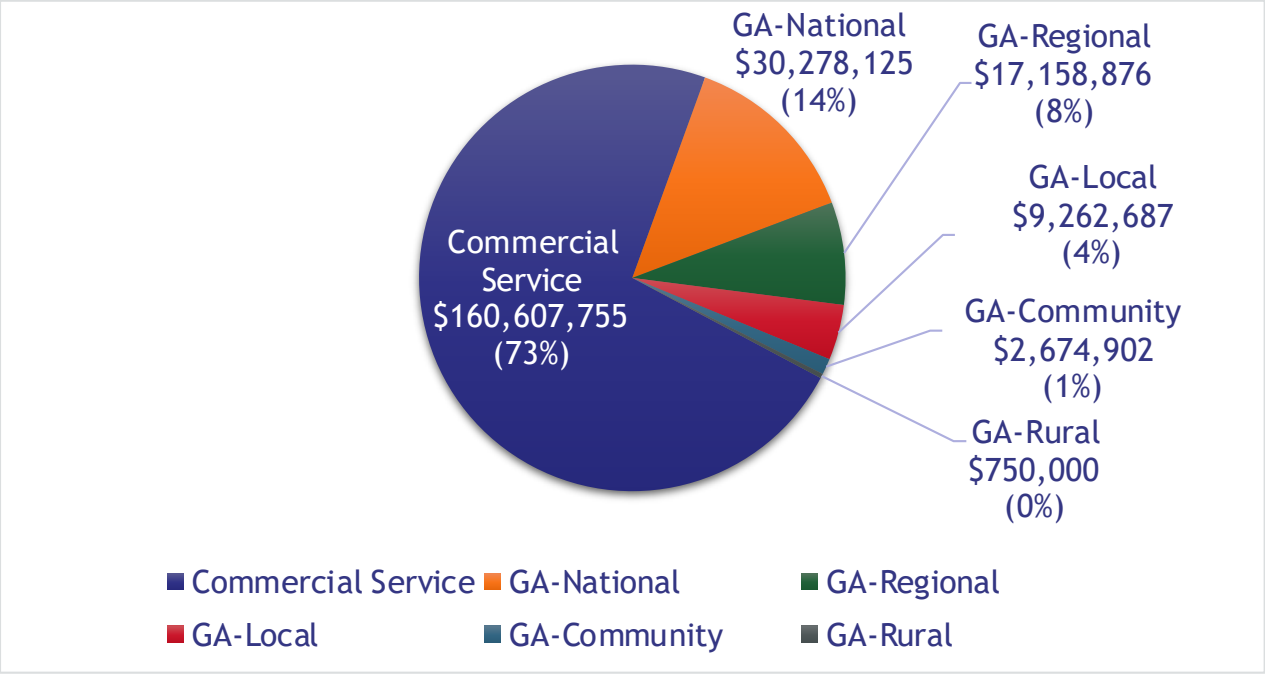
2020 CASP Performance Measure		2018 Performance	Future Performance Target	Total Estimated Cost	% of Total
Percent of Airports with a Dedicated Snow Removal Equipment (SRE) Building*		44%	61%	$9,931,668	4%
Percent of Population within a 30-Minute Drive Time of an All-Weather Runway*		83%	85%	$4,572,777	2%
Percent of Airports with Adequate Terminal Capacity	*Commercial Service Terminal**	29%	100%	$105,152,280	40%
	General Aviation Terminal	58%	100%	$6,572,163	2%
Percent of Airports with Adequate Transient Hangar Spaces*		44%	61%	$94,503,457	52%
			Total Costs	**$220,732,345**	**100%**

**Note: PM costs overlap with applicable F&SO costs.*

Sources: 2018 Inventory & Data Form; FAA Form 5010 Master Record; Kimley-Horn, 2019

The $221 million in recommended projects for the Access and Mobility goal is broken out by airport classification in **Figure 10.3.** Commercial Service airports comprise almost three-quarters of the total project costs for this goal category.

Figure 10.3. Access and Mobility Goal: Project Costs by Airport Classification



Note: Percentages are rounded to nearest whole number.

Source: Kimley-Horn, 2020

10.3.3. Economic Sustainability Goal

Table 10.4 presents a summary of system performance and future targets for the three PMs associated with the Economic Sustainability goal. As shown, costs were not developed for projects related to either the fuel types or utilities, and no target was established for airports to support the aerospace manufacturing, technology and/or testing industry. The PM for fuel specifically pertains to the fuel services provided at the airport (full-service by FBO or 24/7 self-serve) as defined by the F&SOs. No costs are associated with providing fuel services in this PM. For the utilities PM, costs are dependent on multiple factors such as the location where development is needed compared to proximity to existing utilities and even the capacity of utilities. As such, accurate cost estimates could not be developed for each airport.

Table 10.4. Economic Sustainability Goal: Project Costs by PM

2020 CASP Performance Measure	2018 Performance	Future Performance Target	Total Estimated Cost	% of Total
Percent of Airports with Necessary Fuel Type, Available 24/7*	94%	100%	No cost developed	0%
Percent of Airports that Support the Aerospace Manufacturing, Technology and/or Testing Industry	36%	No Target Established	N/A	0%
Percent of Airports with Adequate Utilities	53%	85%	No cost developed	0%
		Total Costs	**$0**	**0%**

Sources: 2018 Inventory & Data Form; Kimley-Horn, 2019

10.3.4. System Viability Goal

Project costs related to PMs for the System Viability goal are shown in **Table 10.5**. The costs of recommended projects are estimated at nearly $61 million for two of the three PMs, with no cost identified for the adoption of a pavement maintenance program (PMP). The PM "Percent of Airports with Certified On-Site Weather Reporting (AWOS or ASOS)" overlaps with the facility and service objective for weather reporting, therefore this cost is duplicative, representing nearly $1.8 million or three percent of the System Viability total cost. The most significant cost is achieving the target performance for airports having an average runway and taxiway PCI of 70 or greater. This cost of over $59 million represents 97 percent of the total System Viability Goal cost. This PM is widely considered to be one of the most critical of the CASP as maintaining the system airports' pavements in good condition is essential to the system's long-term viability.

Table 10.5. System Viability Goal: Project Costs by PM

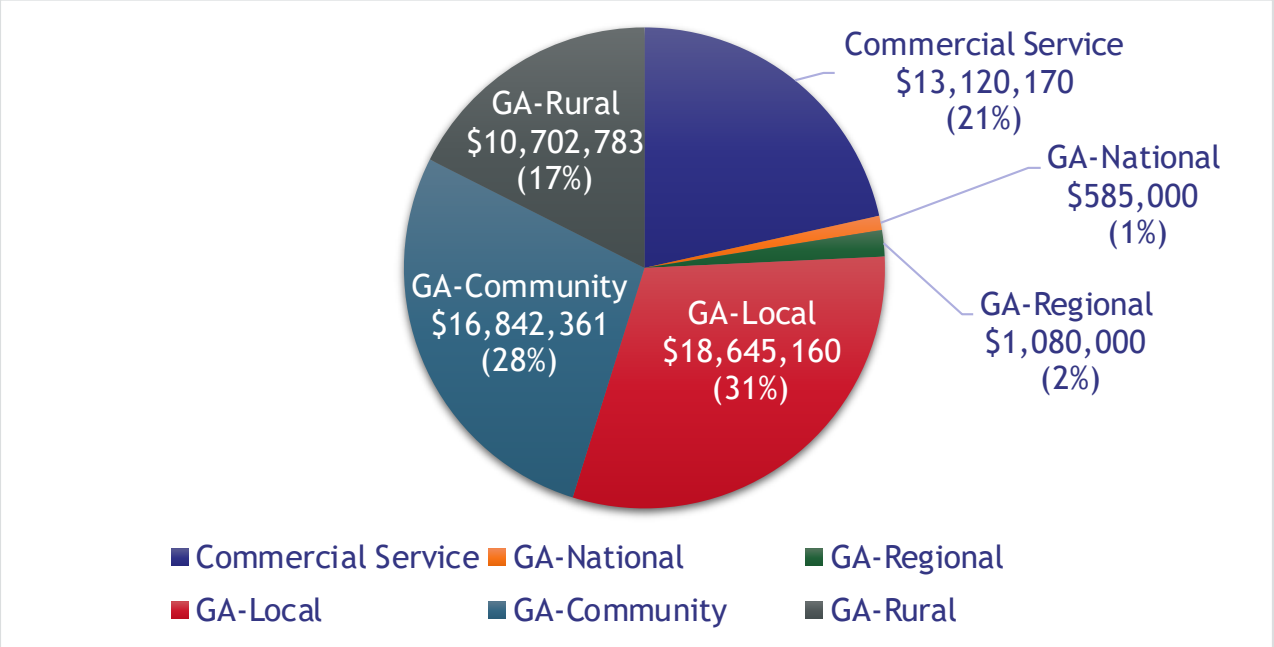
2020 CASP Performance Measure	2018 Performance	Future Performance Target	Total Estimated Cost	% of Total
Percent of Airports with Certified On-Site Weather Reporting (AWOS or ASOS)*	77%	85%	$1,777,777	3%
Percent of Airports with Pavement Maintenance Programs	64%	95%	No cost developed	0%
Percent of Airports with an Average Runway and Taxiway Pavement Condition Index (PCI) of 70 or Greater	47%	95%	$59,197,697	97%
		Total Costs	**$60,975,474**	**100%**

**Note: PM costs overlap with applicable F&SO costs.*

Sources: CDOT Division of Aeronautics Pavement Evaluation and Management, 2018; 2018 Inventory & Data Form; Kimley-Horn, 2020

Figure 10.4 shows the costs of projects under the System Viability goal broken out by airport classification. Of the nearly $61 million in project costs, GA-Local airports make up almost one-third of these costs at almost $19 million, with GA-Community following closely behind with nearly $17 million (28 percent), and Commercial Service with over $13 million in needs (21 percent). GA-Rural, GA-Regional, and GA-National airports follow with 17 percent, two percent, and one percent, respectively.

Figure 10.4. System Viability: Project Costs by Airport Classification



Source: Kimley-Horn, 2019

10.3.5. Total Project Costs by Goal Category

Table 10.6 presents the total development costs to meet all future performance targets set for PMs by goal category.

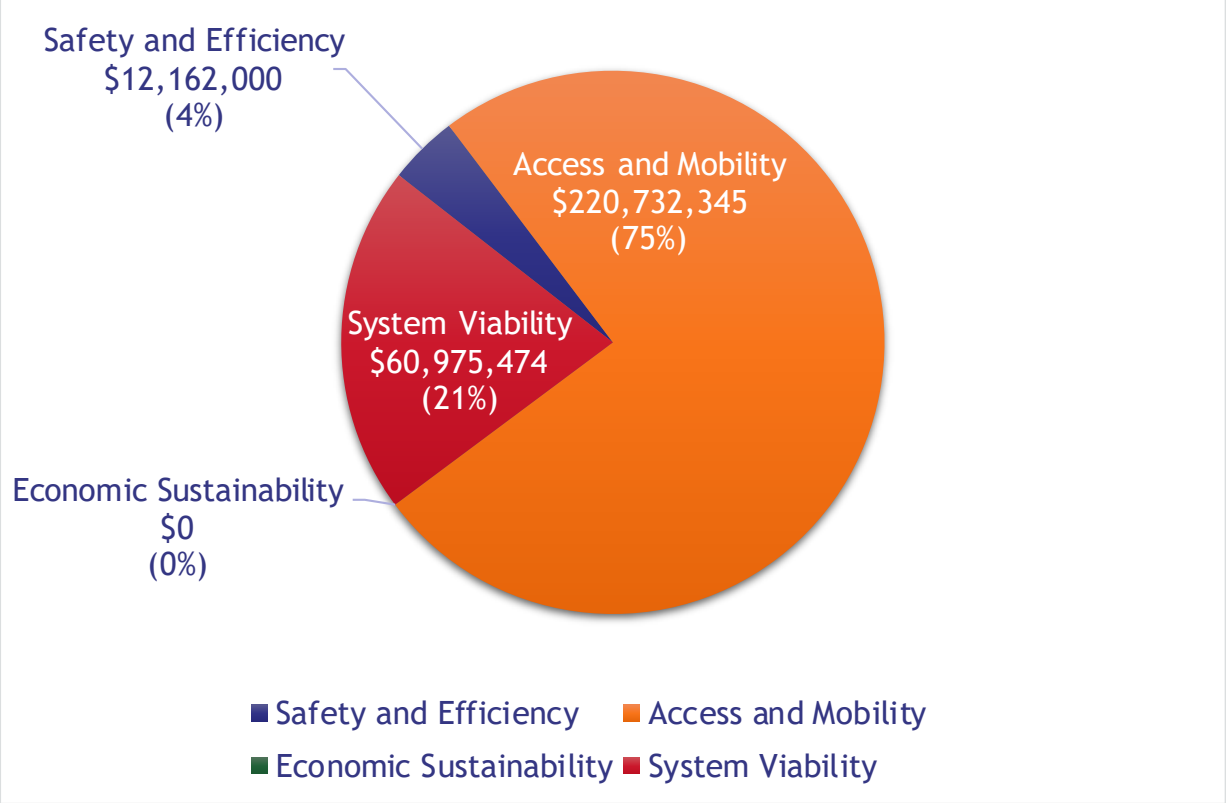
Table 10.6. Total Project Costs by Goal Category

2020 CASP Goal Category	Total Estimated Cost	% of Total
Safety and Efficiency	$12,162,000	4%
Access and Mobility	$220,732,345	75%
Economic Sustainability	$0	0%
System Viability	$60,975,474	21%
Total Project Costs	$293,869,818	100%

Source: Kimley-Horn, 2020

Figure 10.5 graphically displays the results. The total PM system cost is estimated at $293.8 million. Costs related to meeting PMs in the Access and Mobility goal make up 75 percent of these costs. System Viability and Safety and Efficiency goals comprise roughly 21 percent and four percent of total costs, respectively. No costs were established for the Economic Sustainability goal as there were no future targets, no associated project costs, and costs were not developed for the PMs.

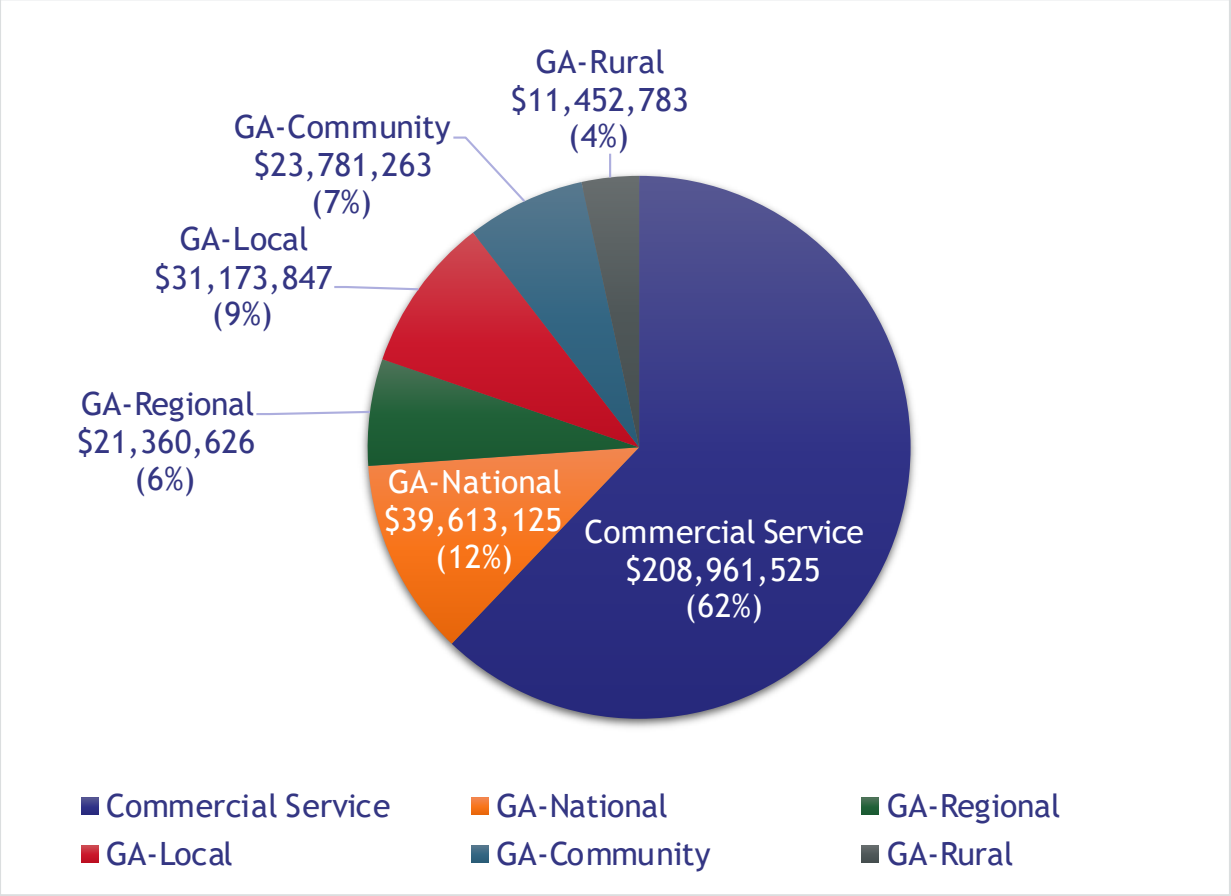
Figure 10.5. Total Project Costs by Goal Category



Source: Kimley-Horn, 2020

Figure 10.6 presents the total costs organized by airport classification. The distribution of project costs is more widespread amongst airport classifications than by goal category. Project costs for Commercial Service airports comprise the largest portion at 62 percent and nearly $209 million, compared to only four percent of costs at GA-Rural airports at more than $11 million.

Figure 10.6. Total Project Costs by Airport Classification



Source: Kimley-Horn, 2020

10.4. System Plan Project Costs by Facility & Service Objective

This section examines costs for airports that did not meet the F&SOs identified for their airport classification. As previously discussed, projects and project costs relating to F&SOs were not developed for DEN. Additionally, project costs which have overlapping PMs and F&SOs are denoted with an (*) in subsequent tables, as appropriate.

10.4.1. Airfield Facility Objectives

Project costs related to airfield facility objectives are shown in **Table 10.7** and

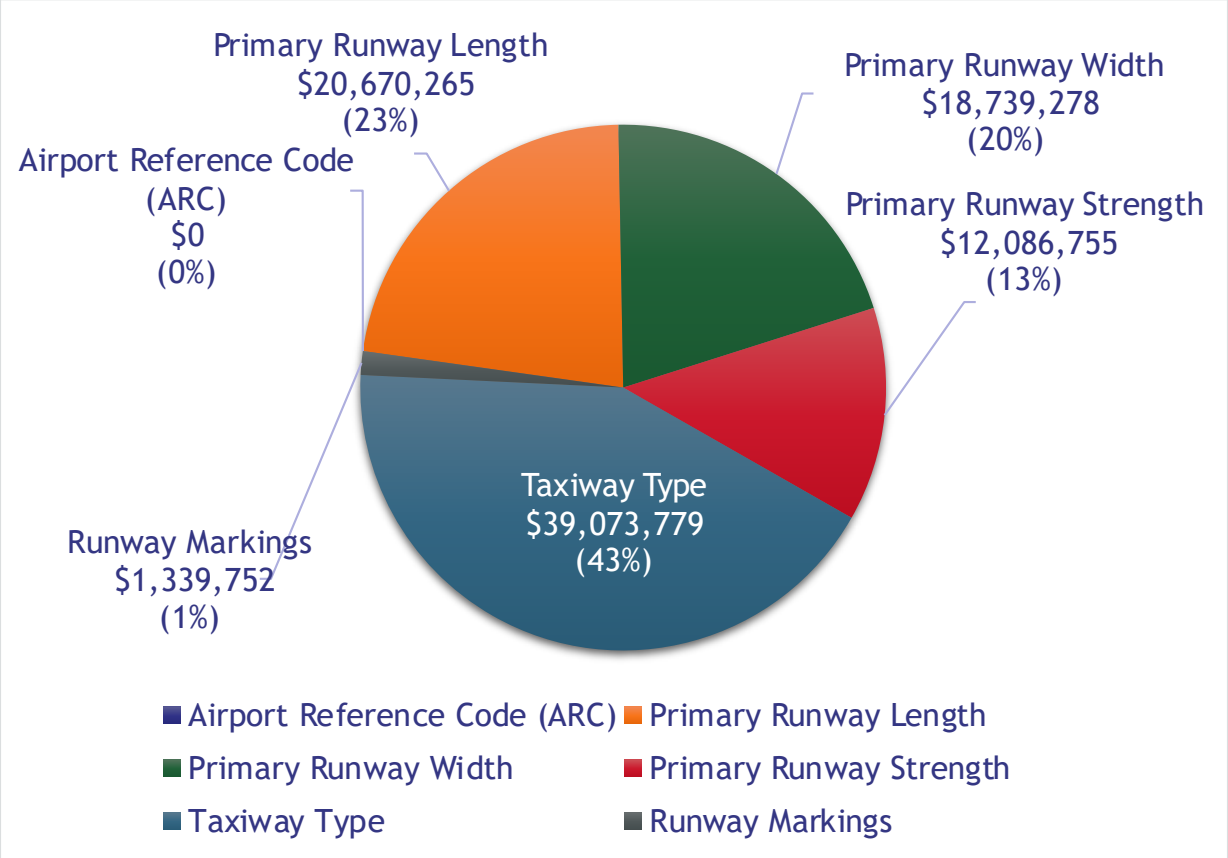
Figure 10.7. The total cost for airports to meet airfield facility objectives amounts to nearly $92 million. Recommended projects for airports to achieve the taxiway objective are estimated at over $39 million which comprises almost half of total airfield facility objective costs. Primary runway length projects make up roughly one-quarter of these costs at over $20 million. No costs were prepared for projects related to airport's meeting the airport reference code (ARC). These projects would consist of a variety of elements such as runway to taxiway separation and safety areas that are associated with airports changing their ARC and the associated runway design code (RDC) for the primary runway. These costs are specific to each airport's situation and therefore are not presented in the CASP.

Table 10.7. Airfield Facility Project Costs by Objective

Facility and Service Objective	Total Estimated Cost	% of Total
Airport Reference Code (ARC)	No cost developed	0%
Primary Runway Length	$20,670,265	23%
Primary Runway Width	$18,739,278	20%
Primary Runway Strength	$12,086,755	13%
Taxiway Type	$39,073,779	43%
Runway Markings	$1,339,752	1%
Total F&SO Recommendations Costs	**$91,909,828**	**100%**

Source: Kimley-Horn, 2020

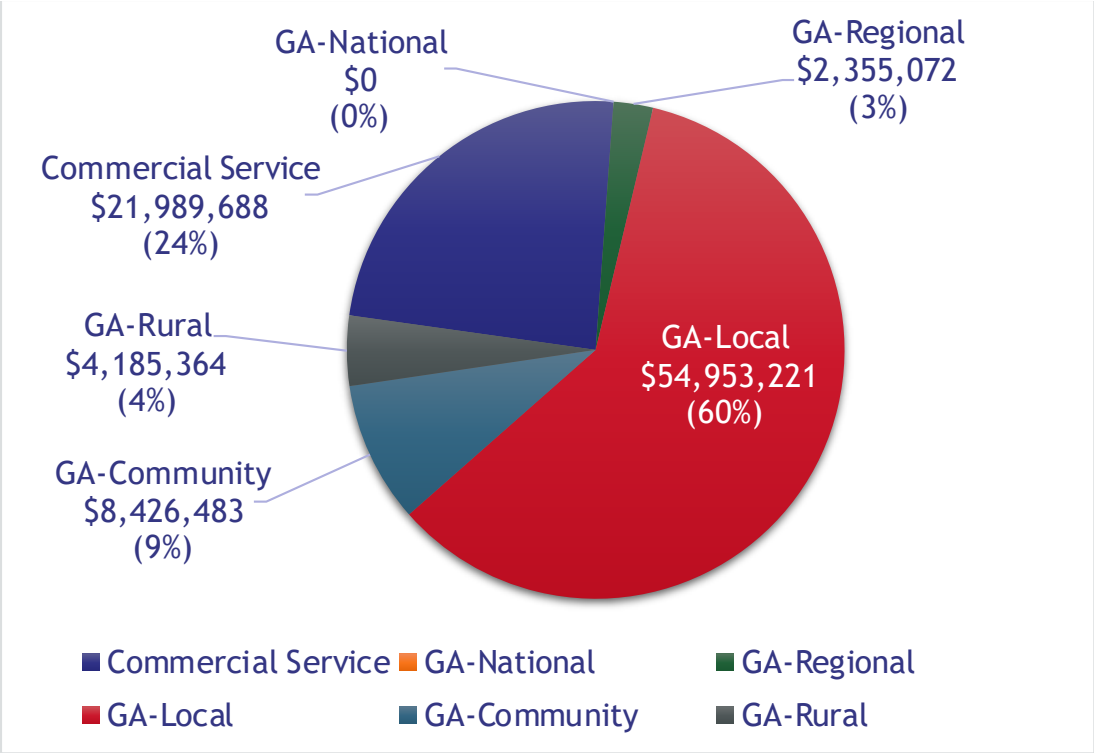
Figure 10.7. Airfield Facility Project Costs by Objective



Source: Kimley-Horn, 2020

Figure 10.8. shows the airfield facility project costs categorized by airport role. GA-Local airports comprise 60 percent of the project costs with almost $55 million, while Commercial Service airports comprise 24 percent with nearly $22 million in airfield facility project costs. The other airport classifications making up smaller proportions of the total recommended airfield facility project costs.

Figure 10.8. Airfield Facility Project Costs by Airport Role



Source: Kimley-Horn, 2020

10.4.2. Lighting/NAVAIDs Facility Objectives

Lighting/NAVAIDs project costs presented by objective in **Table 10.8** and the results are graphically depicted in **Figure 10.9.** Total project costs for lighting and NAVAID facility objectives are estimated at $6.6 million. Primary approach projects make up almost $3 million and equate to 42 percent of total lighting/NAVAIDs project costs. Project recommendations for primary approach and weather reporting share overlapping costs with PMs as denoted in **Table 10.8.**

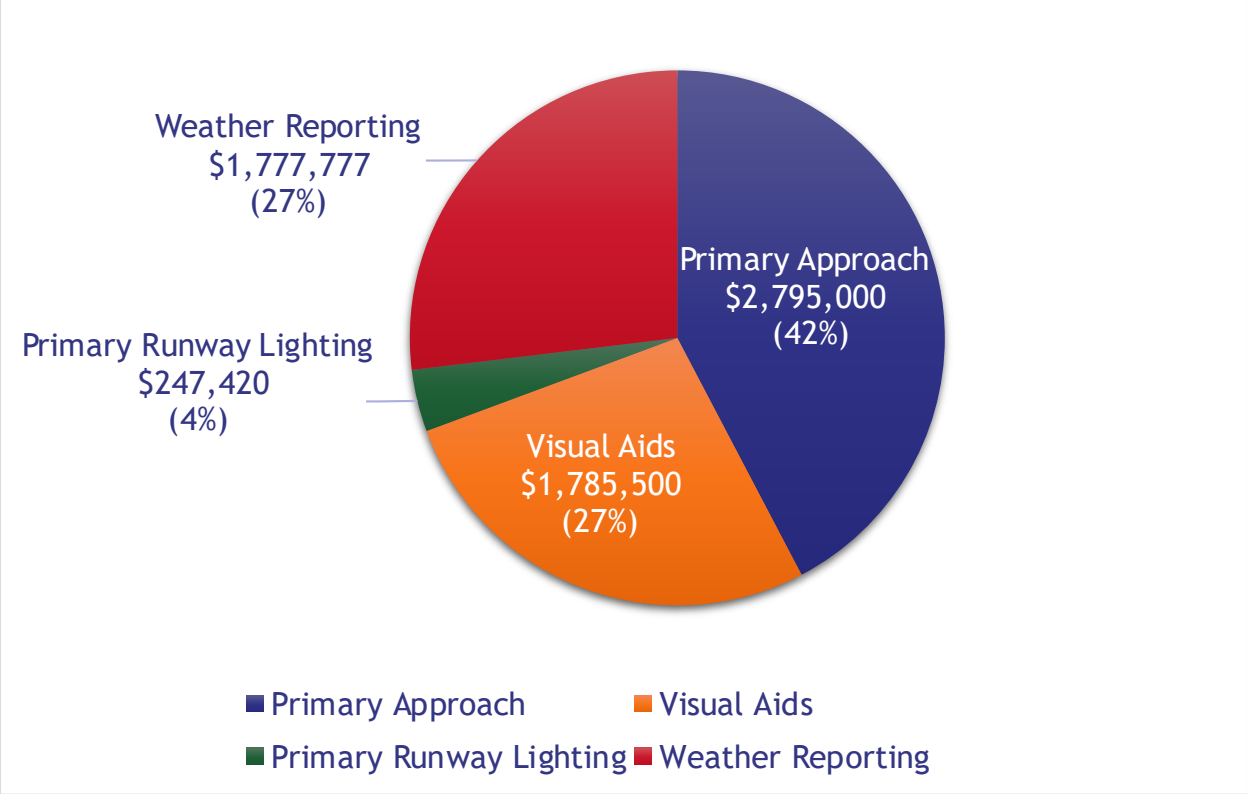
Table 10.8. Lighting/NAVAIDs Facility Project Costs by Objective

Facility and Service Objective	Total Estimated Cost	% of Total
Primary Approach*	$2,795,000	42%
Visual Aids	$1,785,500	27%
Primary Runway Lighting	$247,420	4%
Weather Reporting*	$1,777,777	27%
Total F&SO Recommendations Costs	**$6,605,697**	**100%**

**Note: Facility and service objective costs overlap with PM costs.*

Source: Kimley-Horn, 2020

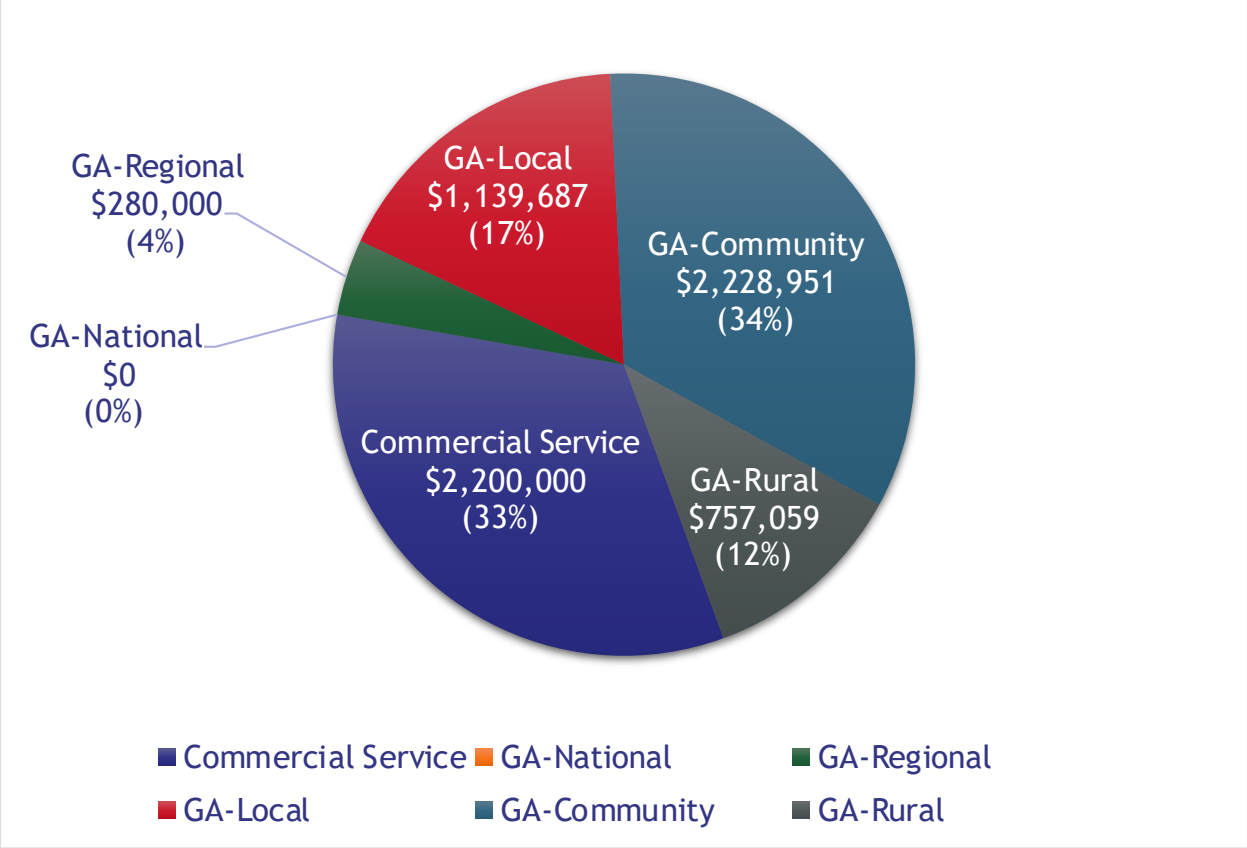
Figure 10.9. Lighting/NAVAIDs Facility Project Costs by Objective



Source: Kimley-Horn, 2020

Project costs for lighting/NAVAIDs projects are broken down by airport classification as shown in **Figure 10.10.** Commercial Service and GA-Community airport classifications' costs make up a combined total of $4.4 million and equal 67 percent of project costs. There are no project costs for GA-National airports.

Figure 10.10. Lighting/NAVAIDs Facility Project Costs by Airport Classification



Source: Kimley-Horn, 2020

10.4.3. Airport Facility Objectives

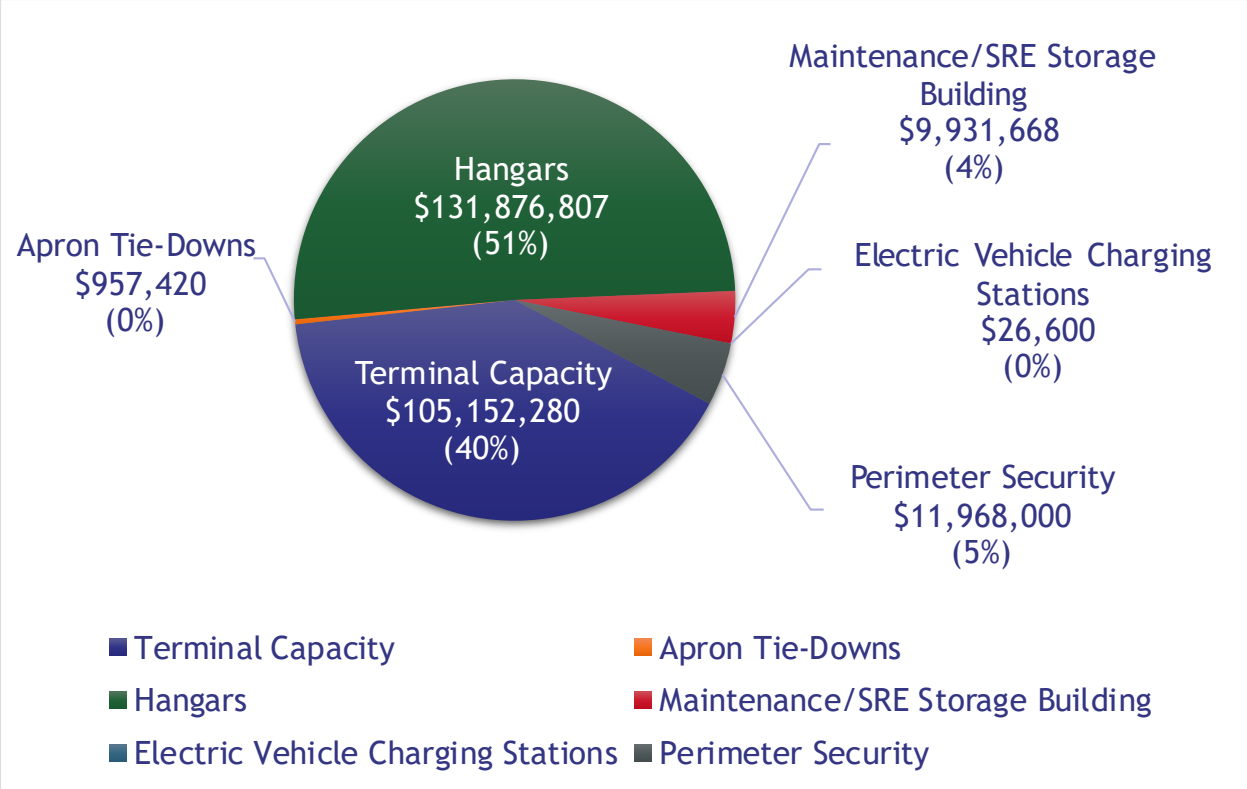
Table 10.9 and **Figure 10.11.** show project costs for projects focused on meeting other airport facility objectives. The total project costs for these airport facility objectives are over $259 million. Projects related to increasing airport aircraft storage (hangars and apron tie-downs) make up more than half (52 percent) of these project costs at over $132 million. Projects to increase commercial service terminal capacity comprise the second largest proportion of project costs at 40 percent and $105 million dollars. There are three F&SOs that overlap with existing PMs: terminal capacity (commercial service only), hangars, and maintenance/SRE storage buildings. It should be noted that recommended projects in this section are specifically driven by 2018 needs to meet these F&SOs. **Section 10.5 Future Facility Project Costs** defines the costs of system facility needs based on 2038 aviation demand forecasts from **Chapter 7.**

Table 10.9. Airport Facility Project Costs by Objective

Facility and Service Objective	Total Estimated Cost	% of Total
Terminal Capacity* (Commercial Service only)	$105,152,280	40%
Apron Tie-Downs	$957,420	0%**
Hangars*	$131,876,807	52%
Maintenance/SRE Storage Building*	$9,931,668	4%
Electric Vehicle Charging Stations	$26,600	0%**
Perimeter Security	$11,968,000	4%
Total F&SO Recommendations Costs	$259,912,775	**100%**

**Note: Facility and service objective costs overlap with PM costs.*
***Note: Percentages are rounded to nearest whole number.*
Source: Kimley-Horn, 2020

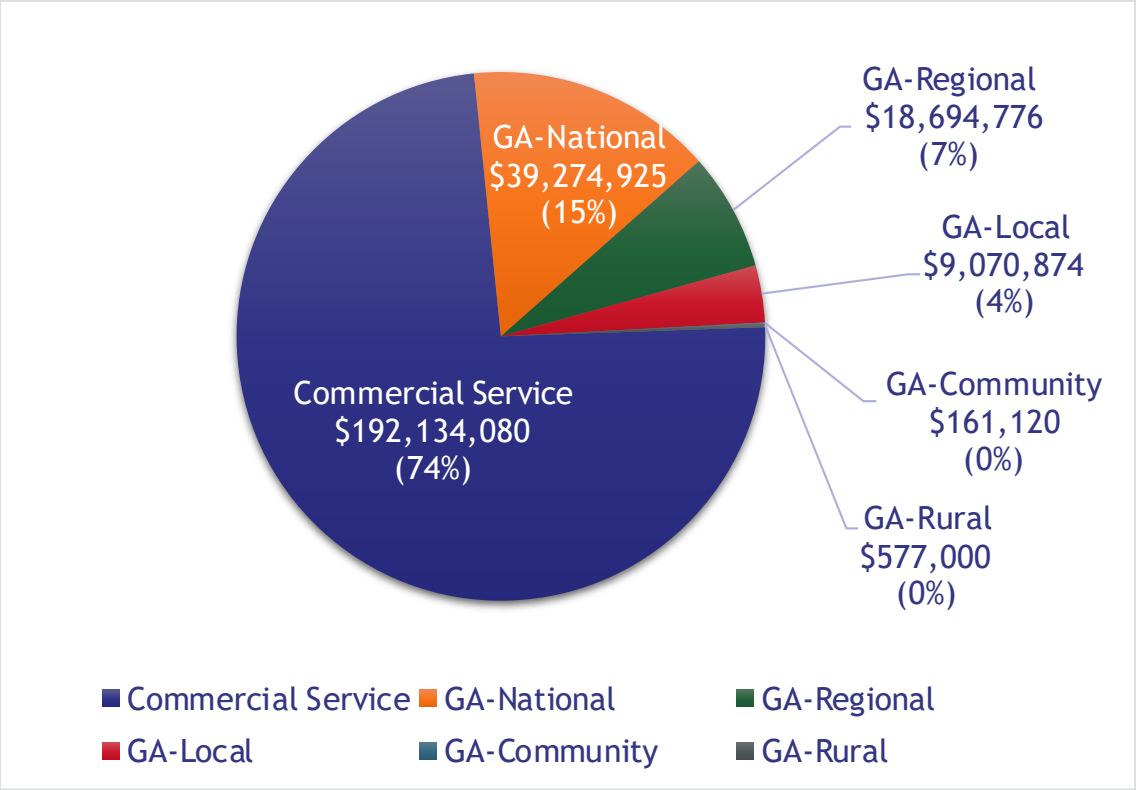
Figure 10.11. Airport Facility Costs by Objective



Note: Percentages are rounded to nearest whole number.
Source: Kimley-Horn, 2020

Recommended development costs for airport facility objectives are organized by airport classification and presented in **Figure 10.12.** Commercial Service airports comprise three-quarters of the costs at almost $200 million. A large proportion of these costs are due to the need for additional aircraft storage in relation to the volume of based and transient aircraft frequenting these airports.

Figure 10.12. Airport Facility Project Costs by Airport Classification



Note: Percentages are rounded to nearest whole number.
Source: Kimley-Horn, 2020

10.4.4. Services/Other Objectives

The project costs to meet services/other objectives are shown in **Table 10.10**. Development costs to meet these objectives amount to almost $50 million. Jet A and AvGas fuel objectives focus specifically on fueling services (e.g., full service by an FBO or 24/7 self-service) provided at the facility. Fuel service does not have a direct cost. Additionally, no costs were developed for sustainability plan projects since CDOT Division of Aeronautics has developed a sustainability plan template that 2020 CASP airports can use without a fee.

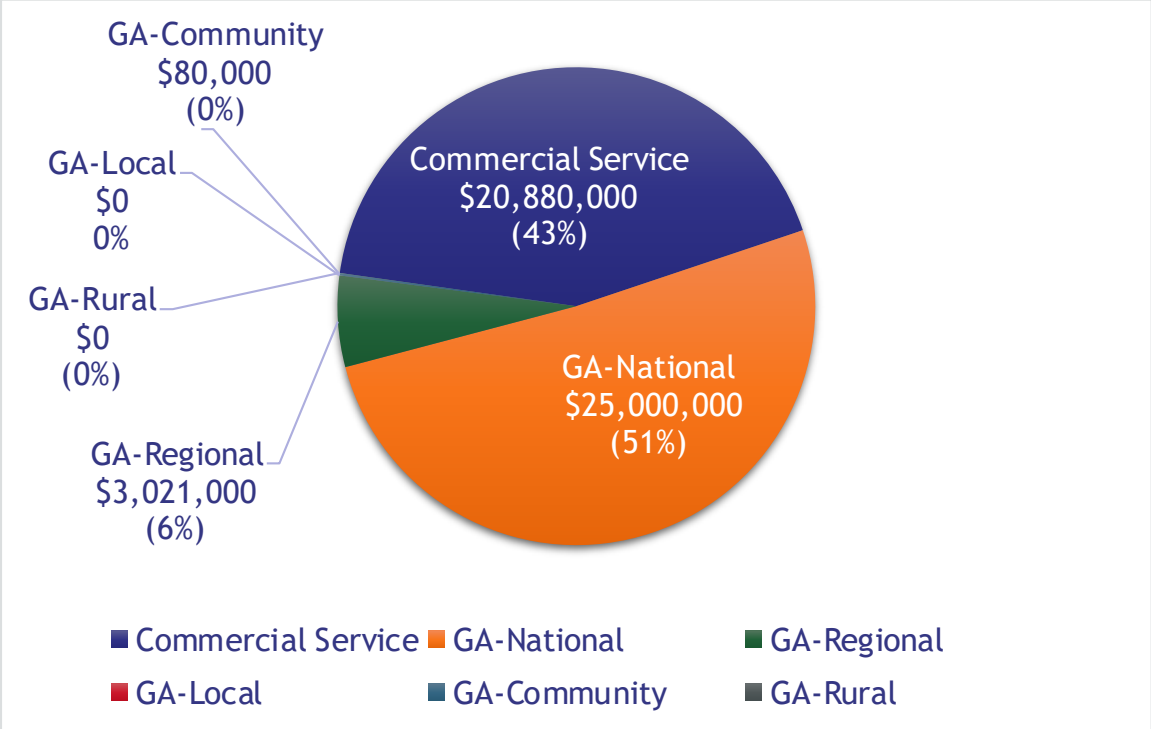
Table 10.10. Services/Other Project Costs by Objective

Facility and Service Objective	Total Estimated Cost	% of Total
Jet A Fuel	No cost developed	0%
AvGas Fuel	No cost developed	0%
Aircraft De-Icing	$48,851,000	100%
Courtesy Car	$130,000	0%**
Sustainability Plan	No cost developed	0%
Total F&SO Recommendations Costs	**$48,981,000**	**100%**

***Note: Percentages are rounded to nearest whole number.*
Source: Kimley-Horn, 2020

Recommended project costs for services/other objectives are categorized by airport classification in **Figure 10.13.** The majority of costs are split between GA-National (51 percent and $25 million) and Commercial Service (43 percent and nearly $21 million) with a combined total of almost $46 million. The remaining six percent of costs are related to projects at GA-Regional and GA-Community airports, with a combined cost of $3.1 million. GA-Local and GA-Rural airports did not have any projects to meet the F&SOs in this category and therefore do not have project costs.

Figure 10.13. Services/Other Project Costs by Airport Classification



Note: Percentages are rounded to nearest whole number.
Source: Kimley-Horn, 2020

10.4.5. Summary

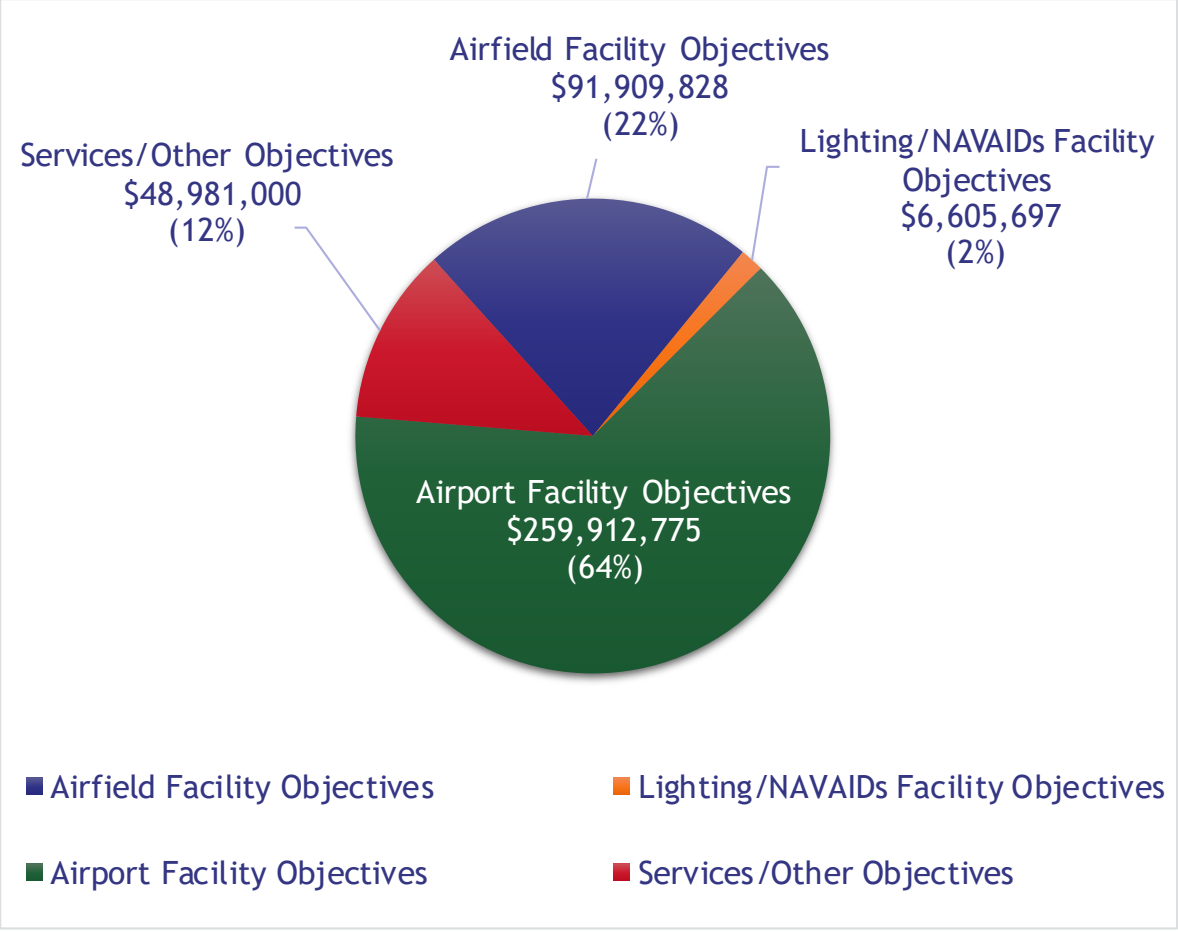
The total recommended development costs to meet all F&SOs are shown by objective category in **Table 10.11** and **Figure 10.14**. The total cost for all system airports to meet the associated classification F&SOs is estimated to be over $407 million. Most of these costs pertain to projects related to airport facility objectives, which include hangars and terminal needs. This category of objectives represents 64 percent of total recommended facility and service objective projects.

Table 10.11. Total Project Costs by Facility and Service Objective Category

Facility and Service Objective	Total Estimated Cost	% of Total
Airfield Facility Objectives	$91,909,828	22%
Lighting/NAVAIDs Facility Objectives	$6,605,697	2%
Airport Facility Objectives	$259,912,775	64%
Services/Other Objectives	$48,981,000	12%
Total F&SO Recommendations Costs	**$407,409,300**	100%

Source: Kimley-Horn, 2020

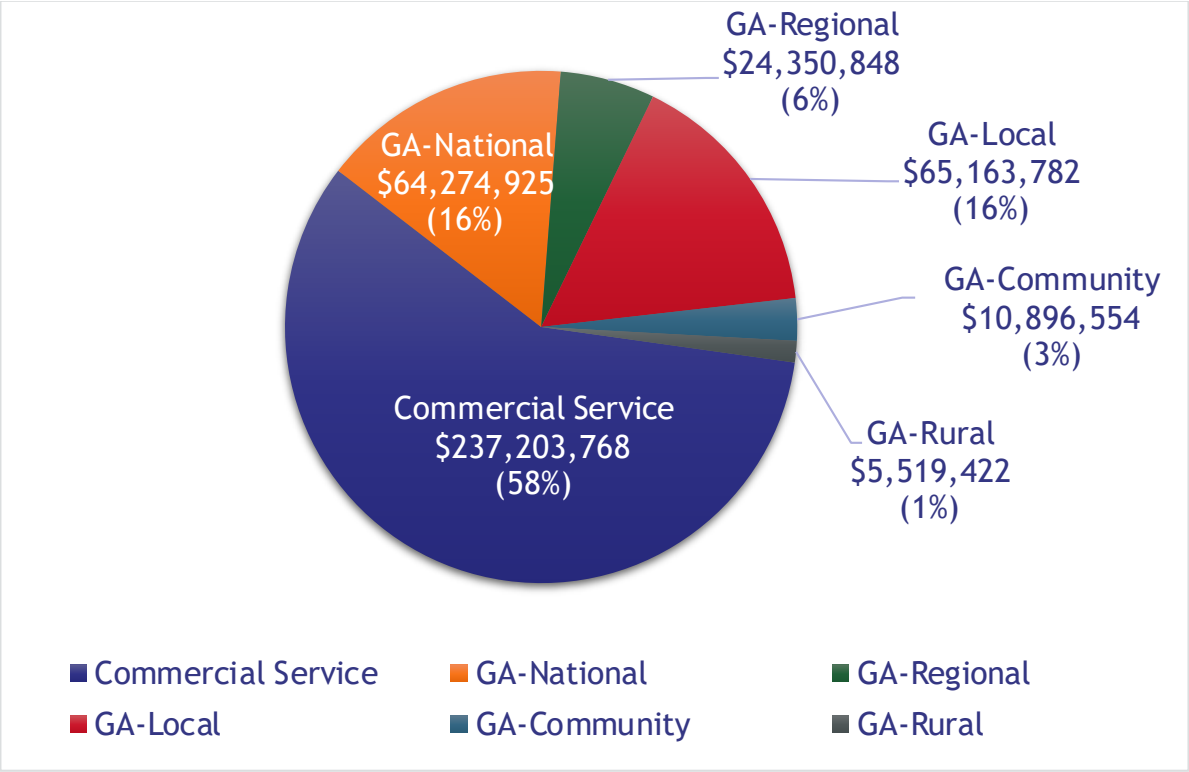
Figure 10.14. Total Project Costs by Facility and Service Objective Category



Source: Kimley-Horn, 2020

Figure 10.15. shows the total costs of the recommended projects to meet all F&SOs organized by airport classification. Commercial Service airports comprise the bulk of total project costs with an estimated $237 million and 58 percent of total costs. Remaining airport classifications make up smaller and smaller proportions of the total project costs with GA-Rural comprising roughly one percent.

Figure 10.15. Total Project Costs for F&SOs by Airport Classification



Note: Percentages are rounded to nearest whole number.
Source: Kimley-Horn, 2020

10.5. Future Facility Project Costs

As part of the analysis completed in **Chapter 8. Future System Performance,** forecasts for aircraft operations and based aircraft were utilized to determine additional facility needs to accommodate anticipated demand in 2038. This analysis addresses those facilities that will need expansion beyond what was identified in the prior section based on increases in activity over the next 20 years. Future facility needs were evaluated for GA terminal capacity, apron tie-downs, and hangar spaces.

Costs for these facilities were obtained by evaluating the difference between 2018 objectives and 2038 needs. For example, an airport may be deficient in meeting its 2018 objective by 10 apron tie-down spaces and, when 2038 based aircraft are considered, this increases to 25 tie-downs. If the airport were to develop 10 apron tie-downs to meet 2018 objectives, then it would also need to develop an additional 15 tie-downs to meet 2038 needs. The development costs for the additional 15 tie-downs are presented in this section along with other future needs using this same methodology.

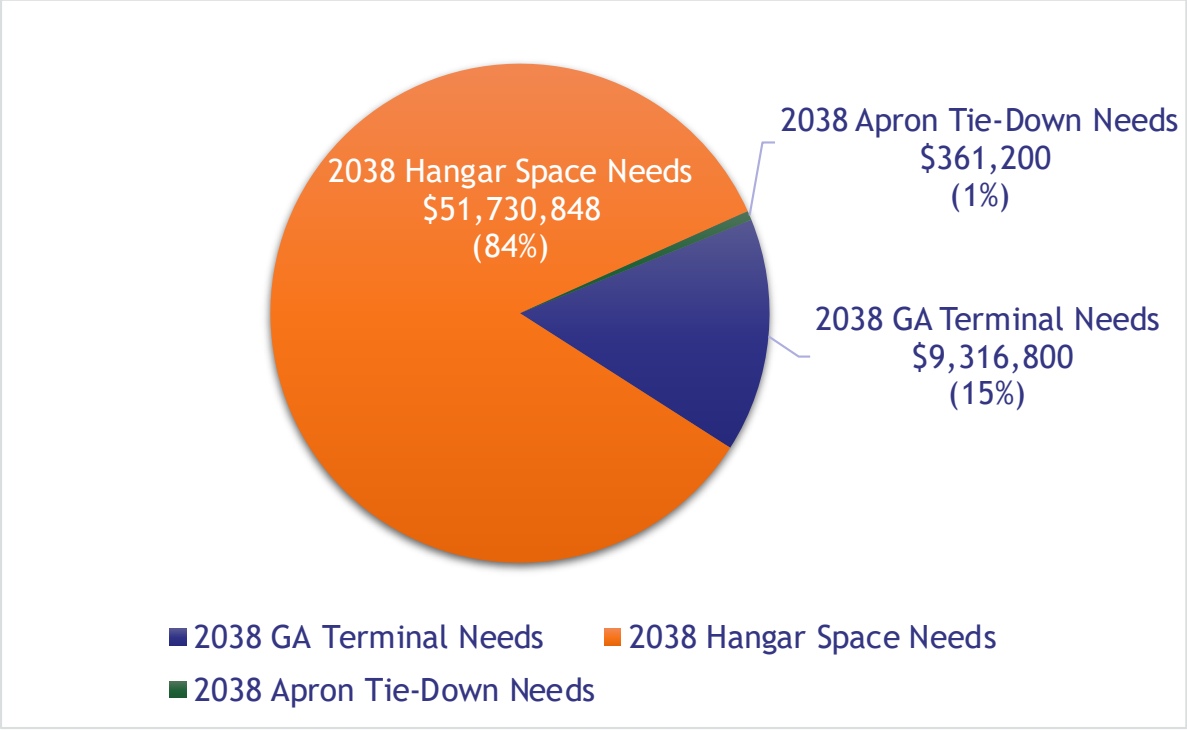
Estimated development costs for future facility needs based on 2038 demand are shown in **Table 10.12**, **Figure 10.16.**, and **Figure 10.17.** present the total future facility costs by type of project and airport classification, respectively.

Table 10.12. Total Future Facility Project Costs

Future Facility Needs	Total Estimated Cost	% of Total
2038 GA Terminal Costs	$9,316,800	15%
2038 Hangar Space Costs	$51,730,848	84%
2038 Apron Tie-Down Costs	$361,200	1%
Total Future Facility Needs Costs	$61,408,848	100%

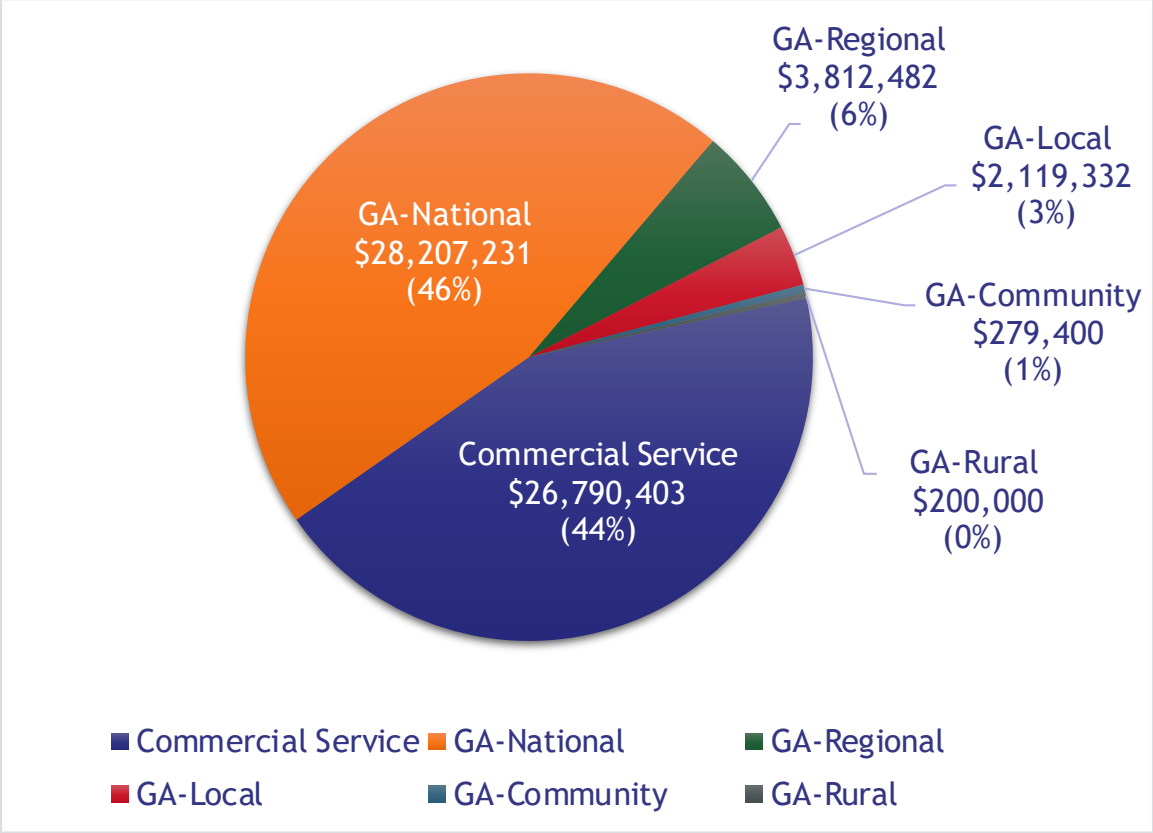
Source: Kimley-Horn, 2020

Figure 10.16. Total Future Facility Project Costs by Type



Source: Kimley-Horn, 2020

Figure 10.17. Total Future Facility Project Costs by Airport Classification



Note: Percentages are rounded to nearest whole number.
Source: Kimley-Horn, 2020

10.6. Overlapping PM and F&SO Costs

Implementing projects that satisfy both PMs and F&SOs could significantly increase the performance of the system in a cost-effective manner. Overlapping costs are determined by identifying projects which serve a dual purpose in meeting both the requirements of a PM and a facility and service objective. There are currently four PMs whose recommended projects overlap with five F&SOs as shown in **Table 10.13**. Total overlapping project costs amount to over $234 million dollars. Almost half of the overlapping projects ($105 million) come from commercial service terminal capacity needs. To note, overlapping transient hangar space costs include needs driven by meeting both 2018 and 2038 demands.

Table 10.13. Total Overlapping PM and F&SO Project costs by PM

2020 CASP Performance Measure	Related Facility and Service Objective		Cost Estimate	% of Total
Percent of Airports with a Dedicated Snow Removal Equipment (SRE) Building	Dedicated Maintenance/SRE Building		$9,931,668	4%
Percent of Population within a 30-Minute Drive Time of an All-Weather Runway	Instrument Approach Type		$2,795,000	1%
	Weather Reporting		$1,777,777	1%
Percent of Airports with Adequate Terminal Capacity	Commercial Service Terminal Capacity		$105,152,280	45%
Percent of Airports with Adequate Transient Hangar Spaces	Transient Hangar Spaces	2018	$94,503,457	40%
		2038	$20,164,600	9%
Total Overlapping PM and F&SO Project Costs			**$234,324,782**	**100%**

Source: Kimley-Horn, 2020

10.7. Non-2020 CASP-Related Project Costs

Beyond recommended projects identified as part of the 2020 CASP, many airports complete annual exercises to appropriately plan and determine budgeting needs for CIP projects. On a long-term basis, the completion of airport master plans and airport layout plans (ALPs) with narratives assists in the identification of future projects to achieve individual airport goals and demands. Planning documents such as these serve as tools to assist the airport in planning, budgeting, and confirming justification for project funding for state and federal funds. CIPs identified in airport master plans are documented in CDOT Division of Aeronautics' statewide CIP which records cost estimates of CIPs identified between the years 2020-2024 and 2025-2040. Denver International (DEN) maintains their own list of projects; the costs of these projects through 2038 are estimated in the following section and presented separately from CDOT's CIP costs.

10.7.1. CDOT Division of Aeronautics CIPs

Projects identified as part of CDOT Division of Aeronautics' statewide CIP were reviewed to gain a broader understanding of total system needs and project costs over the next 20 years. Some CIP costs were identified as overlapping with a 2020 CASP project recommendation (PM or F&SO) and were removed for duplication. As shown in **Table 10.14** and **Figure 10.18.**, all CIP projects were organized into broad project categories: airfield, landside, terminal, and planning. The total CDOT CIP project costs for the system are projected to be over $1.2 billion. Airfield projects include runway extensions, taxiway construction, and pavement rehabilitation and account for roughly 71 percent of total CIP costs. It should be noted that this number may be significantly higher since some cost estimates were not developed for the 2020 CASP.

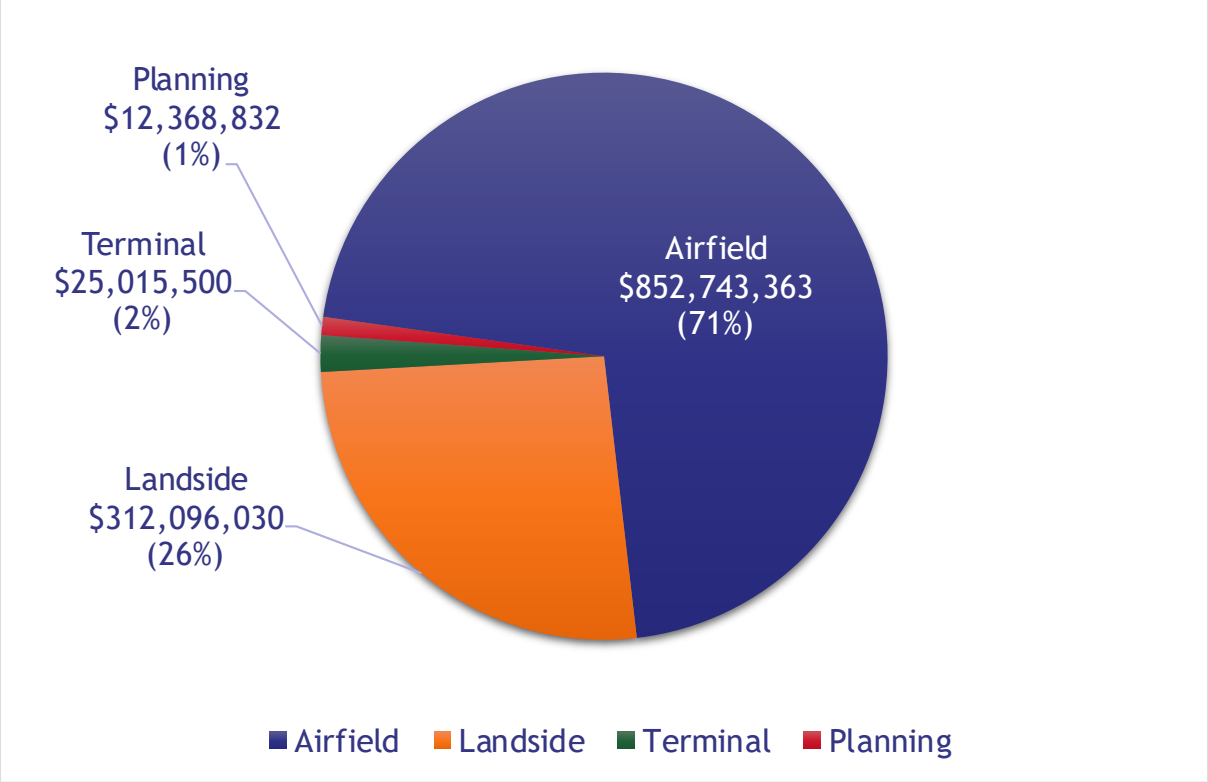
Table 10.14. Additional CDOT CIP Costs by Project Type

Project Type	Cost	% of Total
Airfield	$852,743,363	71%
Landside	$312,096,030	26%
Terminal	$25,015,500	2%
Planning	$12,368,832	1%
Total CDOT CIP Costs	**$1,202,223,725**	**100%**

***Note: Percentages are rounded to nearest whole number.*

Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040, 2020

Figure 10.18. CDOT CIP Costs by Project Type

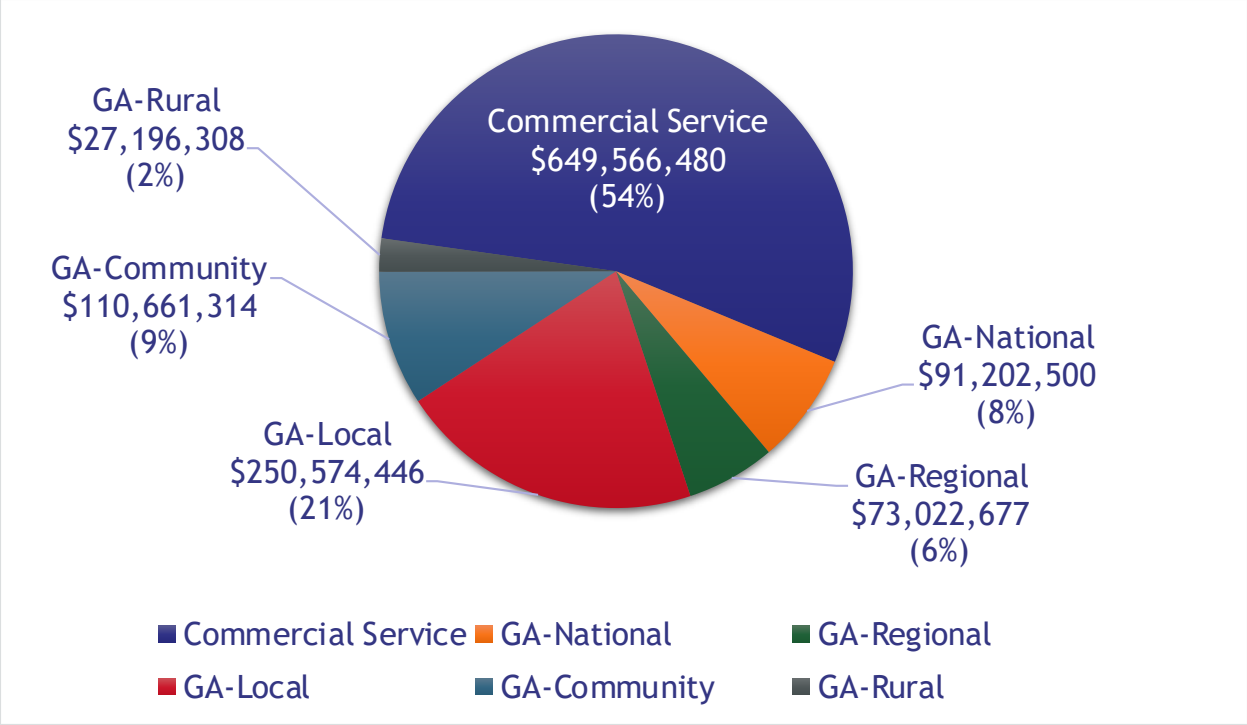


Note: Percentages are rounded to nearest whole number.

Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040, 2020

Total CIP costs by airport classification are shown in **Figure 10.19.** Projects at Commercial Service airports represent more than half of total statewide CIP costs at $649 million in estimated costs.

Figure 10.19. CDOT CIP Costs by Airport Classification



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040, 2020

10.7.2. Denver International CIP

DEN's publicly disclosed CIP, including associated costs was obtained from the DEN 2018-2022 Capital Program. The document groups projects and organizes by broad project category as presented in **Table 10.15**. DEN anticipates CIP projects of over $3.4 billion dollars over the 4-year timespan. More than half of the anticipated CIP costs are focused on projects related to Concourses A, B, and C. It is important to note that information derived from the 2018-2022 Capital Program is subject to future re-evaluation of projects due to potential impacts caused by COVID-19.

Table 10.15. 2018-2022 DEN CIP Costs

Project Type	Cost	% of Total
Concourses A, B, C	$1,800,000,000	53%
Jeppesen Terminal	$1,100,000,000	32%
Airside	$300,000,000	9%
Landside	$200,000,000	6%
2018-2022 DEN CIP Total Costs	**$3,400,000,000**	**100%**

Source: Denver International Airport 2018-2022 Capital Program, 2019

To obtain DEN's CIP costs through the remainder of the planning horizon (2023-2038), DEN's capital expenditures for fiscal year (FY) 2015 through FY 2018 were used to calculate an average yearly expenditure by project category as shown in **Table 10.16**. These expenditures were assumed to reflect likely future expenditures and are used to estimate potential future expenditures.

Table 10.16. DEN Average CIP Costs (FY 2015- FY 2018)

Project Type	Cost	% of Total
Concourses A, B, C	$32,307,000	13%
Jeppesen Terminal/ "Great Hall"	$130,055,000	53%
Airside	$56,738,000	23%
Landside	$28,312,000	11%
Average DEN CIP Total Costs	**$247,412,000**	**100%**

Source: Denver International Airport, 2019

The above averages by project type were then multiplied by 16 years to obtain cost estimates for 2023 through 2038. **Table 10.17** shows DEN's CIP cost estimates for 2023-2038 organized by project category.

Table 10.17. 2023-2038 Estimated DEN CIP Cost

Project Type	Cost	% of Total
Concourses A, B, C	$516,912,000	13%
Jeppesen Terminal/ "Great Hall"	$2,080,880,000	53%
Airside	$907,808,000	23%
Landside	$452,992,000	11%
2023-2038 DEN CIP Total Costs	**$3,958,592,000**	**100%**

Source: Denver International Airport 2018-2022 Capital Program, 2015-2018 data from DEN, 2019

Combined totals for DEN's CIP costs from 2018-2038 are shown in **Table 10.18.** DEN's total CIP costs through the planning horizon of the 2020 CASP are estimated at over $7.4 billion. More than 40 percent of these costs are attributed to projects pertaining to DEN's Jeppesen Terminal/Great Hall.

Table 10.18. 2018-2038 DEN CIP Costs

Project Type	Cost	% of Total
Concourses A, B, C	$2,316,912,000	31%
Jeppesen Terminal/ "Great Hall"	$3,180,880,000	43%
Airside	$1,207,808,000	16%
Landside	$652,992,000	9%
2018-2038 DEN CIP Total Costs	**$7,358,592,000**	**100%**

Sources: Denver International Airport 2018-2022 Capital Program, 2015-2018 data from DEN, 2019

10.8. Total Project Costs

Table 10.19 shows the combined total project costs anticipated for the system through 2038. Overlapping costs are removed from PM, F&SOs, and future facility needs to avoid duplication. This is also true for projects identified by the 2020 CASP and covered under the existing CDOT CIP. These projects utilize estimates included in CDOT's CIP list (as opposed to those developed for the 2020

CASP). These projects are represented in the same 2020 CASP project category and were removed from other CDOT CIP costs. The remaining CDOT CIP project costs outside of the recommendations made in relation to the 2020 CASP include projects such as airfield signage, land acquisitions, runway relocations, etc. that are deemed important to the maintenance and development of the system. Total system project costs excluding DEN CIPs are estimated to be around $1.8 billion. Including DEN CIP costs, the total project costs for the system increases to $9.1 billion.

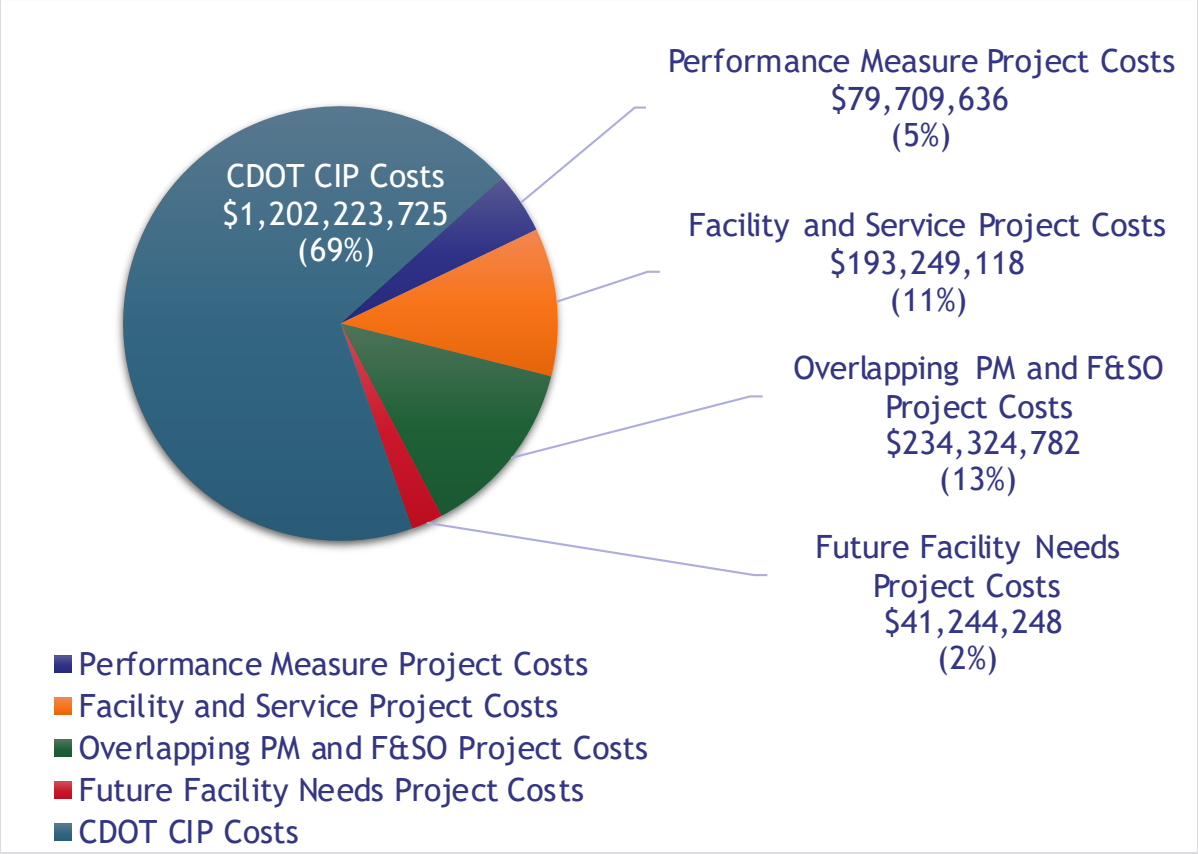
Table 10.19. Total System Projects Costs by Recommendation

Recommendation	Cost	% of Total (Excluding DEN CIP Costs)	% of Total (Including DEN CIP Costs)
Performance Measure Project Costs	$79,709,636	5%	1%
Facility and Service Objective Project Costs	$193,249,118	11%	2%
Future Facility Need Project Costs	$234,324,782	13%	3%
Overlapping PM and F&SO Costs	$41,244,248	2%	0%
CDOT CIP Costs	$1,202,223,725	69%	13%
Denver International (DEN) CIP Costs	$7,358,592,000		81%
Total Costs (Excluding DEN CIP Costs)	**$1,750,751,508**	**100%**	
Total Costs (Including DEN CIP Costs)	**$9,109,343,508**		**100%**

Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Denver International Airport 2018-2022 Capital Program, 2019; Kimley-Horn, 2020

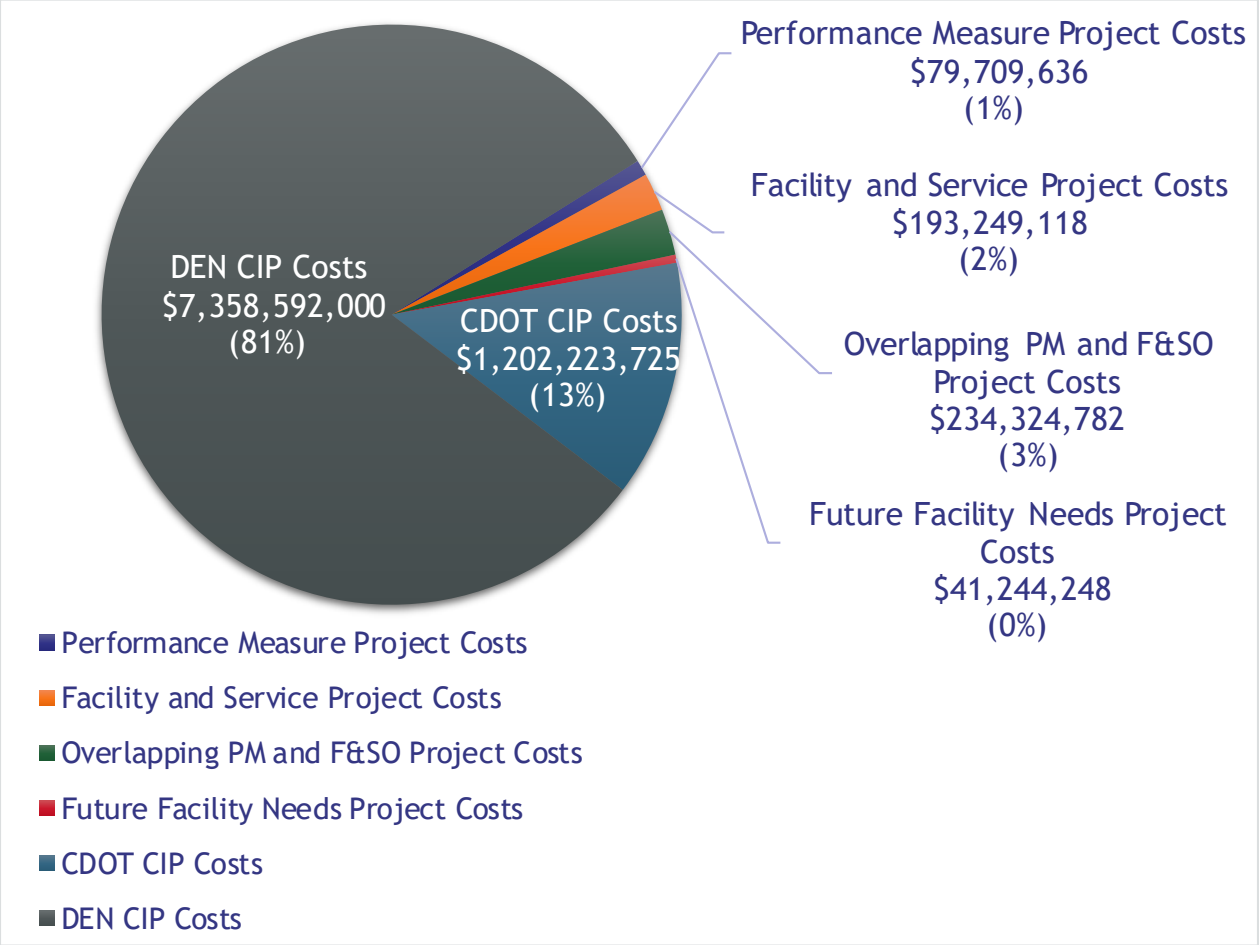
Figure 10.20 and **Figure 10.21** depict total system costs excluding and including DEN CIPs by recommendation type.

Figure 10.20. Total System Project Costs Excluding DEN CIP Costs by Recommendation ($1.7B)



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

Figure 10.21. Total System Costs Including DEN CIP Costs by Recommendation ($9.1B)



Note: Percentages are rounded to nearest whole number.
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Denver International Airport 2018-2022 Capital Program, 2019; Kimley-Horn, 2020

10.9. Total System Plan Cost Summary by Airport Classification

This section builds upon the total development costs for recommended projects in the previous section and re-categorizes those costs by airport classification. Doing so allows for a high-level view of the entire system and identification of airport classifications that may benefit from funding prioritization in the future. The total system project costs are categorized by airport classification in **Table 10.19.** Total system costs by airport classification, with and without DEN CIP costs, are shown in **Figure 10.22.** and **Figure 10.23.**

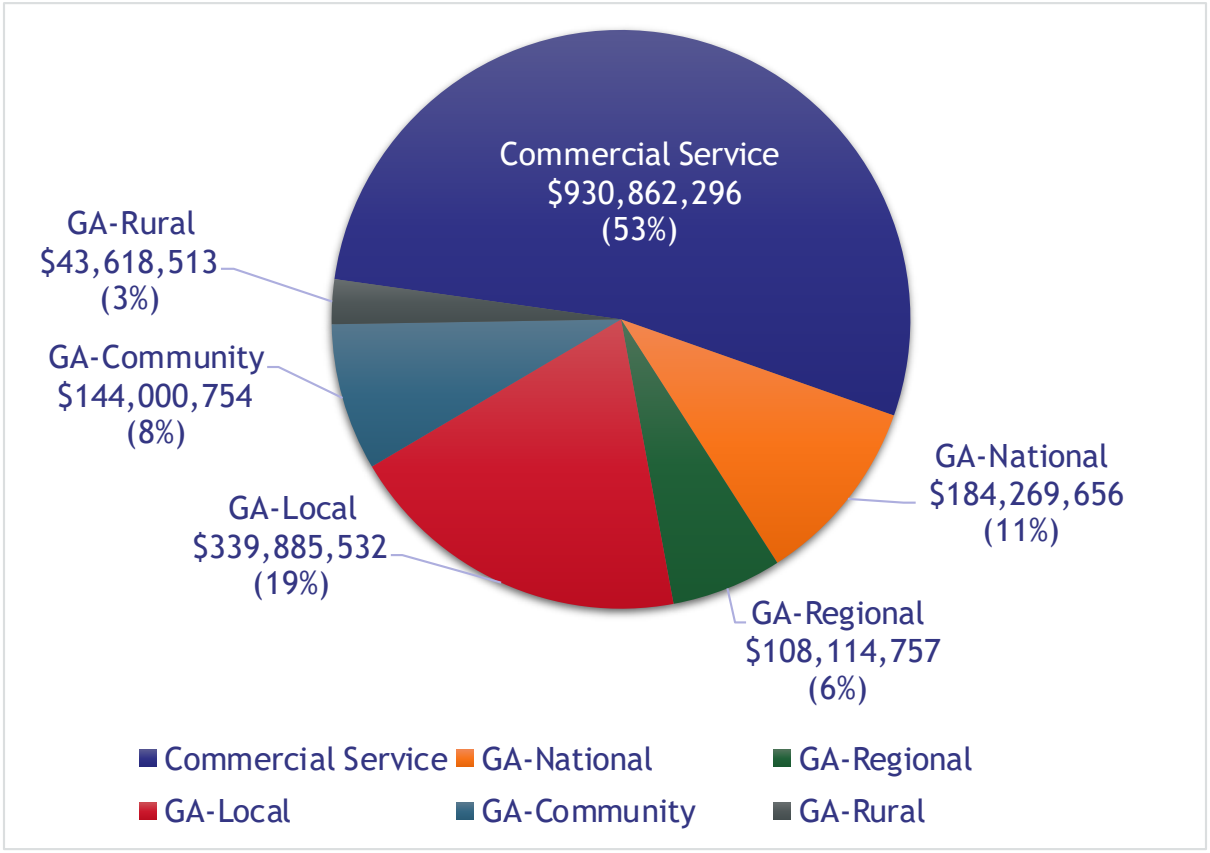
Table 10.20. Total System Project Costs by Airport Classification

2020 CASP Airport Classification	Costs Excluding DEN CIP	Costs Including DEN CIP	% of Total Excluding DEN CIP	% of Total Including DEN CIP
Commercial Service	$930,862,296	$8,289,454,296	53%	91%
GA-National	$184,269,656	$184,269,656	11%	2%
GA-Regional	$108,114,757	$108,114,757	6%	1%
GA-Local	$339,885,532	$339,885,532	19%	4%
GA-Community	$144,000,754	$144,000,754	8%	2%
GA-Rural	$43,618,513	$43,618,513	2%	0%*
Totals	**$1,750,751,508**	**$9,109,343,508**	**100%**	**100%**

**Note: Percentages are rounded to nearest whole number.*

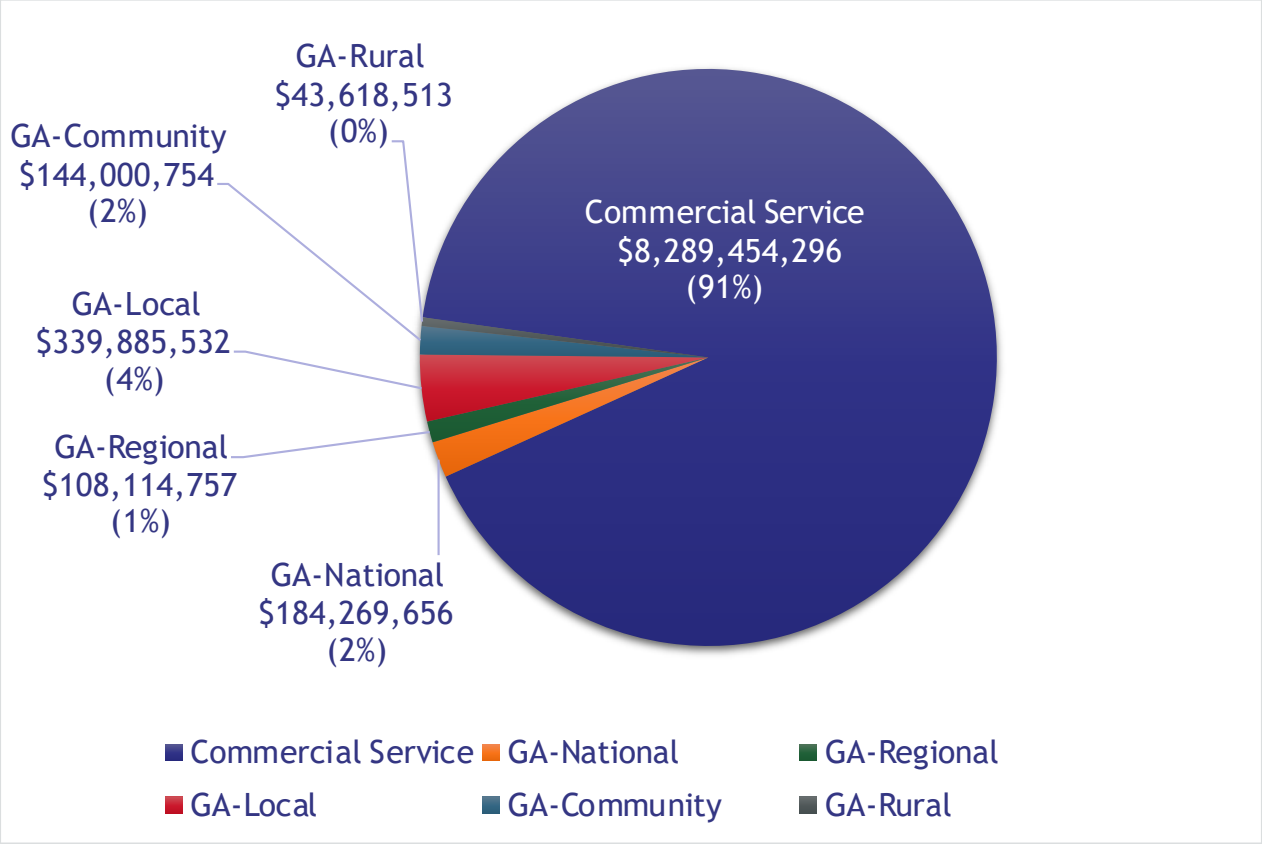
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Denver International Airport 2018-2022 Capital Program, 2019; Kimley-Horn, 2020

Figure 10.22. Total System Costs by Airport Classification Excluding DEN CIP ($1.7B)



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

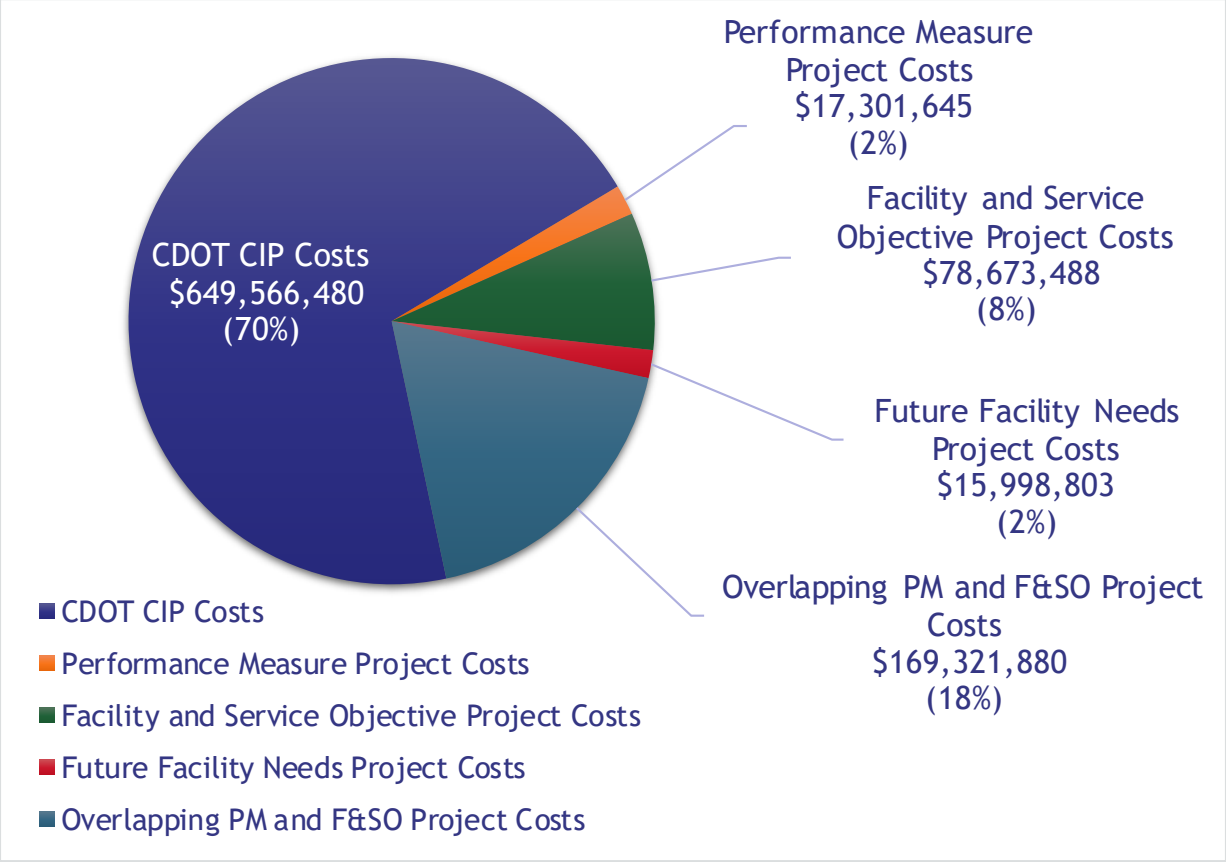
Figure 10.23. Total System Costs by Airport Classification Including DEN CIP Costs ($9.1B)



Note: Percentages are rounded to nearest whole number.
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Denver International Airport 2018-2022 Capital Program, 2019; Kimley-Horn, 2020

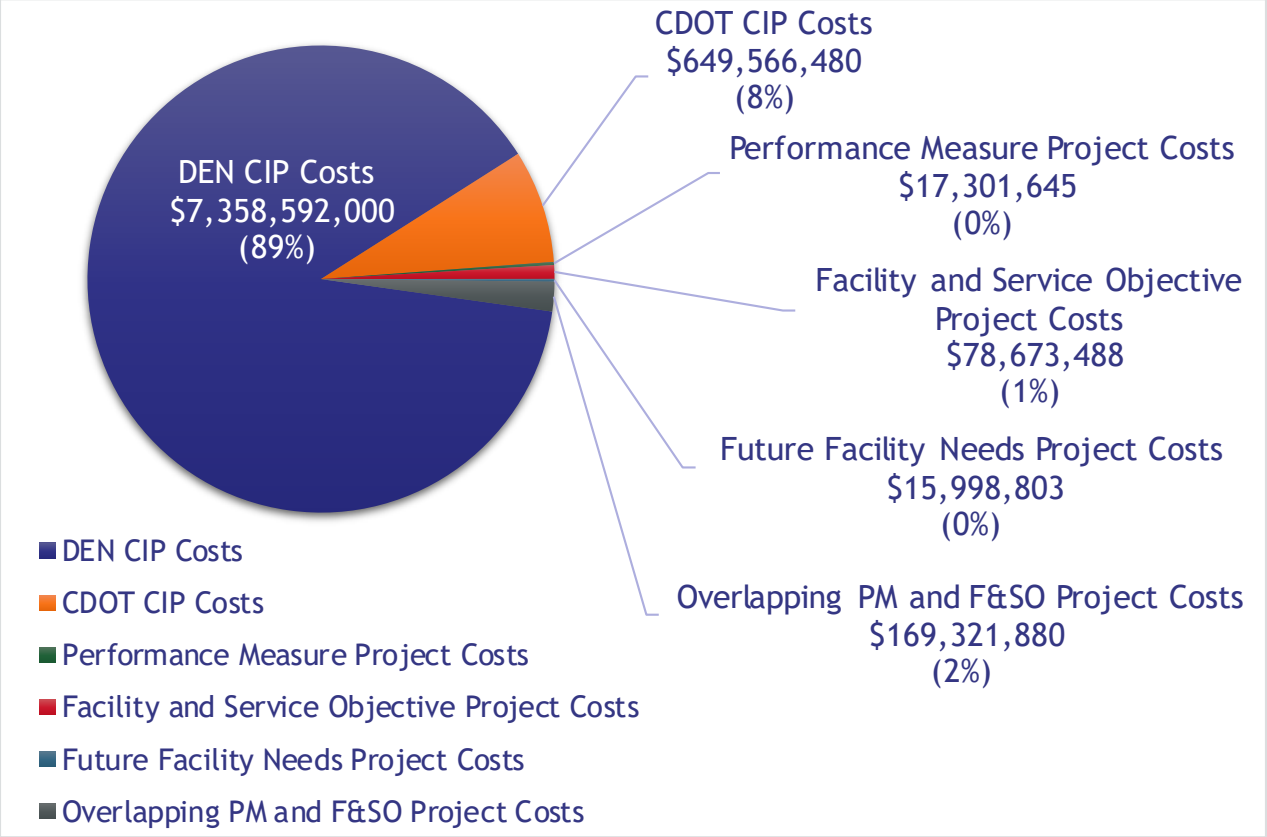
Figure 10.24. and **Figure 10.25.** show Commercial Service airport classification costs with and without the inclusion of DEN CIPs. **Figure 10.26** through **Figure 10.30.** summarize the total costs for each subsequent airport classifications by recommendation type.

Figure 10.24. Project Costs Summary: Commercial Service Excluding DEN CIP Costs ($930M)



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

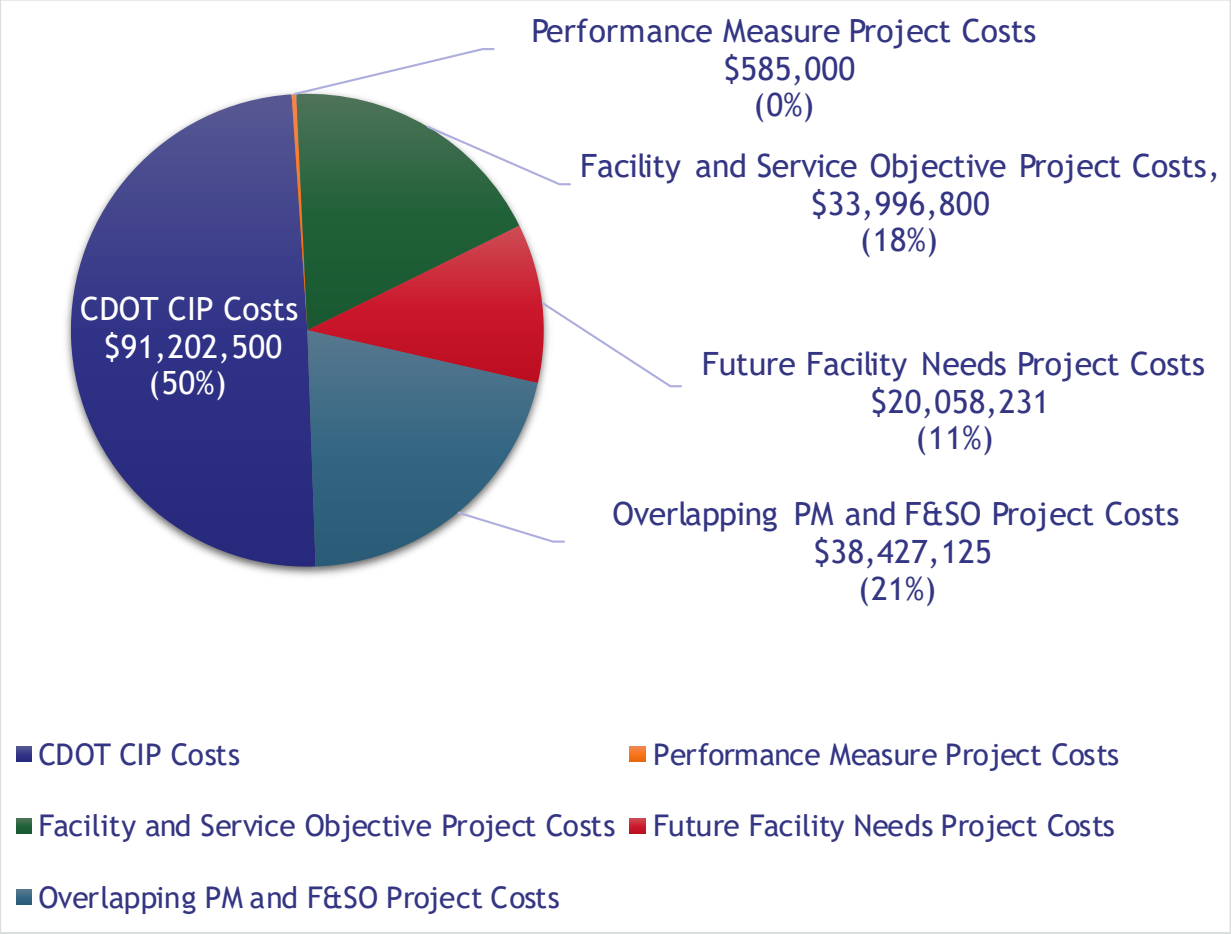
Figure 10.25. Project Costs Summary: Commercial Service, Including DEN CIPs ($8.3B)



**Note: Percentages are rounded to nearest whole number.*

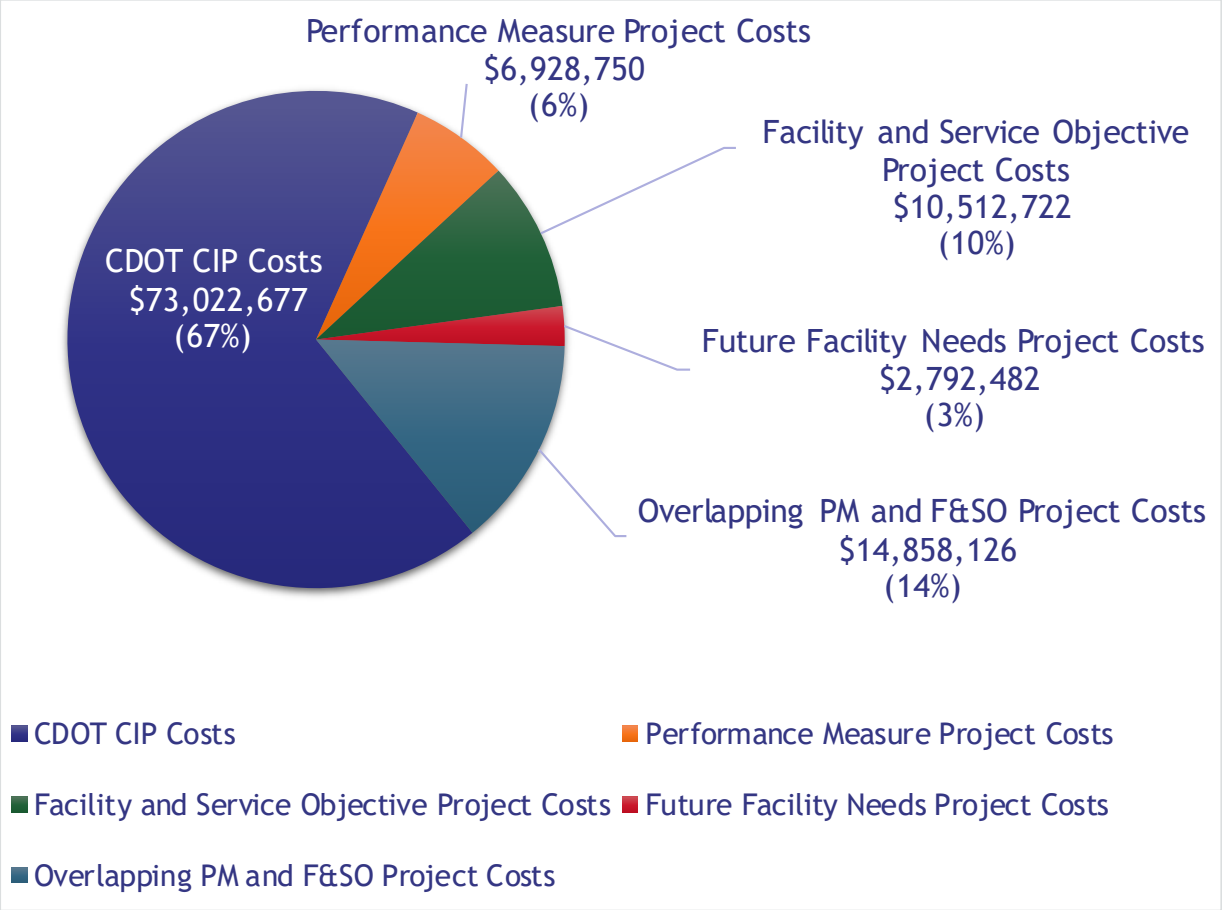
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Denver International Airport 2018-2022 Capital Program; Kimley-Horn, 2020

Figure 10.26. Project Costs Summary: GA-National ($184M)



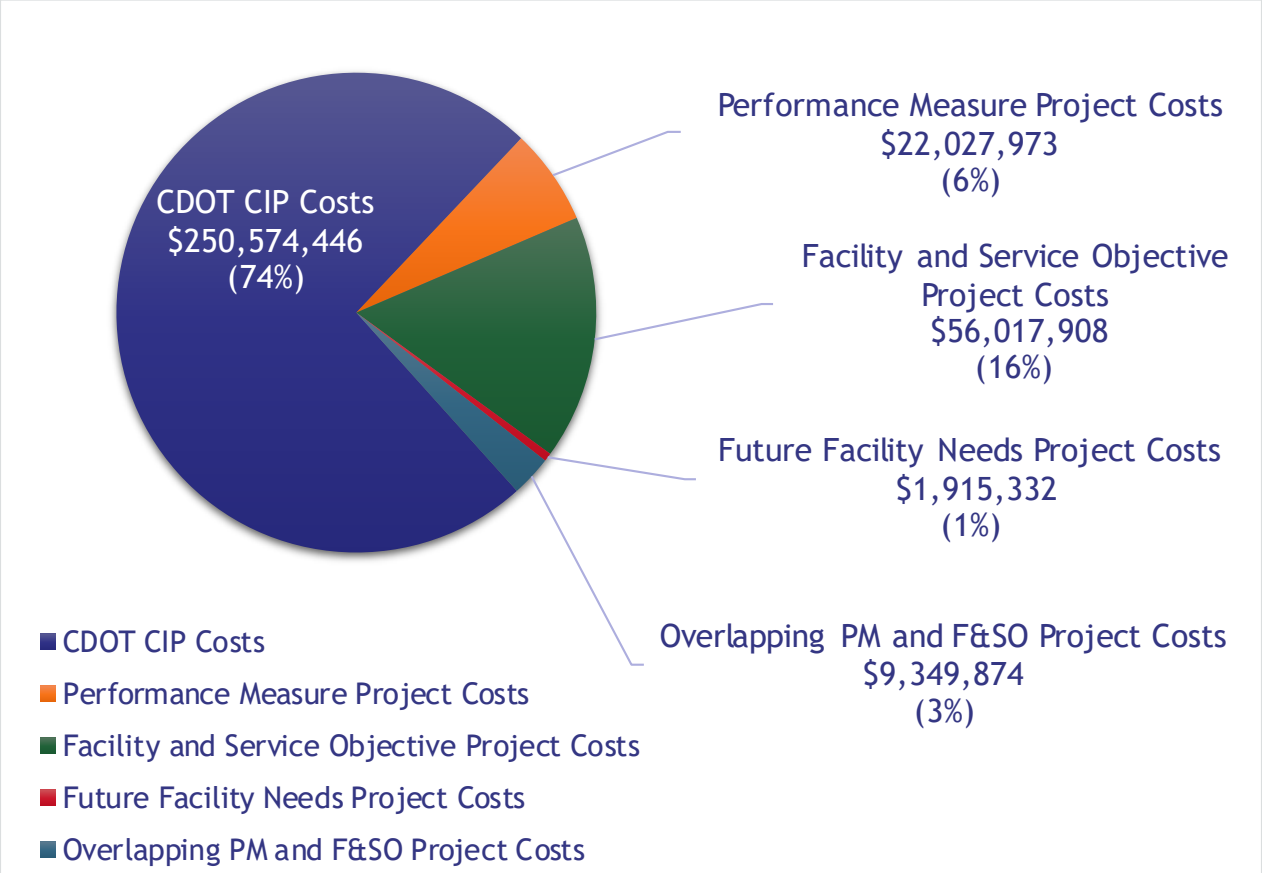
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

Figure 10.27. Project Costs Summary: GA-Regional ($108M)



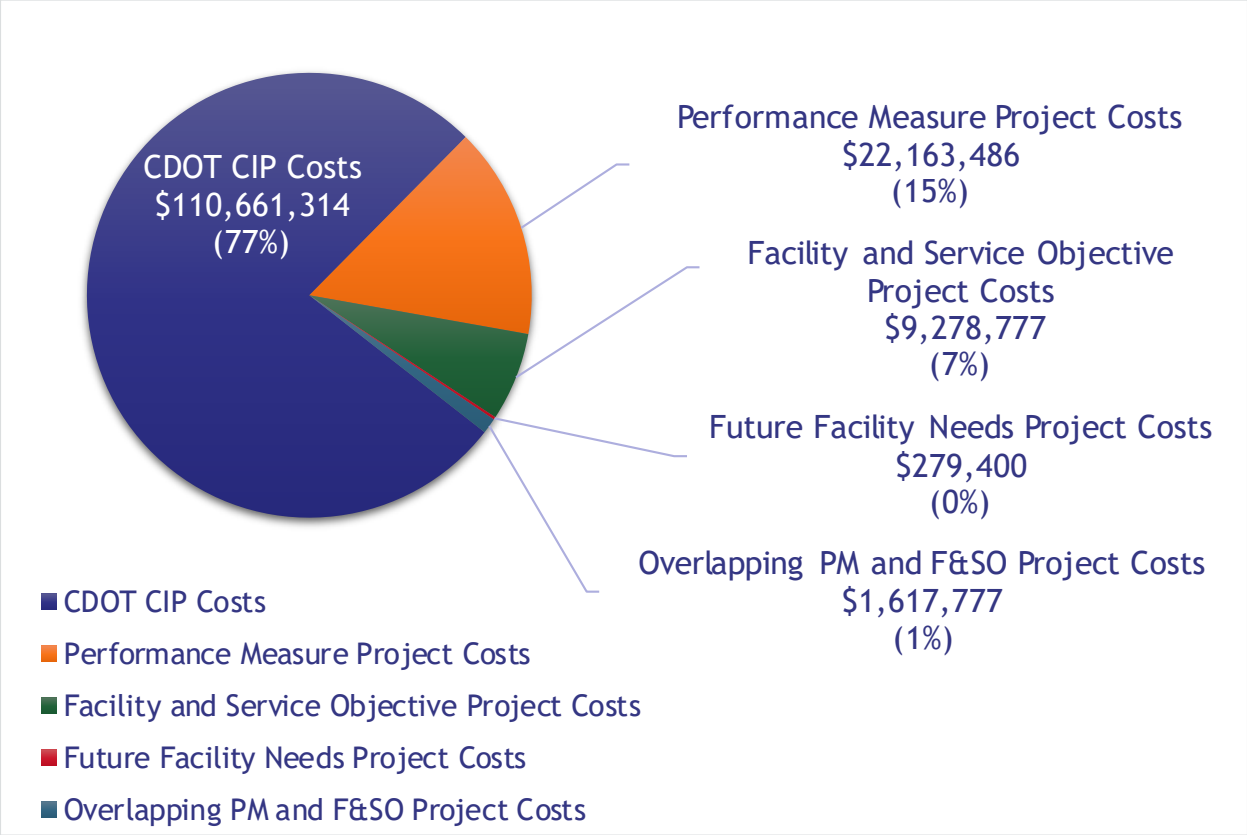
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

Figure 10.28. Project Costs Summary: GA-Local ($340M)



Note: Percentages are rounded to nearest whole number.
Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

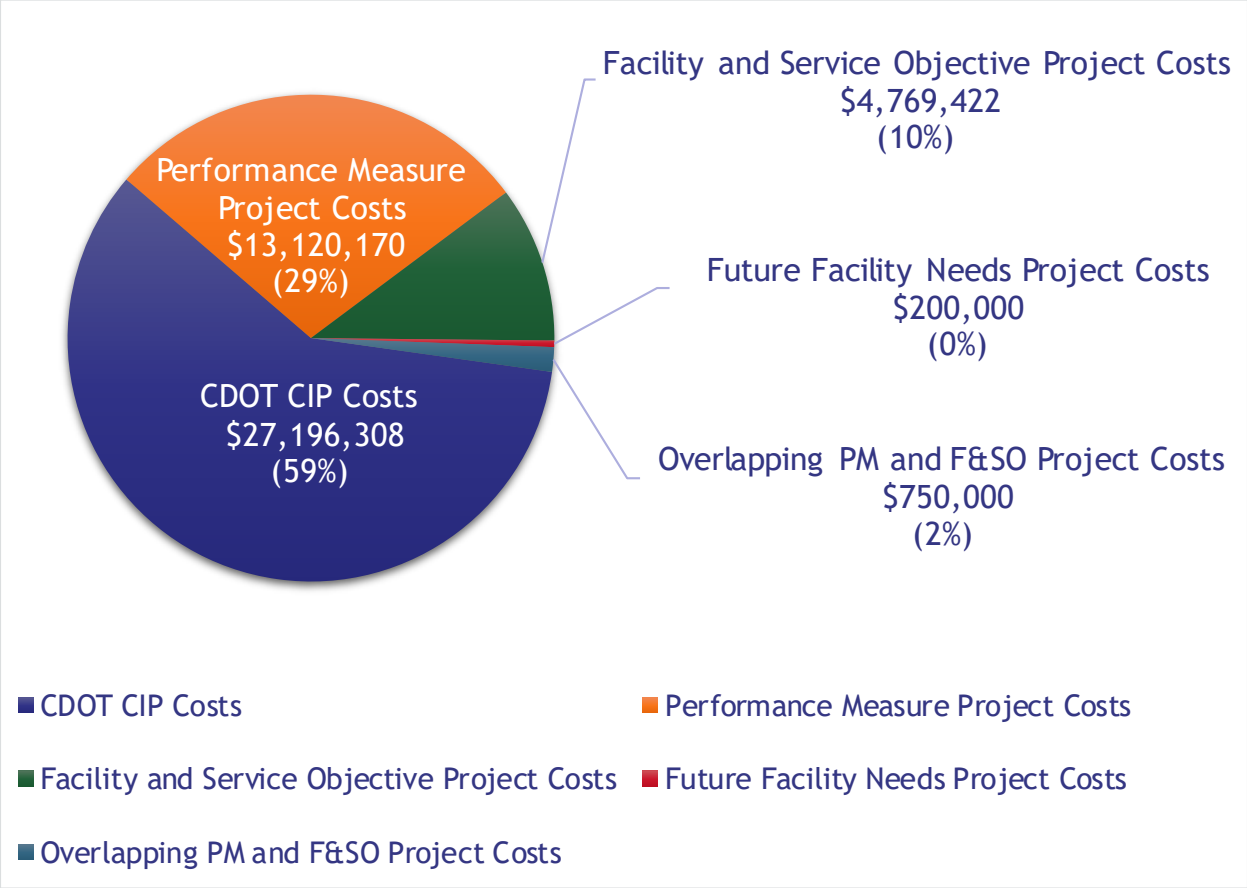
Figure 10.29. Project Costs Summary: GA-Community ($145M)



Note: Percentages are rounded to nearest whole number.

Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

Figure 10.30. Project Costs Summary: GA-Rural ($44M)



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; Kimley-Horn, 2020

10.10. Funding Sources

To adequately plan for projects that accommodate anticipated future needs and improve the overall health of the system, it is important to secure appropriate funds. Improvement project costs often exceed an individual airport's revenue streams and will require funding from external sources. Airports many times utilize a combination of federal (as applicable), state, and local funds to implement projects. An airport sponsor's ability to identify and secure funding from different resources influences the likelihood of airport development. Usually, the majority of funding for airport projects at airports in the National Plan of Integrated Airport Systems (NPIAS), other than large commercial service airports such as DEN, come from the Federal Aviation Administration (FAA) which supplements state and local funding mechanisms. Colorado has been fortunate the past few years to contribute funding for many airport projects. The following sections detail funding sources for Colorado's system at the federal, state, and local levels.

10.10.1. Federal Funding

NPIAS airports are eligible to receive federal funding to cover a percentage of eligible costs for their projects through the Airport Improvement Program (AIP) under FAA Order 5100.338D, *Airport Improvement Program Handbook*. The AIP is funded entirely by the Airport and Airway Trust Fund

through aviation fees and taxes (i.e. airline ticket taxes, cargo fees, aircraft fuel taxes, etc.). Projects eligible for funding under the AIP fall broadly under planning, development, and noise compatibility. Projects may include (pending justification and other criteria) primary runway extensions, airfield lighting/signage, acquisition of SRE, and installation of perimeter fencing amongst a comprehensive list of other projects designated to strengthen the nation's aviation infrastructure.

Due to the costs of projects exceeding the amount of available AIP funds, the FAA distributes AIP funds according to national priorities and objectives. The FAA utilizes a formulaic process to determine AIP fund apportionments for major entitlement categories. The remaining funds from this process are then distributed into a discretionary fund which is used to support airport noise projects, the Military Airport Program, and outstanding projects based on a national prioritization formula. According to the FAA, Colorado received nearly $61.5 million in AIP funds for FY 2019.[1]

In February 2019, Public Law 116-6 "Consolidated Appropriations Act, 2019" was signed into effect and resulted in the addition of $500 million of discretionary grants under the AIP as "Supplemental Appropriations". Supplemental funds were not subject to the same prioritization model as traditional AIP funds. Instead, these funds followed the guidance of the FAA Reauthorization Act 2018, which prioritized small airports and expanded eligibility requirements for terminal-related projects. During federal FY 2019, Colorado received an intent to award from the FAA of $4 million in supplemental funds to support land acquisition and terminal building expansion projects.[2]

10.10.2. State Funding

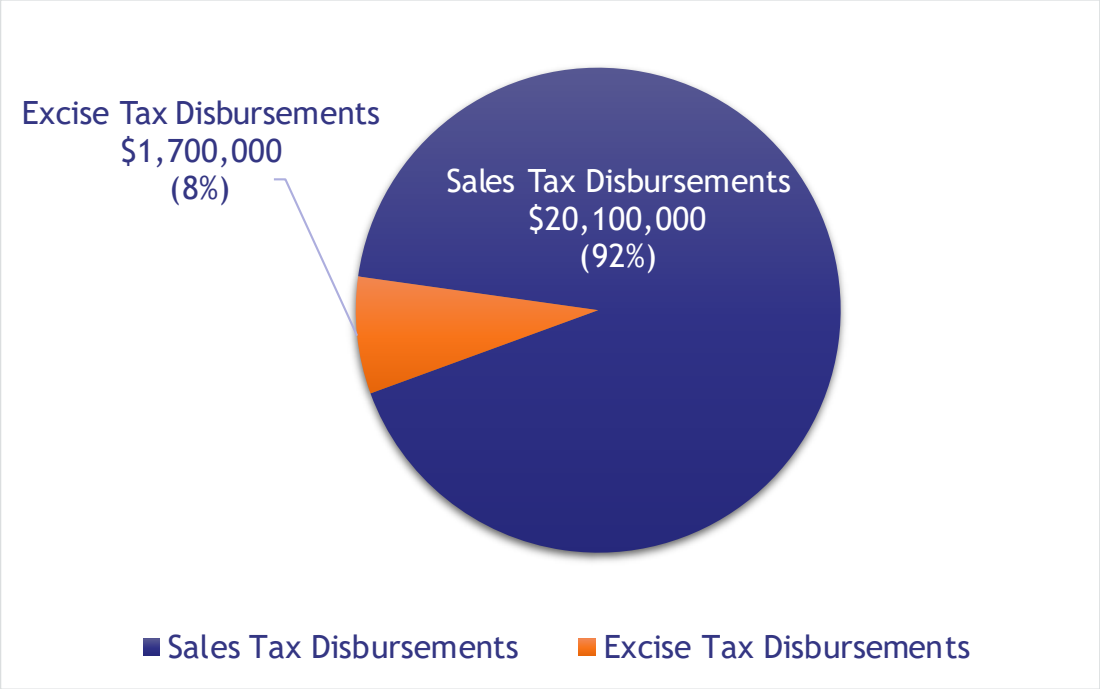
While federal funding is available to NPIAS airports, Colorado's aviation system is also fortunate to be supported through state funds. The state does not appropriate general funds for aviation which is supported solely through state aviation fuel taxes and the State Infrastructure Bank (SIB) program.

10.10.2.1. Colorado's Aviation Tax Fuel Disbursements

Under Colorado's aviation tax fuel disbursements, the majority of sales and excise taxes generated by fuel sales in Colorado are returned to the airports for aviation purposes. The amount of tax disbursements eligible airports can receive are proportional to the amount of fuel sales tax they generate equating to four cents per gallon of the excise tax on AvGas and Non-Commercial Jet A fuel and 2.9 percent of sales tax collected from Jet A fuel.[3] **Figure 10.31.** shows the fuel tax disbursements for FY 2019. For fiscal year 2019, Colorado generated almost $33 million in fuel excise and sales taxes of which 65 percent was distributed back to eligible airports in the form of state tax fuel disbursements.

[1] FAA - "AIP Grants Awarded by State FY 2019":
https://www.faa.gov/airports/aip/grant_histories/annual_reports/media/aip-grants-awarded-by-state-fy-2019.pdf
[2] FAA – "FY 2019 Supplemental Appropriation, Airport Improvement Program Anticipated Grants":
https://www.faa.gov/airports/aip/aip_supplemental_appropriation_2019/media/AIP-Supplemental-Projects-Intent-Award-2019-11-22.pdf
[3] CDOT Division of Aeronautics – *2019 Division of Aeronautics Annual Report":*
https://www.codot.gov/programs/aeronautics/PDF_Files/AnnualReports/2019AeroAnnRep

Figure 10.31. FY 2019 State Tax Fuel Disbursements



Source: CDOT Division of Aeronautics, 2019

10.10.2.2. Colorado Discretionary Aviation Grant (CDAG) Program

The CDAG Program is funded from the remaining 35 percent of monies generated from aviation fuel taxes less the Division of Aeronautics' administrative costs. CDAG funds are used to award individual airport grants back to the airports for various improvement projects and to support statewide aviation initiatives under the discretion of the Colorado Aeronautical Board (CAB).[4] The Division of Aeronautics administers statewide aviation initiatives to fund the improvement of several key aspects of on-airport infrastructure and airport operations. For FY 2019, nine statewide aviation initiatives obtained CDAG funding:

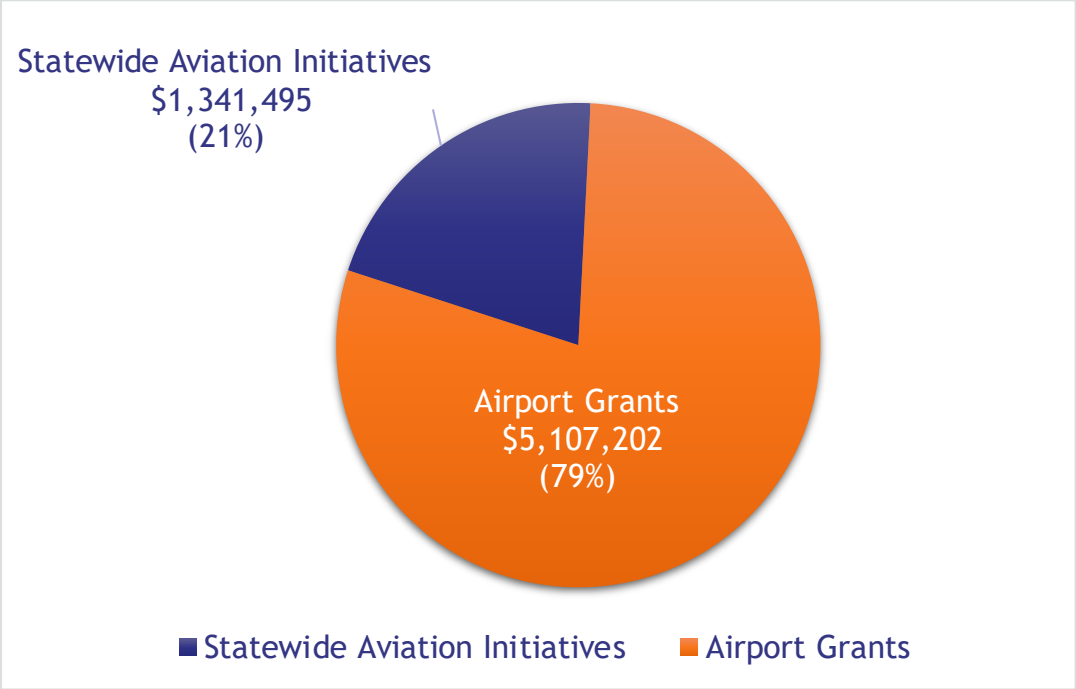
- Airfield Maintenance – Crack Sealant Program
- Airport Inspections (PCI & 5010)
- Automated Weather Observing System Development and Maintenance
- Aviation System Plan & Economic Impact Study
- Communications/Outreach/Safety
- Internship Program
- Remote Tower Project
- Surplus Airport Equipment Program
- USDA – Wildlife Hazard Mitigation

More information on CDOT's programs and initiatives can be found in **Section 10.13 Development Priorities and Justification.** The makeup of how CDAG funding was distributed in FY 2019 is shown in

[4] Ibid

Figure 10.32. FY 2019 CDAG Funding. Almost 80 percent of CDAG funding was allocated in individual airport grants in FY 2019.

Figure 10.32. FY 2019 CDAG Funding



Source: CDOT Division of Aeronautics 2019 Division of Aeronautics Annual Report, 2019

10.10.2.3. State Infrastructure Bank (SIB)

In 1999, CDOT adopted the SIB Loan Program which provides low-interest revolving loans to fund needed transportation facilities. A number of system airports have used SIB loans to implement air traffic control towers, improve pavement conditions, obtain snow removal equipment, and fund land acquisitions. As of June 2019, the SIB program currently administers loans to four system airports totaling $13.5 million for aviation purposes to the benefit of six different communities in the state.[5] Many more airports have utilized the SIB loan program in the past.

10.10.3. Local Funding

Local communities, counties, and individual airport revenues are used to fund the remaining project costs leftover after applicable state and federal funding is applied. Local funds are also needed to fund airport operations and general maintenance of the facilities. Local funding may be derived from a combination of sources such as private funds, airport revenues, bond funds, and general fund revenues from local governments. Typically, state-funded airport project costs are split between 90 percent state and 10 percent local funds. Currently, there are no state statutes mandating local funds to match

[5] CDOT Division of Aeronautics – "2019 Annual Report": https://www.codot.gov/programs/aeronautics/PDF_Files/AnnualReports/2019AeroAnnRep

10 percent of project costs. However, airports requesting grants from CDAG are subject to CAB approval which has the discretion to approve grants with a local contribution of less than 10 percent.[6]

10.10.4. Historical Funding

For FY 19 alone, Colorado obtained a combined $83.3 million in AIP funds and aviation fuel taxes. Sixty-five percent, or roughly $21.8 million, of aviation fuel tax revenues were disbursed back to the airports for their own aviation purposes. Additionally, 2019 expenditures included CDOT Division of Aeronautics' administrative costs, $5.1 million in individual airport grants, and $1.3 million to fund statewide initiatives.[7] CDOT Division of Aeronautics maintains a list of CIPs for 65 public-use airports in the state. The current CDOT CIP (2020-2029) has defined $695 million in project needs to improve system conditions by increasing safety, efficiency, and capacity. According to CDOT's most recent annual report for FY 2019, $65.9 million of combined federal, state, and local funds were leveraged to support CIP projects.[8]

Table 10.21 shows Colorado's investments for the past five fiscal years by funding source – FAA, CDAG, and local. The FAA data was obtained from online AIP grant histories. On average, Colorado's system is awarded $50 million in AIP funds excluding AIP monies awarded to DEN. CDAG has contributed an average of $4.3 million annually for the past five years to fund airport projects. Assumptions were made to determine local contributions such as a five percent local match for AIP funds and a 10 percent match for CDAG funds. Local contributions were not calculated for system investment at DEN as it's recognized DEN utilizes many different resources to fund maintenance and development beyond FAA AIP. While some local contribution is required from all airports, including DEN, DEN's funding for projects is significantly different and no assumption was made in this section regarding their local contribution. Based on these assumptions, local contributions were noted to average $3 million per year. In addition to FAA AIP funds, Colorado was awarded an average of $16 million in FAA supplemental appropriations in 2018 and in 2019, however, averages to over $6 million when the prior three years are considered. Although FAA AIP supplemental funding is identified to potentially continue through the life of the latest FAA bill, the program is administered on a yearly basis and continuation of funding is largely unknown. Due to this reason and to make conservative assumptions of likely available investment in the future, supplemental funds are not included in the totals for average annual investments. Average annual investments into the system excluding DEN AIP awards amount to $57 million. Including DEN AIP monies, average annual system investments rise to $76 million.

[6] CDOT Division of Aeronautics - "Programs & Procedures Manual 2019": https://www.codot.gov/programs/aeronautics/programs/ProgramProcManual/view
[7] CDOT Division of Aeronautics
[8] Ibid

Table 10.21. Colorado System Investments by Source (FY 2015-2019)

Source	2015	2016	2017	2018	2019	2015-2019 Average
FAA AIP (Excluding DEN)	$51,033,559	$70,952,920	$36,529,085	$51,025,750	$41,275,135	$50,163,290
FAA AIP Supplementary	$0	$0	$0	$27,550,000	$4,000,000	$6,310,000
CDOT CDAG	$4,743,649	$2,575,667	$2,485,745	$5,162,419	$6,448,697	$4,283,235
Local Contributions	$3,026,043	$3,805,213	$2,075,029	$3,067,529	$2,708,626	$2,936,488
Total Available Investments (Excluding DEN)	**$58,803,251**	**$77,333,800**	**$41,089,859**	**$86,805,698**	**$54,432,458**	**$63,693,013**
DEN FAA AIP	*$20,029,724*	*$8,642,131*	*$14,570,000*	*$29,793,633*	*$20,219,342*	*$18,650,966*
Total Available Investments (Including DEN Minus AIP Supplementary)	**$78,832,975**	**$85,975,931**	**$55,659,859**	**$89,049,331**	**$70,651,800**	**$76,033,979**

Note: Federal fiscal years run from October 1 to September 30, while state fiscal years run from July 1 to June 30. There may be discrepancies in reporting due to these different timeframes. Additionally, due to the nature of the FAA AIP Supplementary program, these funds are not included in total future available investments as the continuation of the program in the future is largely unknown.

Sources: CDOT Division of Aeronautics 2015-2019 Division of Aeronautics Annual Report; Denver International Airport 2018-2022 Capital Program, 2019; FAA AIP Grant Histories Data, 2015-2019; Kimley-Horn, 2020

10.10.5. Funding Gap

The prior section determined the average available funding for Colorado's system within the past five fiscal years. This information is used to determine the amount of funding that may be available to fund the financial needs identified in the 2020 CASP. This financial need represented projects necessary to maintain and optimize the system to meet the desired goals of the 2020 CASP. System needs often exceed the available funding for investment and it is important to examine this potential gap. The following section compares annual system needs to average annual investment in two ways, both with and without DEN's financial needs.

10.10.5.1. Funding Gap Excluding DEN Needs

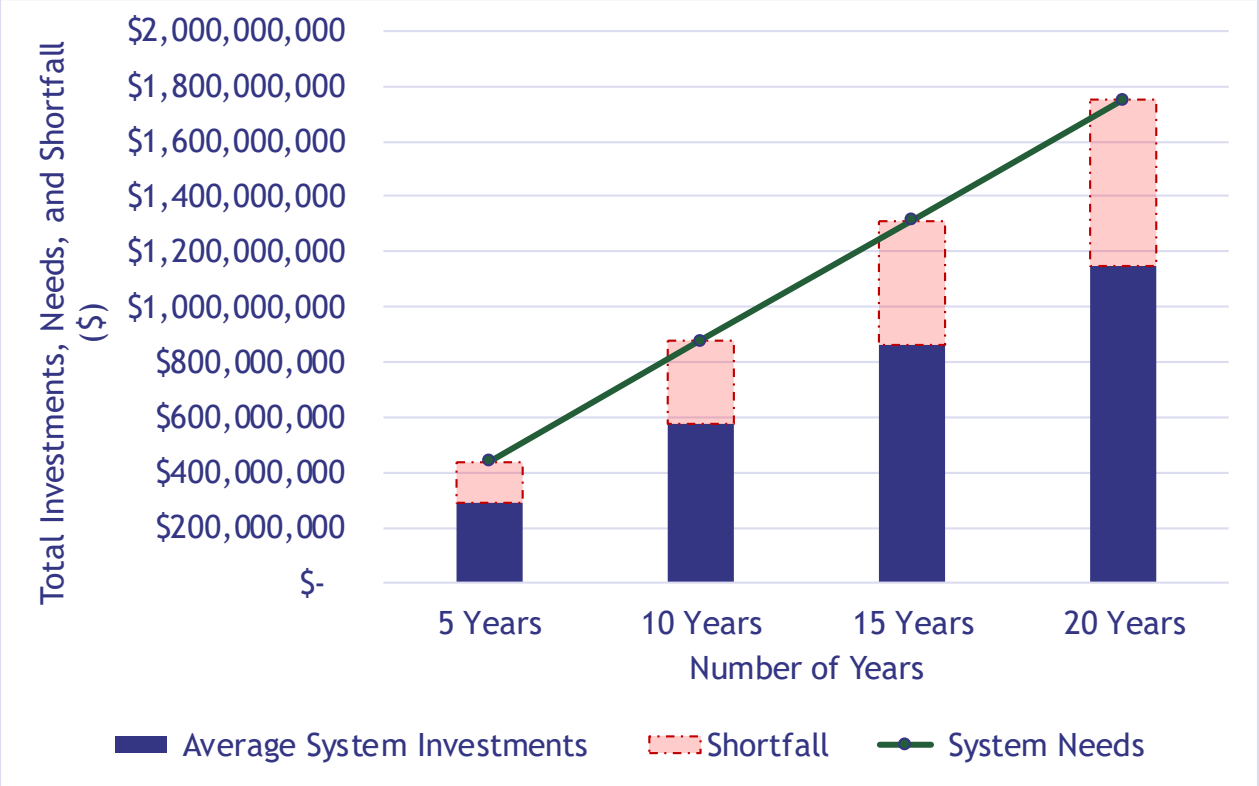
Table 10.22 compares Colorado's annualized system needs to the average annual investment defined in previous sections. Total system projects were anticipated to approach $1.8 billion over the next 20 years. The annualized system needs are estimated to average approximately $88 million per year. Average yearly investment of federal, state, and local funds into Colorado's system is approximately $57 million based on historical trends. The shortfall between annualized system needs and Colorado's historical funding is approximately $30 million per year. As demonstrated in **Table 10.22**, this average gap increases each year that funding is not available and expected to reach $603 million over the 20-year period. **Figure 10.33** shows the difference between average annual investment and the financial needs of the system over the next 20 years.

Table 10.22. Annualized System Needs vs. System Investment Over Time (Excluding DEN)

Time Period	System Needs	System Investment	Shortfall
1 Year	$87,537,575	$57,383,013	$30,154,562
5 Years	$437,687,877	$286,915,066	$150,772,811
10 Years	$875,375,754	$573,830,132	$301,545,622
15 Years	$1,313,063,631	$860,745,198	$452,318,433
20 Years	$1,750,751,508	$1,147,660,265	$603,091,244

Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; CDOT Division of Aeronautics 2015-2019 Division of Aeronautics Annual Report; Denver International Airport 2018-2022 Capital Program, 2019; FAA AIP Grant Histories Data, 2015-2019; Kimley-Horn, 2020

Figure 10.33. Annualized System Needs vs. System Investment Over Time (Excluding DEN)



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; CDOT Division of Aeronautics 2015-2019 Division of Aeronautics Annual Report; Denver International Airport 2018-2022 Capital Program, 2019; FAA AIP Grant Histories Data, 2015-2019; Kimley-Horn, 2020

10.10.5.2. Funding GAP Including DEN Needs

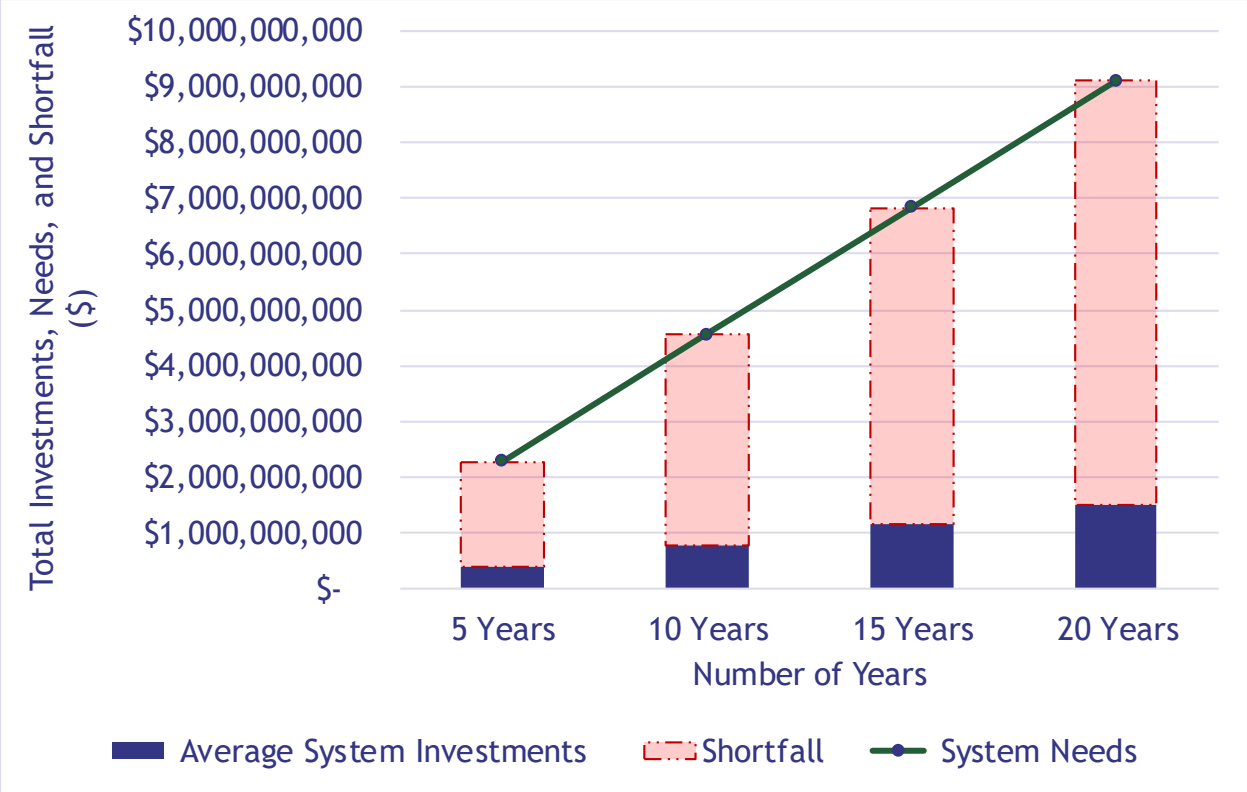
Table 10.23 and **Figure 10.34** compare average system investments, including DEN, against system needs per year. The annualized system needs exponentially rise to $455 million. The average annual investment including federal funding for DEN is estimated at $76 million a year including average of DEN AIP funding. The shortfall between investment and need becomes is anticipated to amount to $7.6 billion over 20 years.

Table 10.23. Annualized System Needs vs. System Investment Over Time (Including DEN)

Time Period	System Needs	System Investment	Shortfall
1 Year	$455,467,175	$76,033,979	$379,433,196
5 Years	$2,277,335,877	$380,169,896	$1,897,165,981
10 Years	$4,554,671,754	$760,339,792	$3,794,331,962
15 Years	$6,832,007,631	$1,140,509,688	$5,691,497,943
20 Years	$9,109,343,508	$1,520,679,585	$7,588,663,924

Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; CDOT Division of Aeronautics 2015-2019 Division of Aeronautics Annual Report; Denver International Airport 2018-2022 Capital Program, 2019; FAA AIP Grant Histories Data, 2015-2019; Kimley-Horn, 2020

Figure 10.34. Annualized System Needs vs. System Investment Overtime (Including DEN)



Sources: CDOT Division of Aeronautics CIP 2020-2024; CDOT Division of Aeronautics CIP 2025-2040; CDOT Division of Aeronautics 2015-2019 Division of Aeronautics Annual Report; Denver International Airport 2018-2022 Capital Program, 2019; FAA AIP Grant Histories Data, 2015-2019; Kimley-Horn, 2020

10.11. Summary of 2020 CASP Recommendations and Implementation

The prior sections have summarized the financial aspects of the CASP recommendations and findings. In addition to financial needs, there are other recommendations that will assist airports and CDOT Division of Aeronautics with enhancing the system's performance and achieving the goals established for the CASP. The following summarizes the non-financial recommendations for each PM, by goal category. These recommendations are focused on other steps or action items airports and CDOT Division of Aeronautics can take that do not require financial commitments.

10.11.1. Safety and Efficiency

The safety and efficiency goal was established to advance Colorado's airport system by promoting and preserving ***safe and efficient*** facilities, on and off airports. Providing safe facilities and operating environments for the users of Colorado's aviation system helps preserve their continuous operation and enhances community relations. **Table 10.24** summarizes 2018 performance, future performance targets, and recommendations related to safety and efficiency.

Table 10.24. Safety and Efficiency Recommendations

Performance Measure		2018 Performance	Performance Target	Recommendation
Percent of airports with approaches negatively impacted by obstructions		35%	0%	Airports should work with local municipalities and other stakeholders to mitigate obstructions within the approach surface to reduce the risk of aircraft accidents.
Percent of airports that have full perimeter wildlife fencing		49%	85%	Airports should coordinate with the FAA or CDOT Division of Aeronautics to perform a more detailed analysis to discern individual airport fencing needs. Airports with partial perimeter wildlife fencing should coordinate with the FAA, CDOT Division of Aeronautics, and their consultants to determine the feasibility and associated costs of installing appropriate wildlife fencing around the remaining facility.
Percent of airports that have adopted land use and height controls	*Land Use Controls*	62%	100%	Airports who have not adopted land use and/or height controls should initiate conversations with their local zoning authority(ies). In addition, CDOT Division of Aeronautics should consider developing additional guidance for airports and communities to promote and improve land use compatibility around airports.
	Height Controls	58%	100%	

Performance Measure		2018 Performance	Performance Target	Recommendation
Percent of NPIAS airports that meet current FAA design standards under AC 150/5300-13A	*Taxiway Geometry Standards*	10%	100%	Airports should address taxiway geometry issues as part of other projects unless an individual airport is identified by the FAA as having Runway Incursion Mitigation (RIM) needs. Airports should also promote focused RSA compliance in local comprehensive planning processes to identify and mitigate/correct existing and/or future deficiencies.
	RSA Standards	78%	100%	

Source: Kimley-Horn, 2020

10.11.2. Access and Mobility

The Access and Mobility goal was established to provide Colorado's airports with infrastructure and sufficient capacity, providing the public adequate ***access and mobility*** in utilizing the aviation system. Providing reasonable access to facilities and services that can accommodate demand helps promote air mobility across the state and beyond. **Table 10.25** summarizes 2018 performance, future performance targets, and recommendations related to access and mobility.

Table 10.25. Access and Mobility Recommendations

Performance Measure		2018 Performance	Performance Target	Recommendation
Percent of airports with a dedicated SRE building		44%	61%	CDOT Division of Aeronautics could consider a program to allocate state aviation funds to prioritize the construction of dedicated SRE buildings at airports with SRE needs.
Percent of population within a 30-minute drive time of an all-weather runway		83%	85%	CDOT Division of Aeronautics could consider assisting with instrument approach procedure development through discussions with FAA, as well as supporting weather reporting infrastructure to increase accessibility to the system. Additionally, CDOT Division of Aeronautics should continue to monitor population growth and trends statewide to determine potential impacts to airport needs to support the growing population.
Percent of airports with adequate terminal capacity	*Commercial Service*	29%	100%	CDOT Division of Aeronautics should coordinate with airports related to their terminal and hangar needs as well as monitor aviation demand that could affect those needs.
	General Aviation	58%	100%	
Percent of airports with adequate transient hangar spaces		44%	61%	

Source: Kimley-Horn, 2020

10.11.3. Economic Sustainability

The Economic Sustainability goal was established to support ***sustainable economic*** growth and development and continue Colorado's existing status as a leader in technology, testing, and the aerospace industry. Equipping airports with the facilities and services to support business use of Colorado's aviation system will help expand the economic impact of Colorado's airports. **Table 10.26** summarizes 2018 performance, future performance targets, and recommendations related to economic sustainability.

Table 10.26. Economic Sustainability Recommendations

Performance Measure	2018 Performance	Performance Target	Recommendation
Percent of airports with necessary fuel type, available 24/7	94%	85%	Airports should continue to work with CDOT Division of Aeronautics to review potential funding sources to install new fueling facilities that are available to pilots 24/7.
Percent of airports that support the aerospace manufacturing, technology, and/or testing industry	36%	No Target Established	CDOT Division of Aeronautics should continue to promote the aerospace manufacturing, technology, and/or testing industry at CASP airports.
Percent of airports with adequate utilities	53%	85%	CDOT Division of Aeronautics should continue to work with airports to identify funding mechanisms for utility infrastructure as demand is realized.

Source: Kimley-Horn, 2020

10.11.4. System Viability

The System Viability goal was established to preserve airport system assets to ***promote fiscal responsibility and sustainable, cost-effective investments*** to ensure the system's long-term viability. Supporting projects that preserve infrastructure and further environmental and operational viability will help save limited resources. **Table 10.27** summarizes 2018 performance, future performance targets, and recommendations related to system viability.

Table 10.27. System Viability Recommendations

Performance Measure	2018 Performance	Performance Target	Recommendation
Percent of airports with certified on-site weather reporting (AWOS or ASOS)	77%	85%	CDOT Division of Aeronautics could continue to provide financial assistance to airports to obtain certified weather equipment.
Percent of airports with a pavement maintenance plan	64%	95%	CDOT Division of Aeronautics should continue to fund and prioritize primary runway and taxiway pavement maintenance and rehabilitation projects to extend the useful life of the pavements as well as to continue to promote safe facilities.
Percent of airports with an average runway and taxiway PCI of 70 or greater	47%	95%	

Source: Kimley-Horn, 2020

10.12. Development Priorities and Justification

CDOT Division of Aeronautics is committed to the success of not only its airports, but the entire multi-modal transportation system. This is proven by the $3.2 million invested in the following statewide aviation initiatives in FY 2019, as reported in CDOT Division of Aeronautics' *2019 Annual Report*.

- **2020 Colorado Aviation System Plan (CASP).** Developed as a fresh, "from scratch" evaluation of Colorado's airport system that aligns with the strategic plan, Colorado's Long-Range Transportation Plan, with clear goals and objectives.
- **2020 Colorado Aviation Economic Impact Study (CEIS).** Developed to quantify the total economic impact of the Colorado aviation system as well as on an individual airport basis. The study also quantified the construction, tax impacts, visitor spending, air cargo, and agricultural impacts.
- **Automated Weather Observing System Development and Maintenance.** Program funded to maintain and repair Colorado's network of 13 mountain top automated weather observing systems (AWOS) to increase safety for pilots flying over the Rocky Mountains. Airports who own and operate their AWOS are eligible to receive up to 90 percent of eligible costs for maintenance expenses.
- **Airport Sustainability Program.** Program that provides guidance, resources, and tools to 2020 CASP airports to assist in the self-preparation of customized airport sustainability plan. It should be noted that no monies were spent on this program in FY 2019.
- **Surplus Airport Equipment Program.** Developed to partner with DEN and other airports to coordinate and administer an annual sale of used airport service vehicles (varying percentages of costs funded by CDOT Division of Aeronautics dependent upon buying quantities) to GA and smaller commercial service airports who typically would be unable to afford the equipment new.
- **5010 Airport Inspections.** Funding allocated to conduct regular safety inspections at system airports.
- **USDA Wildlife Hazard Mitigation Program.** Funding allocated to assist system airports with approved wildlife programs.
- **Airport Internship Program.** Partnership with participating airports to partially fund an hourly wage for an intern.

- **Remote Air Traffic Control Program**. Initiative at Northern Colorado Regional Airport (FNL), in partnership with the FAA and Searidge Technologies to integrate ground-based video and aircraft track-based/radar components to provide air traffic data to air traffic controllers working in a remote facility.
- **Airfield Maintenance & Crack Sealant Program**. Funding allocated for a crack sealant rebate program for preventative maintenance of 2020 CASP airfield pavements. CDOT also offers airports up to 100 percent purchase reimbursements for crack fill machines intended to be used by a group of small airports in a region. Under the program, eligible airports may receive 100 percent reimbursements to purchase replacement parts as part of crack fill machine maintenance and upkeep.
- **Web-based Information Management (WIMS) System**. Management system that allows airport sponsors to apply for, track, and manage their grants from a central portal.
- **Communications, Pilot Outreach & Safety**. Funds the production of the Colorado Airport Directory and Colorado Aeronautical Chart to give pilots up-to-date airport and airway information.

These priorities are likely to continue to be critical to the overall success of Colorado's airport system. CDOT Division of Aeronautics should continue to evaluate the efficacy of the programs listed above, as well as consider including regular updates of the Airport Pavement Management System (APMS), the CASP, and the Colorado Aviation Economic Impact Study (CEIS). It is important that monitoring of the system's performance continue, as recommended by the FAA through its continuous planning process. The following are some continuous studies that should be part of CDOT's continuous system planning process.

10.12.1. Airport Pavement Management System (Continuous) Study

Maintaining adequate pavement condition is critical to the safe and efficient operation of aircraft at airports. As noted in previous chapters, pavement maintenance is one of the costliest capital investments an airport makes. As a result, pavement management is required at all airports in both state and FAA grant assurances and is a PM in the 2020 CASP.

CDOT Division of Aeronautics funds and conducts regular safety and PCI inspections at 2020 CASP airports. The Division staff is trained to measure and rate airport pavements using the PCI industry standard so that maintenance and repair can be planned and implemented at the appropriate time during its lifecycle. Once the pavement data is collected, it is then provided to a consultant who develops the APMS program.

CDOT Division of Aeronautics should continue to perform regular runway, taxiway, and apron PCI inspections at 2020 CASP airports as well as continue to contract with a consultant to manage and develop the APMS program that breaks down pavement reports by airport and develops recommendations for maintaining the pavements in good condition. While the inspection and APMS program come at a cost, the cost is significantly less than the cost to rehabilitate or fully reconstruct an entire pavement section.

CDOT Division of Aeronautics should also consider creating incentives as well as a generic template for airports to implement a PMP. An airport PMP employs a system of evaluation tools and schedules for airports to maintain the pavement rehabilitation needs in the future. A PMP provides important indicators to understand current pavement conditions and uses a set of indicators to assess the rate of degradation to predict when rehabilitation should occur. Executing maintenance and rehabilitation

(M&R) techniques to keep the pavement from dropping below fair or poor condition is estimated to be four or five times less expensive than rehabilitating pavement conditions when it drops below those thresholds[9].

CDOT Division of Aeronautics should also continue to support the Pavement Maintenance and Crack Sealant Program which aims to assist airports with preventative pavement maintenance. All airports, but especially small airports with limited capital funding, benefit from these programs.

10.12.2. CASP Update

The primary purpose of a system plan is to study the performance and interaction of an aviation system and identify airport needs. The plan guides decisions and educates those who oversee the system, including local, state, and federal policy makers. The last system plan completed for Colorado's aviation system was published in 2011. Since then, CDOT Division of Aeronautics initiated the 2020 CASP which evaluated Colorado system airport's 2018 existing conditions, demand, and needs over a 20-year planning horizon. The aviation industry is ever-changing, however, an update to the 2020 CASP would allow CDOT Division of Aeronautics to monitor how those changes affect the Colorado system. CDOT Division of Aeronautics should initiate an update of the 2020 CASP in the 2023-2025 timeframe.

10.12.3. CEIS Update

An aviation economic impact study quantifies the economic impacts of on-airport businesses, activities, and other spin-off or multiplier impacts of airports. Economic impact studies help communicate the benefits of airports, both quantitative and qualitative, and validate the continued public investment in an airport system. CDOT Division of Aeronautics published an economic impact study for Colorado airports in 2013 which reported that Colorado's airports produced a total annual economic output of $36.7 billion. The 2013 Economic Impact Study for Colorado Airports was updated by way of the 2020 Colorado Aviation Economic Impact Study (CEIS) which reported that by 2018, the total statewide annual airport economic impact (i.e. Business Revenues) increased to $48.6 billion. Due to the ever-changing aviation industry, these studies should be updated every three to five years. CDOT Division of Aeronautics should initiate an update of the 2020 CEIS in the 2023=2025 timeframe.

10.13. Policy and Investigation Recommendations

As noted in the prior section, CDOT Division of Aeronautics funds and promotes a multitude of programs and initiatives designed to strategically improve 2020 CASP airports. Based on the findings of the 2020 CASP, CDOT Division of Aeronautics should consider the following additional programs and studies to supplement the programs and initiatives funded to date, as well as the recommendations derived from PMs.

10.13.1. Snow Removal Equipment (SRE) Building Program

Many of the 2020 CASP airports experience a wide range of weather conditions including heavy snowfall during the winter months. Numerous Colorado airports accommodate access to world-renowned ski resorts and winter sports attractions making SRE a vital component to uninterrupted operations during

[9] FAA AC 150/5380-7B " Airport Pavement Management Program" October 2014: https://www.faa.gov/documentlibrary/media/advisory_circular/150-5380-7b.pdf

the winter season, especially to continue bringing the many tourists that increase the state's economic impact. Based on analyses documented in Existing and Future System Performance Chapters, 44 percent of airports reported having a dedicated SRE building with a goal of 61 percent of airports having the facility in the future.

As noted in **Chapter 8. Future System Performance**, to improve overall system performance by meeting established future system performance targets, airports may need to identify existing facilities to convert into a dedicated SRE building or construct a completely new building for these purposes. However, SRE buildings are typically lower on the FAA CIP priority list, and with limited funding available to some airports, SRE buildings may not be feasible.

CDOT Division of Aeronautics could consider a statewide action or program that sets aside specific funding each year for the design and construction of dedicated SRE buildings at 2020 CASP airports. A standard design for an SRE building could be developed by CDOT for implementation at airports needing this facility. This standard design could reduce overall costs, however, individual airport needs may differ based on demand and geographic location (i.e. mountain airports with substantial operations may get priority over others).

10.13.2. GA Terminal Building Program

The 2020 CASP evaluated GA terminal buildings at all airports using size calculations (150 square feet) per peak number of passengers at each airport in 2018. As mentioned in **Section 10.5. Future Facility Needs**, GA terminal building needs were also evaluated based on forecast demand as reported in **Chapter 7. Aviation Demand Forecasts**.

In 2018, 58 percent of airports had an adequately sized GA terminal building compared to the 100 percent target established in Chapter 8. Future System Performance. Terminal building needs significantly increase once 2038 aviation demand forecasts are applied, justifying the need for new or expanded GA terminal buildings at many 2020 CASP airports.

Similar to dedicated SRE buildings, GA terminals are typically lower on the FAA CIP priority list, making them challenging to fund, especially at airports with limited financial resources. As such, CDOT Division of Aeronautics could consider a statewide action or program that sets aside specific funding each year for the design and construction of GA terminal buildings at 2020 CASP airports. The Division could also contract a design engineer to develop a standard GA terminal building template based on 2020 airport classifications as GA terminal sizes and needs at higher traffic airports would be more significant than at rural airports with less demand.

10.13.3. Denver Regional Demand/Capacity Study

As documented in **Chapter 8. Future System Performance**, annual service volume (ASV) is a planning estimate of the maximum number of annual operations that an airport can reasonably accommodate in a year. An ASV analysis is a high-level tool that provides a starting point for determining potential capacity needs that require further study. Per FAA Order 5090.5, *Formulation of NPIAS and ACIP*, the FAA recommends that planning for developments to increase capacity should be initiated once annual operations reach 60 percent of an airport's ASV. Airports with annual operations at or above this

threshold may begin to experience operational delays and airfield congestion. Airports should initiate capacity improvement construction once the airport's ASV exceeds the 80 percent threshold.

By 2038, Greeley-Weld County (GXY) is projected to exceed the 60 percent planning threshold for capacity and in the same timeframe, four airports (DEN, FNL, Centennial [APA], and Rocky Mountain Metropolitan [BJC]) are anticipated to exceed the 80 percent capacity improvement construction threshold. Each of the five airports are located within proximity of the Denver metropolitan area which indicates that capacity isn't a statewide issue, but more of a localized, Denver-specific issue.

CDOT Division of Aeronautics should consider working with these airports as well as consider a more in-depth, regional demand/capacity study. Many of the airports with projected capacity issues have limited expansion potential, meaning capacity-increasing construction projects may not be feasible. The study should focus on identifying opportunities for regional capacity shifting, the feasibility of developing new facilities to add to the regional capacity, and facilitating discussions with airport users, the FAA, Air Traffic Control, and the public. The study should view the Denver-area airports as one network or system of airports, rather than several airports operating individually.

10.13.4. Approach Surface Obstruction Study

As noted in **Chapter 8. Future System Performance**, obstructions within the approach surface of a runway increase the risk of damage to property and potential injury or death to persons both in the plane and/or on the ground. They may take the form of man-made or naturally existing obstructions and coordination to either remove them or take extra precautions to avoid aircraft collisions with them are imperative to overall safety.

One out of every three airports in the Colorado system have obstructions that negatively impact the approach slopes to the primary runway. The number of airports affected by obstructions will most likely increase if an analysis were conducted to evaluate all runways in the system. As such, CDOT Division of Aeronautics should consider undertaking a detailed statewide approach surface obstruction study to identify the issues affecting so many airports, including identifying each obstruction, and making actionable recommendations to mitigate these hazards.

10.14. Recommended NPIAS Changes

The FAA has established a set of criteria to determine if an airport is eligible for entry into the NPIAS through FAA Order 5090.5, *Formulation of the NPIAS and ACIP,* which cancels FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)* and FAA Order 5100.39A, *Airports Capital Improvement Plan.*

In reference to **Chapter 5. Airport Role and Classification Analysis**, 49 of the 66 2020 CASP airports met the eligibility requirements for inclusion into the 2019-2023 NPIAS. These airports were deemed as important to the national airport system and contributed integral aviation services or facilities to the nation's aviation system. Nine of the 49 airports were designated as Primary airports and were then subcategorized into Large, Medium, Small, and Nonhub dependent upon their share of total U.S. enplanements. The remaining 40 airports were designated as Nonprimary and subcategorized into Commercial Service, Reliever, and General Aviation airports.

Based on 2018 data used in **Chapter 7. Aviation Demand Forecasts** and NPIAS eligibility criteria identified in **Chapter 5. Airport Role and Classification Analysis**, two 2020 CASP airports appear eligible for consideration for inclusion into future NPIAS reports:

- Mineral County Memorial (C24)
- Springfield Municipal (8V7)

CDOT Division of Aeronautics should work closely with each airport's public sponsor to understand the implications and needs associated with becoming a NPIAS airport, including the pros and cons, as well as with the FAA before moving forward with NPIAS inclusion consideration.

10.15. Summary

This chapter serves as the culmination of the 2020 CASP, presenting the system's financial needs and the associated recommendations and implementation plan. The project costs identified in this chapter are an important outcome of the 2020 CASP as they provide a complete picture of the resources needed to maintain the system compared to the average annual federal, state, and local investments. It is also important to recognize that Colorado's airports contribute much more to the economy of the state than the needs over the next 20 years as documented in the CASP. The CEIS demonstrated that in 2018, Colorado's airports provided a total annual economic impact of $48.6 billion. This economic impact varies per year based on increases and decreases in the aviation activities, however, when compared to the identified 20-year need and the average investment that has been made and is anticipated to continue, the aviation system generates more impact per year than is expended. **Table 10.28** summarizes and compares Colorado airports' 2018 economic impact, their annualized need, and average annual investment.

Table 10.28. Colorado Airports Annual Funding Gap

Metric	Amount
2018 Total Economic Impact	$48.6 Billion
2018 Total Project Needs	$88 Million
2018 Total Investment	$59.7 Million

Sources: CDOT Division of Aeronautics, 2018; Kimley-Horn, 2020

In addition to the needs and associated project costs, recommendations were developed as a result of a multi-year collaborative effort between CDOT Division of Aeronautics, the FAA, and various stakeholders represented on the Project Advisory Committee (PAC) for continuous system monitoring and improvement. The recommendations support CDOT's on-going programs and initiatives and also encourage additional follow-on studies as well as provide action items for airports and CDOT Division of Aeronautics to meet future performance targets. As noted above, the total need for CASP airports exceeds the total funding anticipated to be available for capital improvement projects. This further emphasizes the value of the 2020 CASP to CDOT Division of Aeronautics as future policies and programs are evaluated in terms of strategically and intentionally maximizing the available funding based on the 2020 CASP recommendations.