2050 Long-Range Transportation Plan

ADOT

Multimodal Gap and Investment Choice Analysis

Connecting Arizona. Better Lives Through Better Transportation.

Contents

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1   Introduction

1.1   Purpose of the Working Paper

This working paper presents analysis related to the funding gap and potential investment choices and is a supporting document of Arizona Department of Transportation 2050 Long-Range Transportation Plan (LRTP). The funding gap analysis represents the difference between the anticipated infrastructure needs and the projected revenue for the Arizona Department of Transportation. Based on the transportation funding gap, the investment choices identify how available funding should be prioritized between the following three primary investment categories:

- **Preservation** - Activities that improve or sustain the condition of road pavement and bridge facilities to a state of good repair.

- **Modernization** - Improvements to the existing State Highway System that upgrade efficiency, functionality, and safety without adding capacity.

- **Expansion** - Improvements that add capacity to the State Highway System through new roads, adding lanes to existing highways, new rail, and constructing new grade separated overpass/underpass.

The document also includes a list of strategies that can be used to meet the vision, goals, and objectives set by the ADOT in the 2050 LRTP. These strategies include recommendations for studies, prioritization processes, evaluations, performance metrics, and agency operations.

1.2   Investment Choice Development Process

The LRTP is a policy document that is updated every five years to reflect changes to the state's planning priorities and to develop a roadmap for investments in the state transportation system over the next 25 years. The investment choices that are developed through the LRTP process provide guidance on future investment decisions. The process surrounding the investment choice decisions and the LRTP in general include stakeholder engagement, public involvement efforts, and technical performance-based analysis as reflected in **Figure 1**.

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Figure 1: Investment Choice Development Process
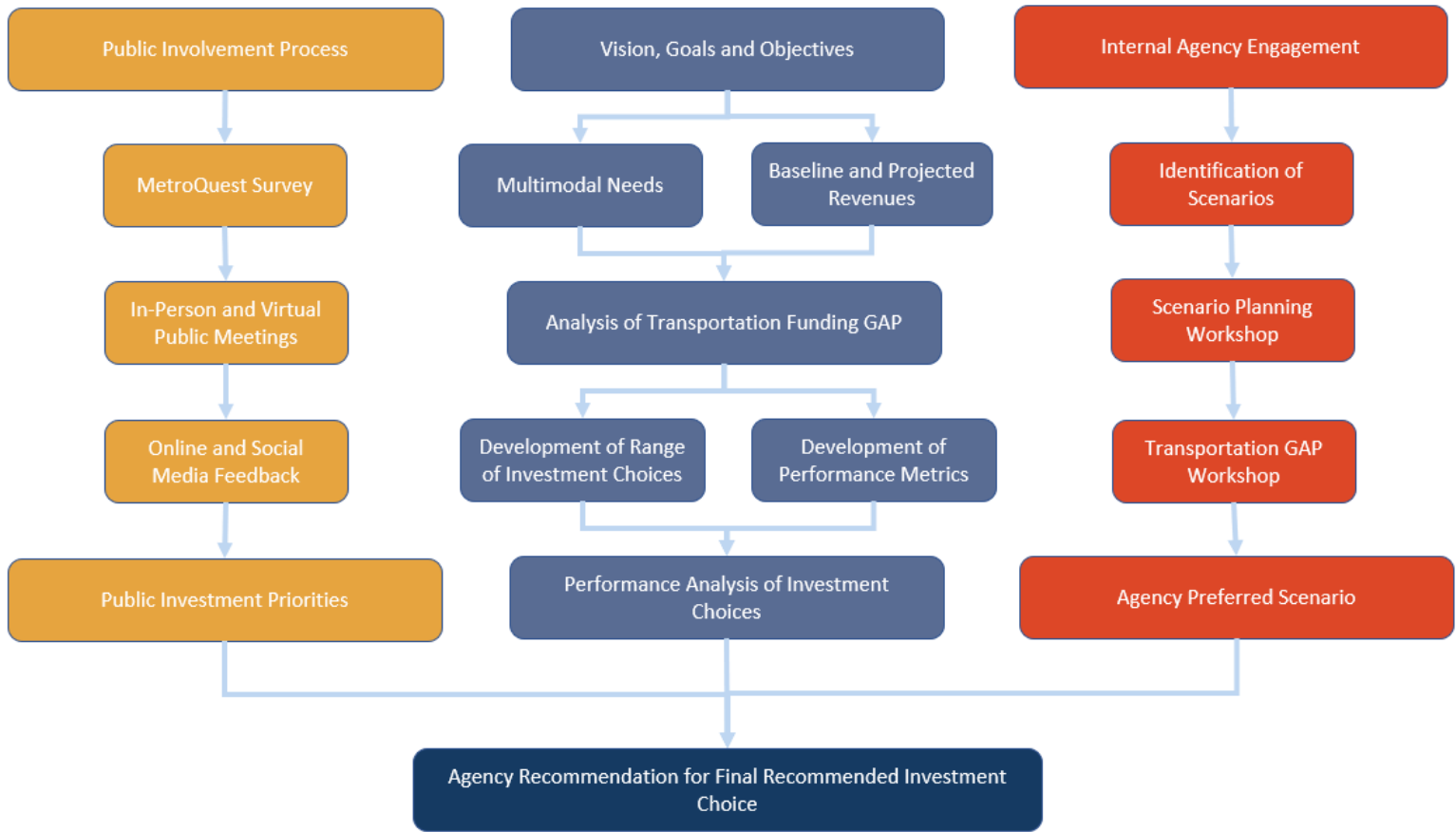
The interim documents that provide input into the gap analysis and investment choice analysis include the Vision Report, the Multimodal Needs Analysis, and the Baseline and Projected Revenue Document. The Vision Report establishes the vision, goals, and objectives for Arizona's transportation system.

Vision Document:

The Vision document establishes the vision, goals, and objectives for Arizona's transportation system and highlights how current and future plans and policies impact the preservation and growth of Arizona's transportation system.

Multimodal Needs Analysis:

The Multimodal Needs Analysis document identifies ADOT's infrastructure needs which consist of three distinct categories: ADOT infrastructure, ADOT stewardship, and complementary systems. The ADOT infrastructure represents the total cost to preserve, improve, and expand the highway system to meet ADOT's performance targets. The ADOT stewardship represents the fiscal oversight that ADOT provides to programmatic elements available to other agencies, while complementary systems are activities that ADOT is not involved in directly. These needs were based on prior studies and documentation and fiscally unconstrained. A summary of these needs is provided in *Section 2.2*.

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Baseline and Projected Revenue Document:

> The Baseline and Projected Revenue document identifies sources of revenue and projects the funding available for ADOT to meet Arizona's transportation needs. The revenue projections were done in coordination with ADOT's Financial Management Services. Three funding projections (baseline, high, low) were developed and include the Highway User Revenue Fund (HURF), Infrastructure Investment and Jobs Act (IIJA) / Bipartisan Infrastructure Law (BIL), and Maricopa County's Regional Area Road Fund (RARF). A summary of ADOT's projected revenue is provided in *Section 2.3*.

Throughout the LRTP development process, ADOT engaged with the public by conducting surveys, public meetings, and online feedback to identify the priorities of the public regarding investment in transportation. A summary of ADOT Public Involvement and the results of public feedback are provided in Section 5. In addition to public involvement, ADOT also held internal scenario planning events to identify preferred funding scenarios surrounding the state transportation system. A summary of these scenario planning workshops and the resultant preferred scenarios are provided in *Section 6*.

2 Gap Analysis

2.1 Defining the Gap

The difference between infrastructure needs and available revenue defines the funding gap. The magnitude of the gap can differ based on the definition of the needs and revenues relative to the agency responsibilities. The 2050 LRTP divides the statewide transportation system into three categories based on ADOT's relative ownership and oversight responsibilities – ADOT Infrastructure, ADOT Stewardship, and Complementary Systems. A graphic representation is shown in **Figure 2.**

Figure 2: Arizona Transportation System
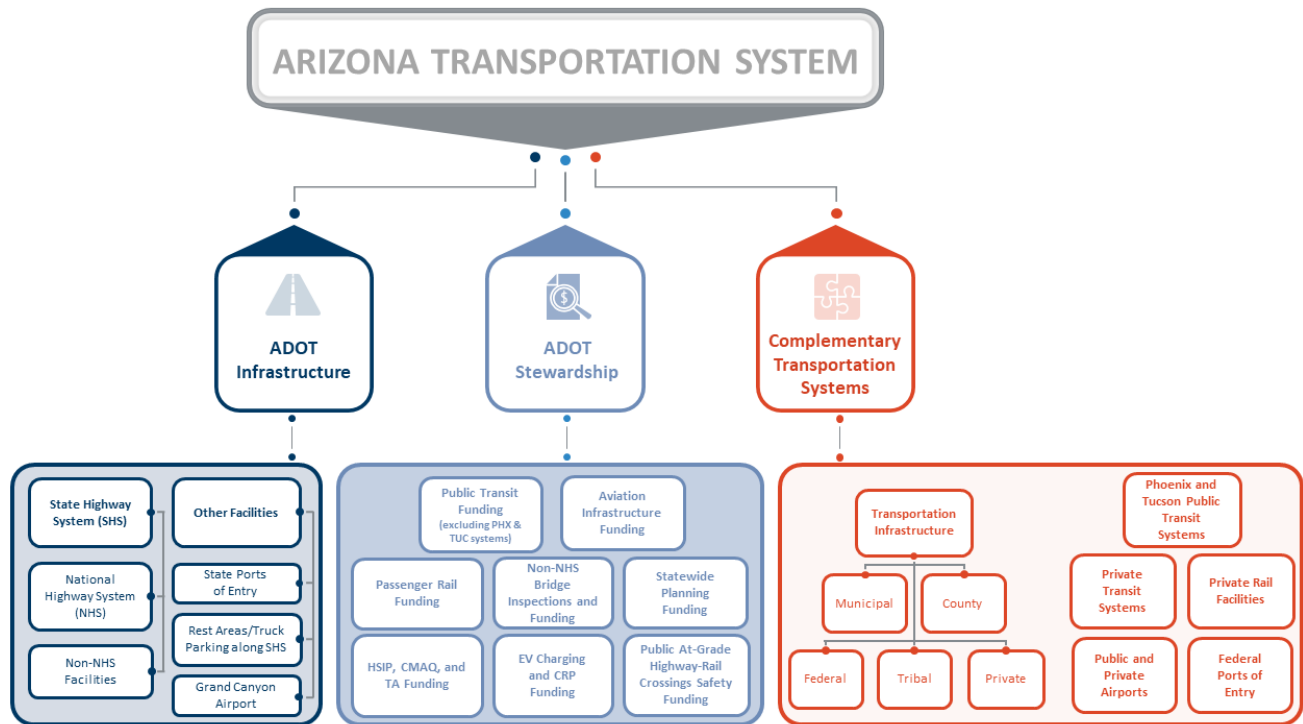
The "ADOT Infrastructure" category consists of ADOT-owned and maintained facilities largely located within the State Highway System. While these are primarily roadway-based, other assets within the category include State ports of entry, rest areas and truck parking, and the Grand Canyon Airport.

The "ADOT Stewardship" category consists largely of programs that ADOT is responsible for the administration and oversight of funds. These programs differ in their application of revenues and some are considered "pass through" (prohibited from being spent on ADOT infrastructure) while others have flexibility on the application and may be used on both ADOT and non-ADOT infrastructure.

The "Complementary Transportation Systems" category encompass those aspects of the statewide transportation system in which ADOT has no involvement – primarily local roadways and transit systems.

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For the purposes of the ADOT LRTP, the analysis of gaps and investment choices focuses on the two categories for which ADOT has responsibility and revenue – ADOT Infrastructure and ADOT Stewardship. The needs and revenue associated with the Complementary Transportation Systems is not included in this document.

2.2   Needs

The Multimodal Needs Analysis evaluated the anticipated infrastructure needs for ADOT over a 25-year period, reflected in 2026 dollars. The total ADOT LRTP needs were over $231 B, with $174 B for ADOT Infrastructure and $57 B for ADOT Stewardship. A graphic showing the values is provided in **Figure 3** while **Table 1** shows the breakdown within each category.
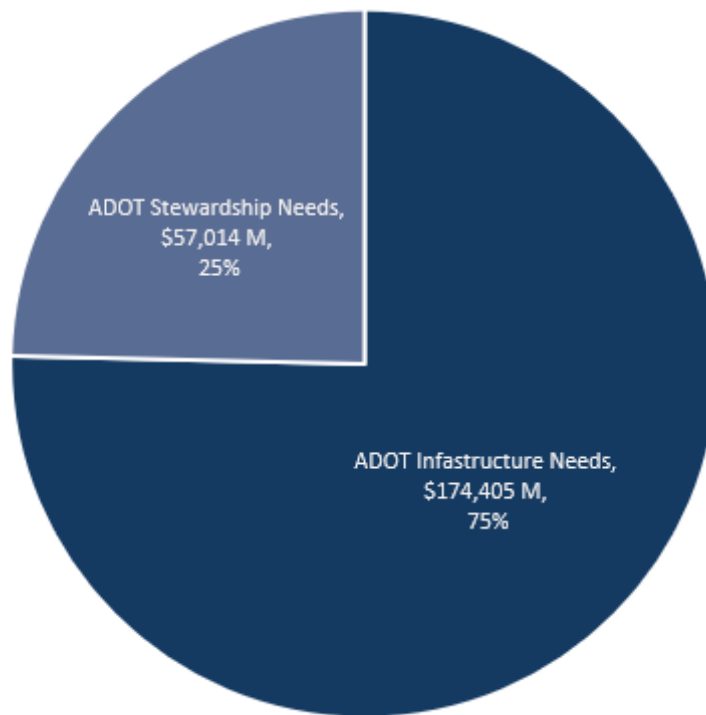
Figure 3: Projected Needs

ADOT Stewardship Needs,
$57,014 M,
25%

ADOT Infastructure Needs,
$174,405 M,
75%

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Table 1: Projected Needs by Category

Investment Category		Need Category	Total Needs (2026 Dollars in Millions)
ADOT Infrastructure	Preservation	Pavement	$63,300
		Bridge	$8,842
	Mobility (Expansion and Modernization)	Mobility (MAG)	$71,076
		Mobility (PAG)	$10,006
		Mobility (Greater Arizona)	$6,980
	Modernization	Safety	$5,892
		Freight	$4,404
		State Ports of Entry	$1,085
		Rest Areas/Truck Parking	$2,785
		Grand Canyon Airport	$34
ADOT Stewardship		Public Transit Funding	$3,457
		Aviation Infrastructure Funding	$19,968
		Passenger Rail Funding	$17,504
		Non- SHS Bridges Inspection and Funding	$826
		Statewide Planning Fund	$1,748
		HSIP, CMAQ, and TA Funding	$13,147
		EV Charging and CRP Funding	$59
		Public At-Grade Highway-Rail Crossings Safety Funding	$306
Total Needs			**$231,419**
	ADOT Infrastructure		$174,405
	ADOT Stewardship		$57,014

2.2.1   Preservation Needs

The "Preservation" needs identified above include a combination of activities that are supported through operational activities as well as programming activities. Operational activities are those that are less aggressive in terms of treatment and can be carried out by maintenance forces using either internal resources or contracts. These are often simply referred to as "maintenance" and decisions are made at the District level using operational budgets. Programming activities are those that require more extensive treatment and rely on procurement to follow a more traditional construction approach. Within ADOT, these are most commonly referred to as "preservation" and decisions are made at the statewide level and eligible for Federal funding. **Table 2** compares common treatment activities associated with ADOT-owned pavements and bridges.

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Table 2: Preservation Activities

|	Pavement	Bridge
Operational Treatments ("Maintenance")	Pothole repair	Deck joint seal
	Crack fill/seal	Painting of steel
	Chip seal	Scour maintenance
	Fog seal or flush	Slab repairs
	Micro-surface	Drainage repair
	Slurry seal	Embankment repair
Programming Treatments ("Preservation")	Mill & fill pavement	Deck overlays
	Overlay pavement	Deck replacement
		Railing replacement
		Retrofit of structural supports
		Bridge widening

2.3   Revenue

The Baseline and Projected Revenue document evaluated the anticipated revenue for ADOT over a 25-year period, reflected in 2026 dollars. The document provided projections for the three primary funding streams that contribute to the overall funding of ADOT capital expenditures – the Highway User Revenue Fund (HURF), the Regional Area Road Fund (RARF), and Federal funding. Additional monies from State legislative appropriations out of the general fund and competitive Federal grant opportunities were not included in the revenue forecasts as these are not a consistent source of funding for ADOT projects.

Three forecast scenarios were developed representing a "Base" (55 percent confidence level) and alternative high and alternative low. A graphic of the three projections is shown in **Figure 4.**

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Figure 4: Future ADOT Revenue Forecasts

Total Value for Fiscal Years 2026-2050

Legend: ■ HURF ■ RARF ■ Federal Aid Highway Program
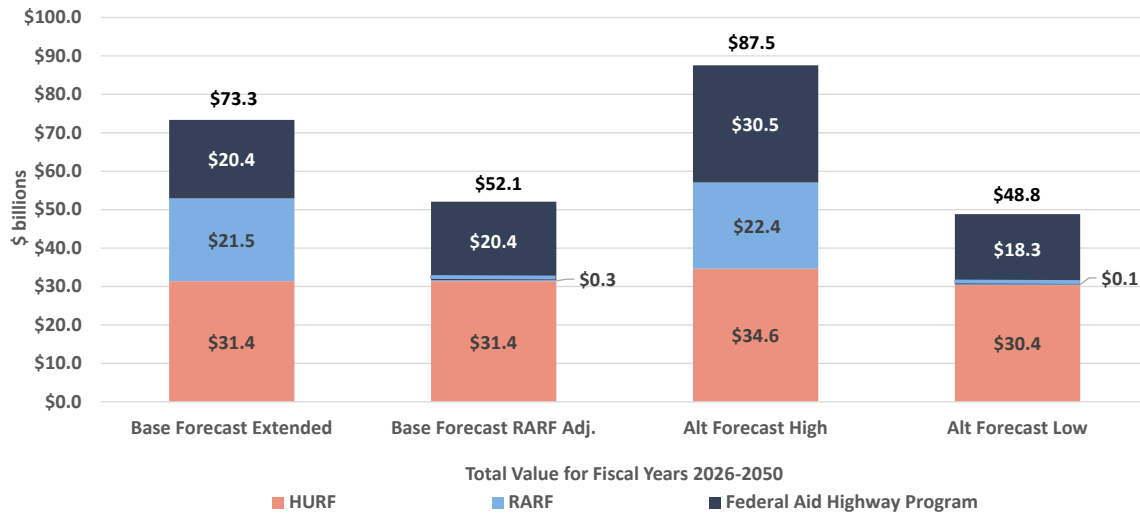
The Base Forecast was selected as the most likely and aligns closely with the ADOT official revenue projects that are developed by the ADOT Chief Financial Officer.

2.3.1 Revenue Refinement

The $73.3 B identified within the Baseline and Projected Revenue document was further refined during the gap analysis. Modifications were largely considered relative to the HURF revenue and local funds.

For ADOT's distribution of HURF, the agency's operating budget, forecast to be $19.8 B, was subtracted from the previous HURF revenue projection of $31.4 B. Of that operating budget, some is allotted to pavement and bridge preservation activities through a maintenance special line item (SLI). Input from ADOT's maintenance management staff indicate that the preservation-related expenditures from the maintenance SLI could amount to $4.1 B and were therefore added back to the available revenue. Once debt service was accounted for, the total HURF revenue available to ADOT to address LRTP needs was $12.9 B.
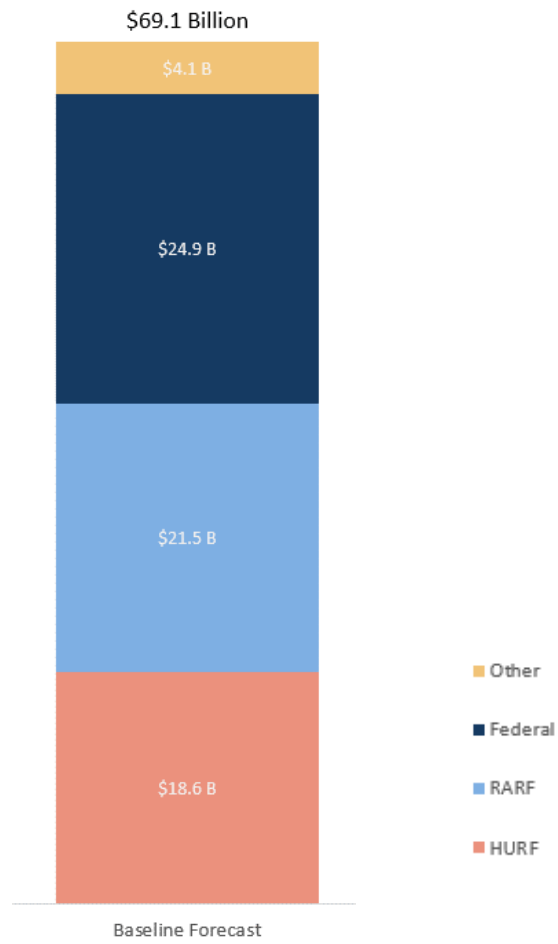
The statutory distributions to MAG and PAG from HURF's State Highway Fund (total of $5.6 B), while not directly under ADOT management, were added to the Base revenue forecast as the expenditures ultimately address ADOT infrastructure. In addition, a portion of PAG's local transportation sales tax (Regional Transportation Authority) was included based on past expenditures but is not designated to be spent on ADOT facilities in the future.

Minor adjustments were made to Federal revenues to account for the funding of programs, largely from FAA and FTA, that fall under the ADOT Stewardship category.

The refined "Base" revenue projection is shown in **Figure 5**.

Figure 5: Refined Base Revenue Projection

$69.1 Billion

Baseline Forecast

Legend:
- Other
- Federal
- RARF
- HURF

Bar segments (top to bottom):
- $4.1 B (Other)
- $24.9 B (Federal)
- $21.5 B (RARF)
- $18.6 B (HURF)

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2.4   Gap

The gap is defined as the difference between the projected needs and the projected revenue relative to the ADOT Infrastructure and Stewardship categories. Using the baseline revenue scenario, the total projected gap is anticipated to be $162.3 B over the LRTP timeframe. Separated into the ADOT Infrastructure and the ADOT Stewardship categories, the gap is $111.6 B and $50.7 B, respectively, as $62.8 B can be used for ADOT Infrastructure and $6.3 B can be used for ADOT Stewardship. **Figure 6** graphically shows the funding gap by category.

Figure 6: Projected Gap by Category
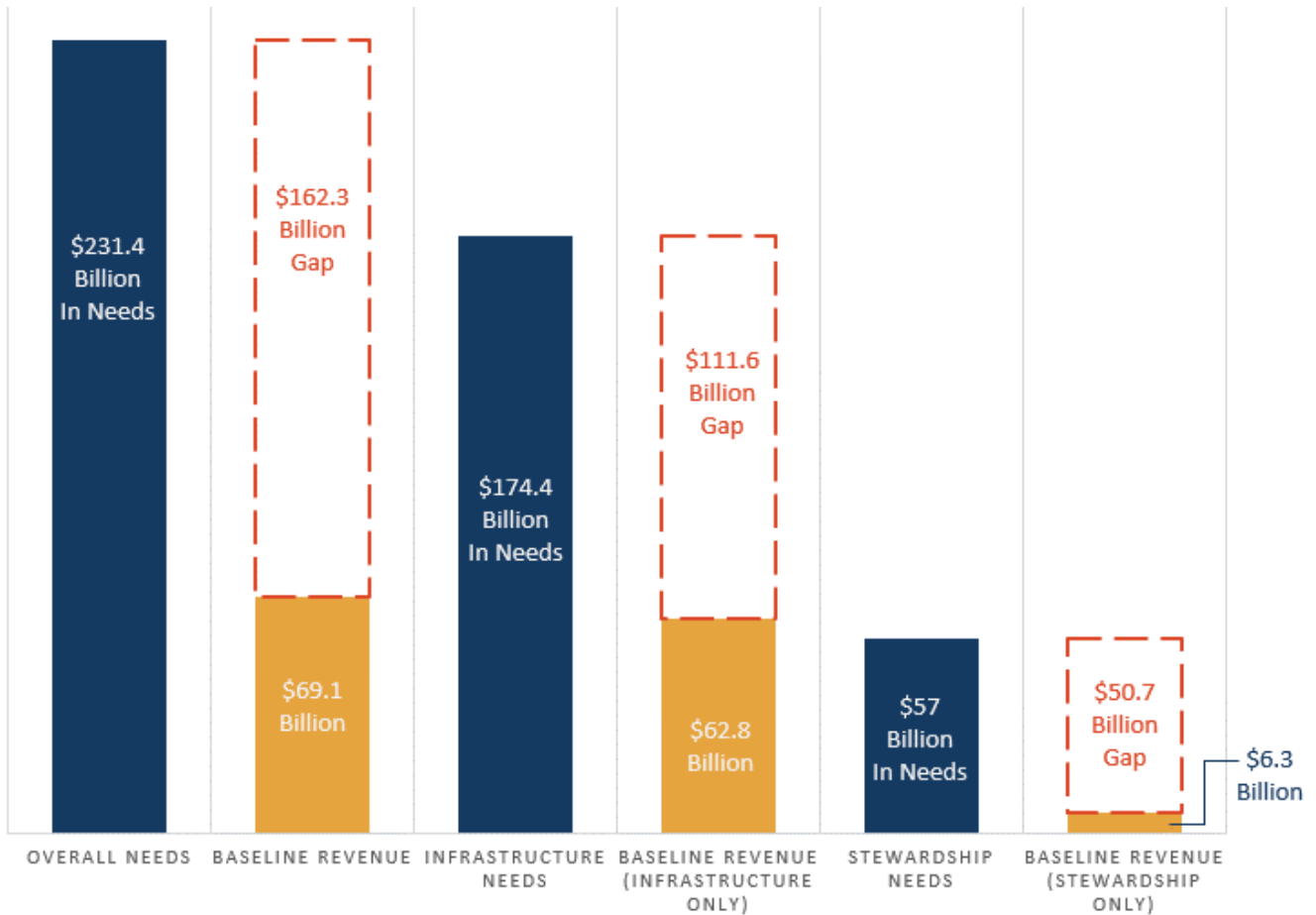
When accounting for the geographic distribution of revenue, considering limitations from MAG and PAG funding, the amount of investment available to Greater Arizona (areas outside the urban MAG and PAG areas) is $29.7 B.

3 Previous ADOT Investment Choices

The realities of a funding gap are not new to ADOT and the department has previously prioritized limited resources. Two primary efforts that require ADOT to manage funding gaps relative to infrastructure and make investment choices are the LRTP and the Five-Year Program. Past decisions associated with each of these activities can provide perspective to the ADOT decision-making process.

3.1 What Moves You Arizona 2040

The concept of a Recommended Investment Choice (RIC) as part of ADOT's Long Range Transportation Plan has been a part of the two previous plans. It was first introduced in the What Moves You Arizona (WMYA) 2035 to establish investment choices between Preservation, Modernization, and Expansion. The subsequent plan, known as WMYA 2040, also included a RIC with additional detail associated with the distribution between Greater Arizona, MAG, and PAG. The overall WMYA 2040 RIC is shown in **Figure 7** while the distributed RIC is shown in **Figure 8**. Dollar amounts in these graphics are average annual investments over the LRTP timeframe.
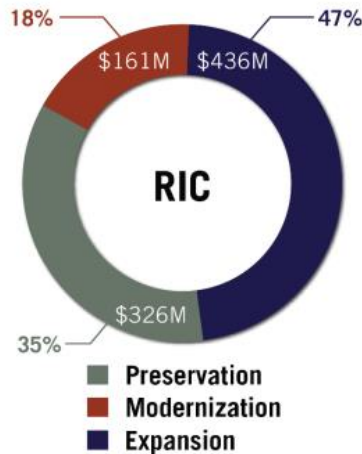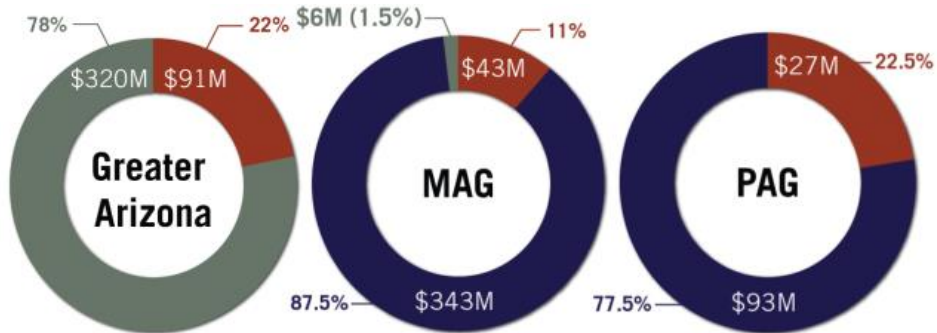
Figure 7: WMYA 2040 Investment Choice

Figure 8: WYMA 2040 Investment Distribution

3.2   2024-2028 Five-Year Program

The Five-Year Transportation Facilities Construction Program ("Five-Year Program") is ADOT's programming effort to establish expenditures of funds over the subsequent five-year period. As opposed to the WMYA 2040, which is a policy/guidance document, the Five-Year Program is the specific allocation of funds that will be used on projects. The current 2024-2028 Tentative Five-Year Program effectively represents ADOT's investment choices for the initial periods of the 2050 LRTP. Based on the programmed projects, the Tentative Program reflects an investment choice of 66% in Preservation, 20% in Modernization, and 14% in Expansion for the Greater Arizona Region. It should be noted that the 2024-2028 Tentative Program includes $208 M in State legislative appropriations and federal earmarks which influence short-term investment choices. The overall Five-Year Program investment choice is shown in **Figure 9** while the distributed investment choice is shown in **Figure 10**.

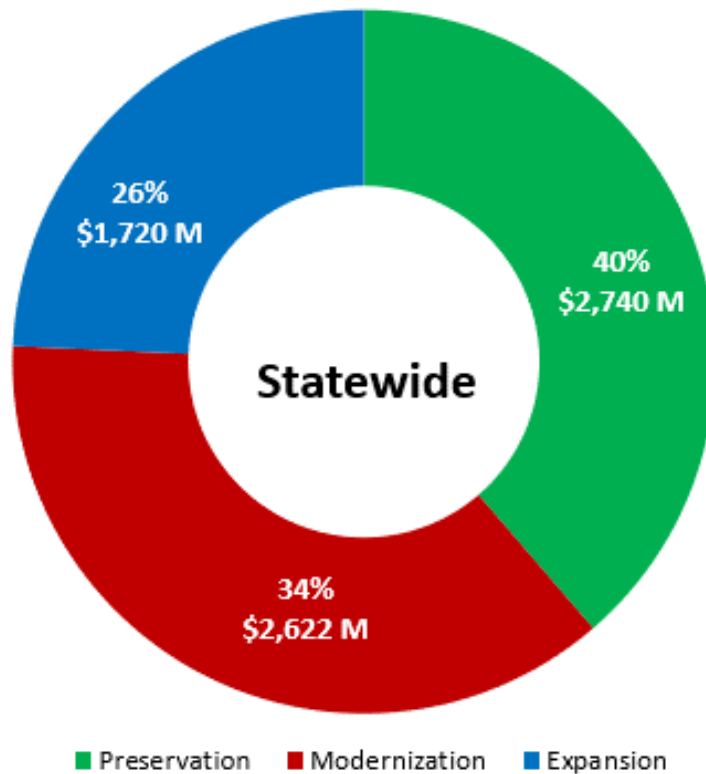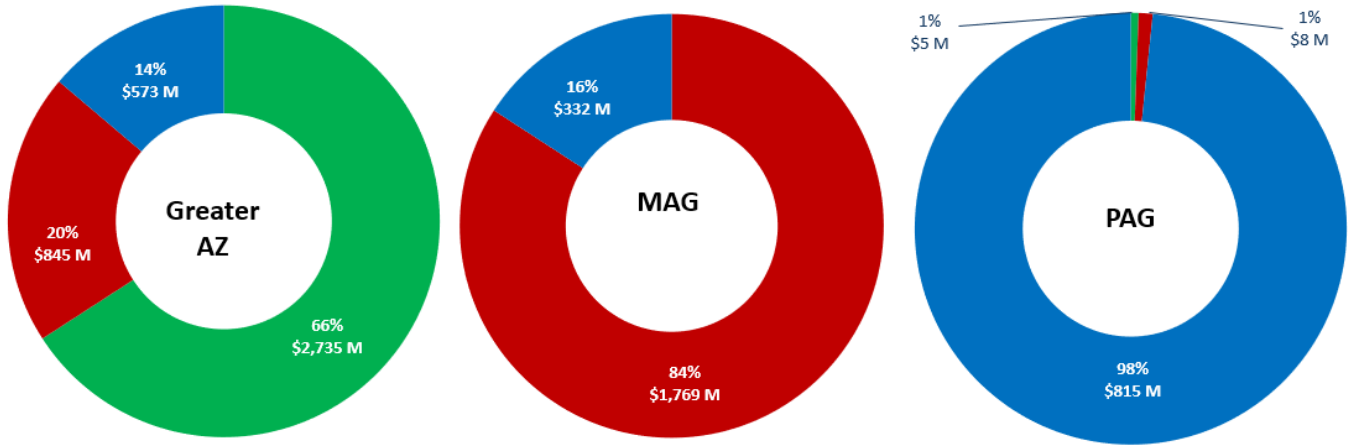**Figure 9: 2024-2028 Five-Year Program Investment Choice**

**Figure 10: 2024-2028 Five-Year Program Investment Distribution**

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4   Public Input on Investments

Public input during the development of the 2050 LRTP was obtained through questionnaires, surveys, public comments, and in-person and virtual public meetings. The greatest magnitude of feedback was obtained through an online survey conducted between October 24th, 2022, and January 4th, 2023. This survey garnered 7,862 responses from residents throughout Arizona and involved three activities: a vision and goals priority ranking, an investment category ranking, and a budget allocation exercise.

The budget allocation exercise required respondents to prioritize a limited investment to accomplish their own goals and vision. Each participant was given 10 "coins" to distribute across the categories of preservation, expansion, modernization, innovation, and accessibility. Preservation, expansion, and modernization were defined similarly to the LRTP investment categories while innovation was defined as technology-based infrastructure (such as EV and autonomous vehicle infrastructure) and accessibility was defined as the ability of all road-users to safely participate in the statewide transportation system, including people with disabilities, pedestrians, and cyclists.

Through this process, the total distribution of "coins" resulted in the following rankings as shown in **Figure 11**: preservation (31%), expansion (24%), modernization (19%), innovation (14%), and accessibility (12%). These results indicate that the public's top three investment categories align with the prior WMYA 2040 investment choices – preservation, modernization, and expansion.

Figure 11: Public Input on Investment Choices

Legend:
- Preservation
- Modernization
- Expansion
- Accesibility
- Innovation

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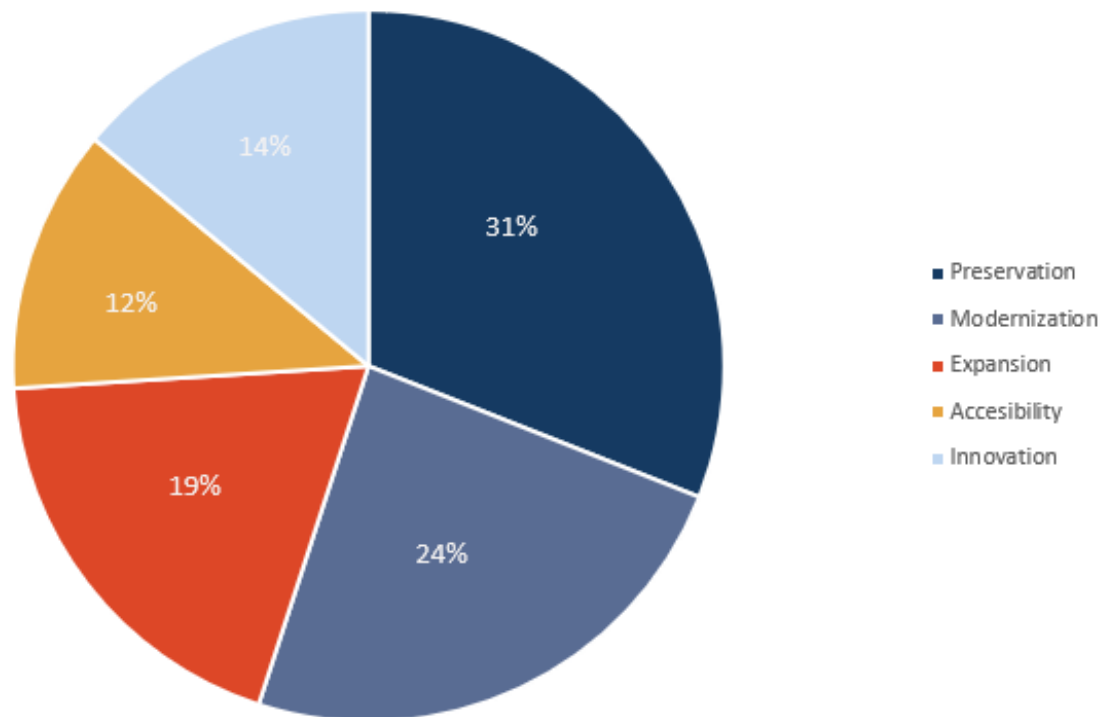
The ADOT 2050 LRTP also sought public input through the in-person and virtual public meetings held between February 28, 2023, and March 31, 2023. People were able to comment during this time through oral comments in the public meetings, comment forms provided through the website, or by email. A total of 593 people attended these public meetings, with 521 of these attending the virtual meetings, and the public submitted 391 comments during the period. Error! Reference source not found. provides a summary of common themes presented by the comments.

Table 3: Public Meeting Summary

| Area of Interest	Comment Theme
Vision and Goals	• Promote bicycle infrastructure and facilities • Expand public transit • Increase modernization and safety measures
Anticipated Needs	• Fix or maintain roads in poor condition • Promote bicycle infrastructure and facilities • Expand public transit, including urban high-speed rail
Anticipated Revenue	• Extend the transportation tax to help fund projects • Prioritize active projects or expedite current projects • Expand active roads in rural parts of the state
Funding Priorities	• Prioritize active projects or expediting current projects • Promote mobility, accessible and reliable transportation • Promote bicycle infrastructure and facilities
Other	• Prioritize active projects or expedite current projects • Increase safety measures for highways • Expand public transit, including urban high-speed rail

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5 Investment Alternatives

5.1 Scenario Planning

The choice of future investments involves uncertainty in needs, revenues, and programming allocations. To evaluate various scenarios, a matrix was developed that considered the range of potential investment amounts as well as shifts in investment choice. **Figure 12**Error! Reference source not found. shows the four scenarios developed – Preserve and Upgrade, Widen and Expand, Repair and Protect, and Extend and Patch. The scenarios on the top half of the matrix represent an increased level of funding associated with a higher revenue forecast and the pursuit of additional investment opportunities. The scenarios in the bottom half of the matrix represent lower funding levels and a decreased amount available for spending on the SHS. The scenarios on the left represent a higher investment on system preservation while the scenarios on the right prioritize greater investment in expansion and modernization. For each scenario, high level trends associated with system performance were developed for consideration.

Figure 12: ADOT Workshop Scenarios
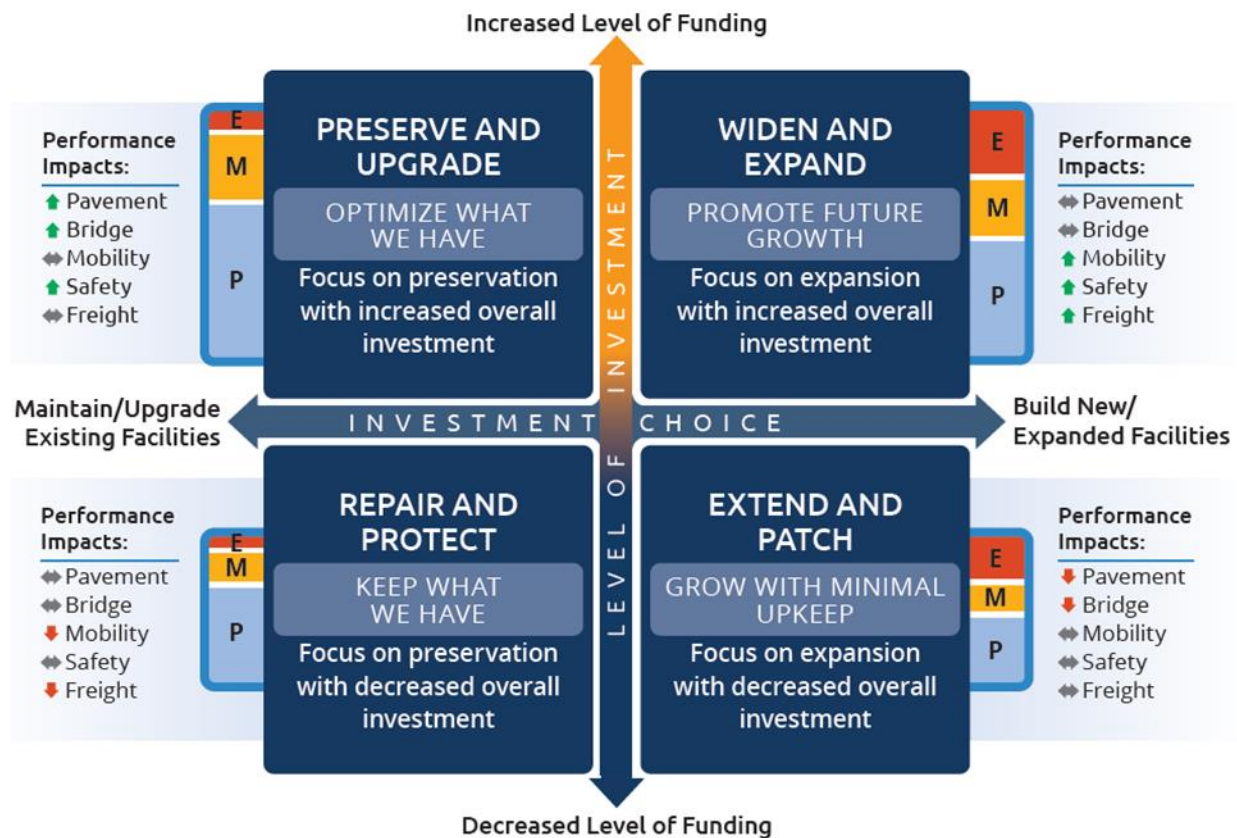
5.1.1   Scenario Selection

A workshop was held with ADOT leadership to discuss the scenarios, including the probability of occurrence, performance impacts, public acceptance, and risk. Based on feedback from ADOT, the scenarios were ranked in order of preference.

Preferred Scenario

- The Preserve and Upgrade Scenario was identified as the preferred scenario. This scenario assumes a higher level of funding and prioritizes preservation of the system.

Secondary Scenarios

- The Repair and Protect Scenario was identified as a feasible but not top scenario. It includes a lower level of funding with a focus on preservation of the system.

- The Widen and Expand Scenario was identified as a feasible but not top scenario. This scenario assumes the higher level of funding with an increased focus on system expansion.

Least Preferred Scenario

- The Extend and Patch Scenario was identified as the least preferred scenario. The scenario assumes a lower funding level with an increased focus on system expansion.

Feedback during the workshop confirmed the agency's desire to continue investments toward existing infrastructure to prevent assets from further degradation. The top two preferred scenarios minimize investments toward expansion in favor of preservation and modernization.

5.2   Investment Choices

To evaluate the impact of limited revenue against the varied needs, several investment choices were developed that reflect the current Five-Year Program, public input, and agency scenario planning preferences. Each investment choice provides specific percentages within the three investment categories – Preservation, Modernization, and Expansion. It should be noted that the focus of the investment choices is on ADOT Infrastructure as the ADOT Stewardship category has little flexibility (most programs are directly funded and not guaranteed to be expended on ADOT infrastructure). In addition, as MAG and PAG funding is limited to the respective urban areas, the investment choices apply only to the $29.7 B available for Greater Arizona over a 25-year period (average of $1.2 B annually).

Investment choices included:

0% Expansion: This choice represents a preservation-heavy approach where most revenue flexibility is applied to Preservation followed by Modernization with no investments in Expansion outside the MAG and PAG regions. This results in $25.5 B in Preservation and $4.2 B in Modernization.

7% Expansion: This choice represents a 5% expenditure on Expansion outside MAG and PAG region after the current Five-Year Program, resulting in an average 7% expenditure on Expansion. The remaining revenues are split between Preservation and Modernization to address approximately the same percentage of projected need in each category. This results in $23.0 B in Preservation, $4.6 B in Modernization, and $2.1 B in Expansion.

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11% Expansion: This choice represents a 10% expenditure on Expansion outside MAG and PAG region after the current Five-Year Program, resulting in an average 11% expenditure on Expansion. The remaining revenues are split between Preservation and Modernization to address approximately the same percentage of projected need in each category. This results in $21.8 B in Preservation, $4.6 B in Modernization, and $3.3 B in Expansion.

Resulting average annual expenditures for the three investment choices are shown in **Figure 13**.

Figure 13: Average Annual Expenditures for Investment Choices
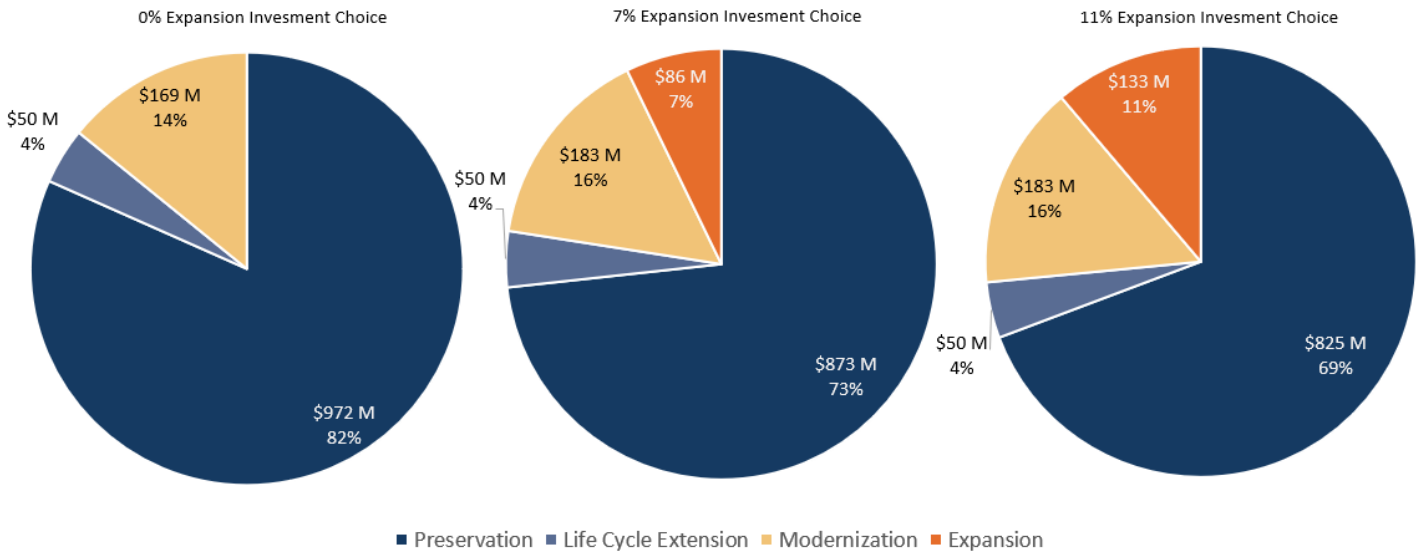
5.2.1   Life Extension Program

ADOT has included a new program within the Preservation category called Life Extension (LE) Program. While this is a preservation effort, it has a specific approach and programming which requires a dedicated $50 M per year as reflected in **Figure 13**. Life extension projects are segments of pavement that are not good candidates for typical minor surface treatments (i.e., chip seal and micro surfacing) but also not poor enough in condition to qualify for a full rehabilitation. As the current rate of pavement rehabilitation project completion is around 2% of lane miles per year, the LE program was developed to fill the large gap between surface treatment needs and available funding. The LE program supports the regular maintenance of pavement on all lane miles on a consistent basis with a lower development and construction cost than a full rehabilitation of the pavement.

A LE project will return the pavement driving surface to a state of good repair by preserving as much of the existing pavement as possible, identifying and quantifying localized pavement distress and spot failures, and by placing a new "heavy" surface treatment on everything. All existing pavement in Good and Fair condition would remain in place even though some of this pavement could present minor cracking, rutting and IRI issues.

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6   Performance Evaluation

The selection of future investment choices should consider the agency's performance management goals. A performance evaluation was undertaken to determine the impacts that different investment choices had to system pavement, bridge, mobility, safety, and freight conditions. Performance curves provide a technical-based approach to determine how future scenarios align with the goals of the agency and the priorities of the public.

6.1   Pavement and Bridge Performance Curves

Pavement and bridge performance is tracked by ADOT through the TAMP effort which includes annual assessments as well as predictive condition models. These data provide a solid basis for developing performance curves for each Preservation investment.

Pavement condition is measured and reported in three categories: poor, fair, and good condition. At the timing of this report, the current assessment of ADOT pavement was 9.8% poor, 58.4% fair, and 31.7% good. **Figure 14** illustrates the percent of the ADOT roadway network exhibiting each pavement condition (poor, fair, good) averaged over the life of the LRTP based on various investment levels within the pavement model. As shown, the lower investment ranges (below $30 B) result in significantly higher percentage of the network in poor condition compared to existing. The percent network in good condition increases as investment increases and exceeds the current condition once the investment exceeds $32 B. The estimated pavement investments in the investment choices range from $15 B to $25 B.

Figure 14: Pavement Condition by Investment Amount
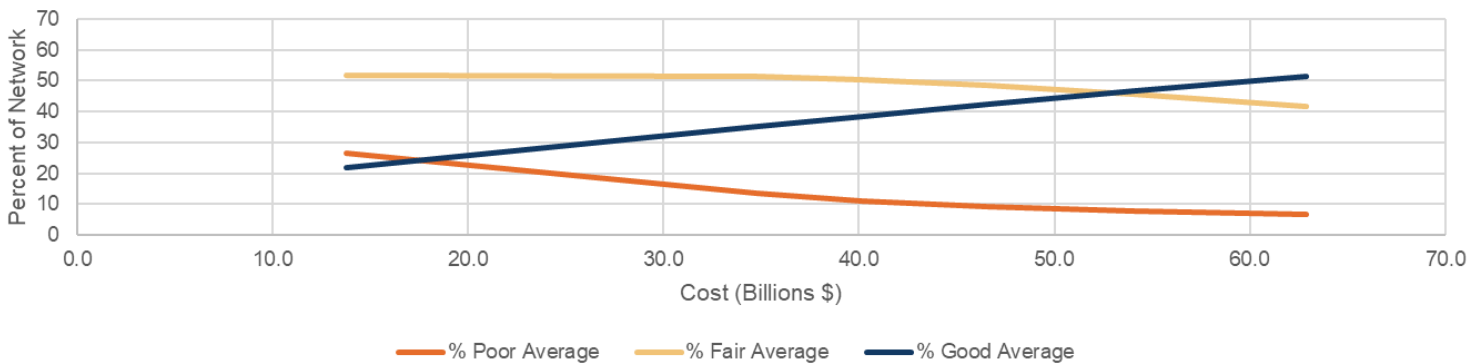
Bridge condition is measured and reported in three categories: poor, fair, and good condition. At the timing of this report, the current assessment of ADOT bridges is 1% poor, 36.1% fair, and 62.9% good. **Figure 15** illustrates the percent of the ADOT bridge network exhibiting each bridge condition (poor, fair, good) averaged over the life of the LRTP based on various investment levels within the bridge model. As shown, the lower investment ranges (below $8 B) result in significantly higher percentage of the network in fair condition compared to existing. The percent network in good condition increases as investment increases though the changes taper once the investment exceeds $10 B. The magnitude of change in poor condition is not significant due to the age of the bridges and the longer lifecycle. The estimated bridge investments in the investment choices range from $3.5 B to $4.7 B.

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Figure 15: Bridge Condition by Investment Amount
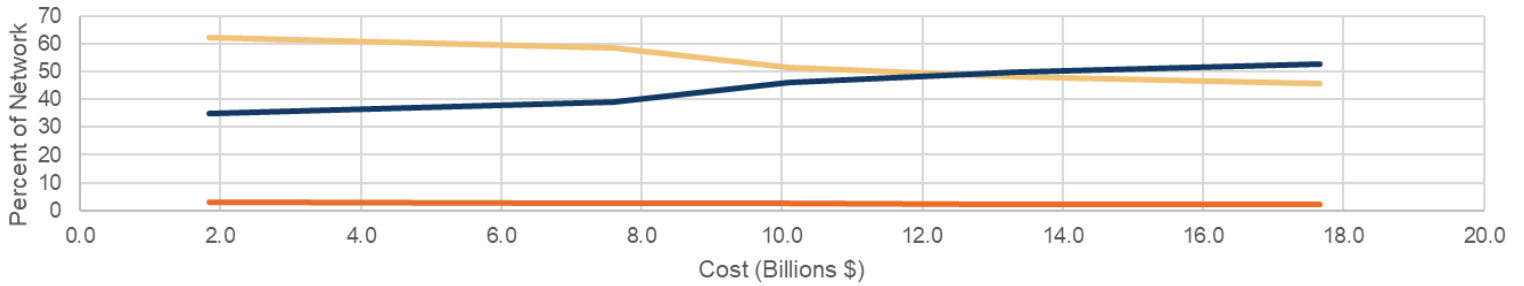
6.2   Safety, Mobility, and Freight Performance Curve

Investments toward safety, mobility, and freight are typically associated with Modernization and Expansion. While Preservation activities can improve safety and freight depending on the prior pavement condition, the performance curves for safety, mobility, and freight were developed with a focus on modernizing and expanding the system.

6.2.1   Greater Arizona

Performance curves for areas outside the urban MAG and PAG regions were developed using data contained in the Corridor Profile Studies that ADOT has completed on most major routes. The total needs were identified and summed within the safety, mobility, and freight categories and relational curves were developed based on the percent reduction of need accomplished for various investment levels. **Figure 16** shows the individual curves for investments in safety, mobility, and freight in Greater Arizona while **Figure 17** shows the aggregated curve across all the three investments. The investment analysis was capped at $6.7 B as the curve shows that benefits start to decrease beyond that level of investment.

Figure 16: Safety, Mobility, and Freight Condition by Investment Amount
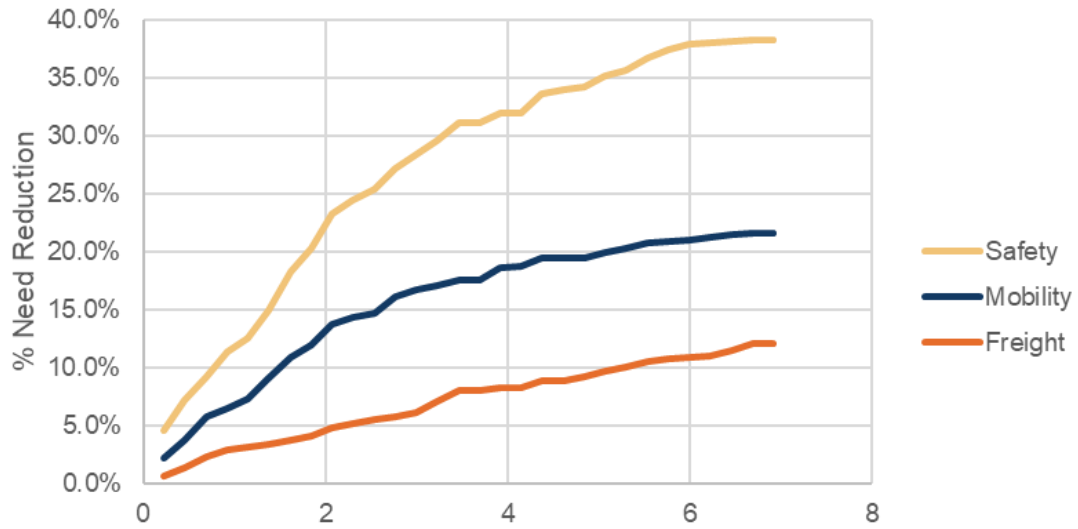
Figure 17: Aggregated Condition by Investment Amount

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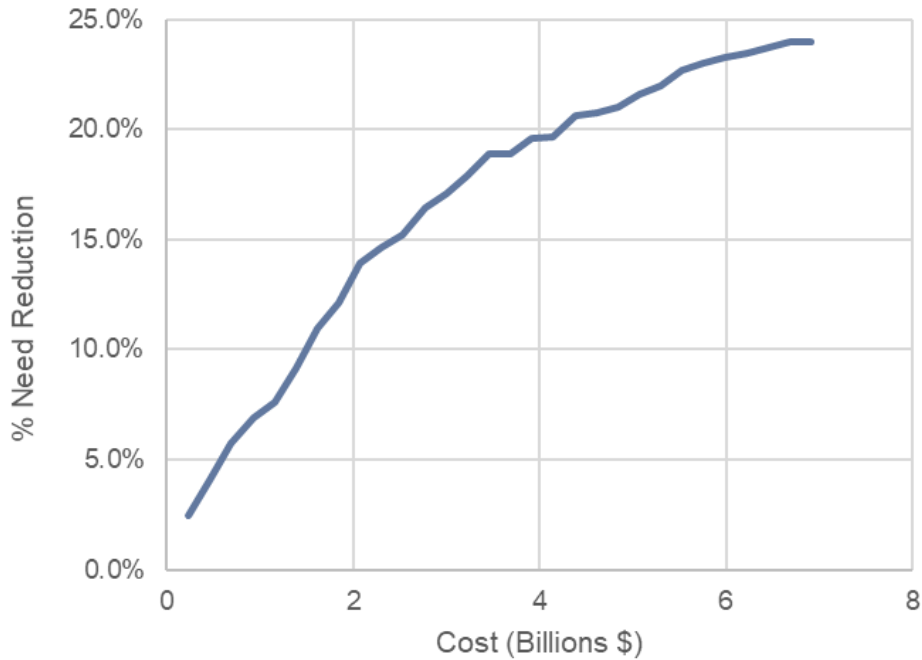
6.2.2   MAG and PAG Regions

Performance curves for the urban MAG and PAG regions were developed using data developed by the respective MPOs as part of their funding programs. The two approaches differ slightly. MAG compares expenditures to % congested lane miles and PAG compares expenditures to VMT under congestion. **Figure 19** and **Figure 18** show these MAG and PAG performance curves.

Figure 19: MAG Congestion Reduction with Safety, Mobility, and Freight Investment
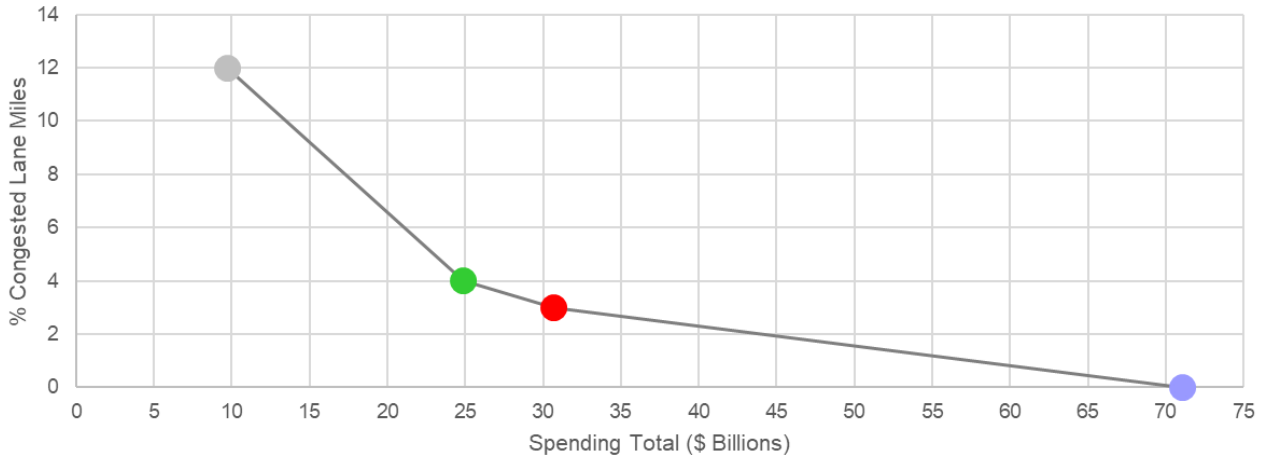
Figure 18: PAG Congestion Reduction with Safety, Mobility, and Freight Investment

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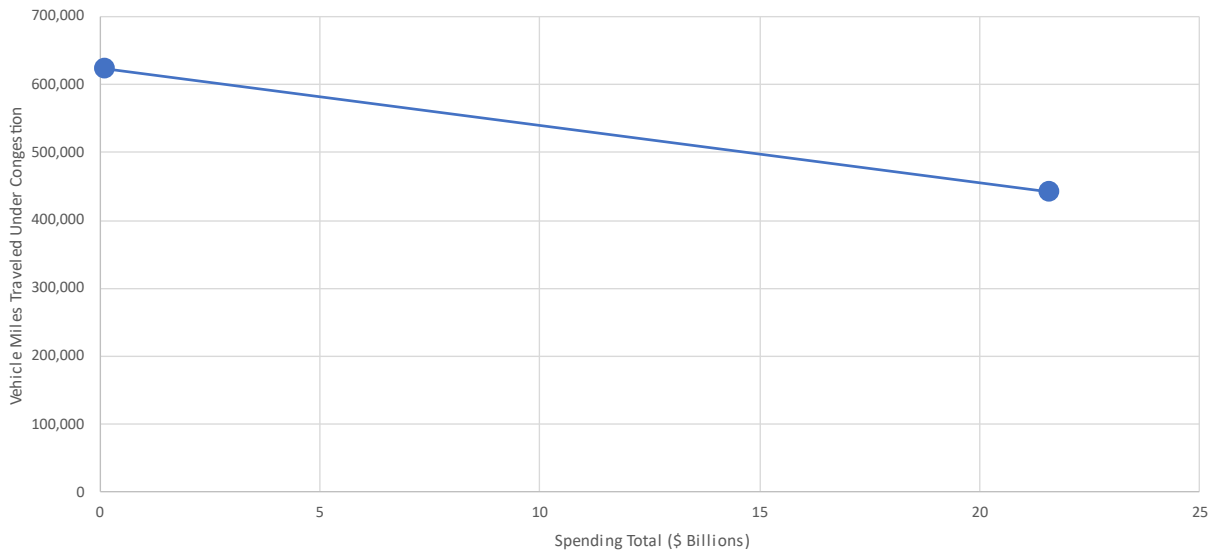
6.3   Investment Choice Performance Impacts

To determine the performance impacts of each investment choice, the available investments were compared to the performance curves to evaluate the performance in terms of pavement, bridge, mobility, safety, and freight.

6.3.1   Pavement Results

The pavement performance curves consist of three conditions (poor, fair, and good) for any given investment amount. To visually display and compare pavement results across the investment choices, a single value was developed to represent pavement condition utilizing a weighted average. Percent network in good condition was weighted 75, percent fair weighted 50, and percent poor weighted 25. All investment choice results are shown in **Figure 20** with the 0% Expansion investment resulting in the highest pavement condition due to the higher investment in preservation. For reference, the existing pavement condition results in a baseline score of 55.4 which is significantly higher than any of the scenarios.

Figure 20: Pavement Results by Investment Choice

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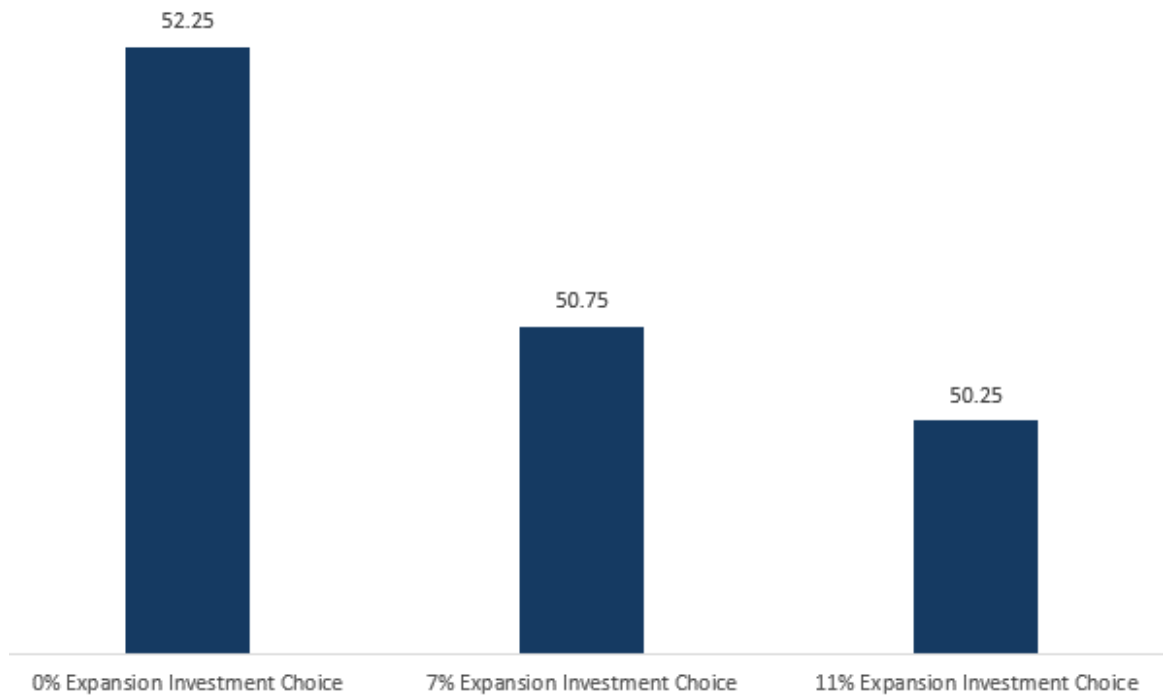
6.3.2 Bridge Results

The bridge performance curves consist of three conditions (poor, fair, and good) for any given investment amount. To visually display and compare bridge results across the investment choices, a single value was developed to represent bridge condition utilizing a weighted average. Percent network in good condition was weighted 75, percent fair weighted 50, and percent poor weighted 25. All investment choice results are shown in **Figure 21** with the 0% Expansion Investment resulting in the highest bridge condition due to the higher investment in preservation. For reference, the existing bridge condition results in a baseline score of 65.5 which is significantly higher than any of the scenarios.

Figure 21: Bridge Results by Investment Choice

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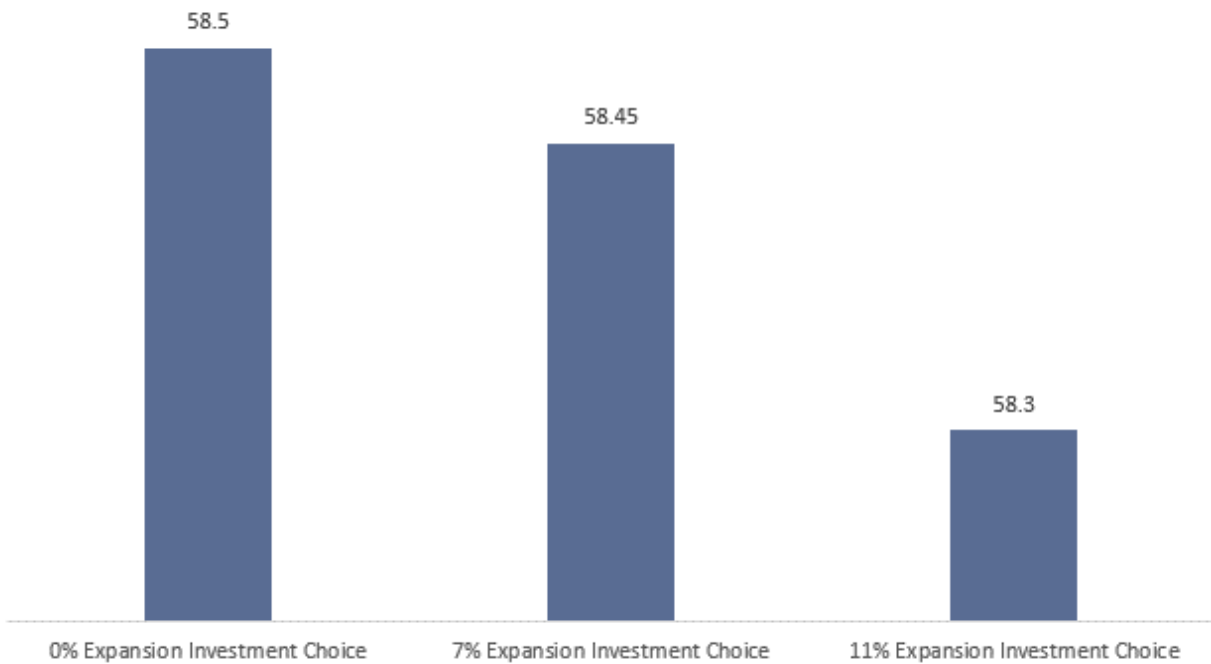
6.3.3 Safety and Freight Results

Safety and freight improvements are major objectives of modernization investments. Evaluation of the safety and freight impacts from each investment choice rely on the percent of need reduced based on the investment amounts. **Figure 22** shows the aggregated percentage of needs reduced with each investment scenario. The 7% Expansion Investment and 11% Expansion Investment result in a slightly higher result due to the higher investment in modernization.

Figure 22: Safety and Freight Results by Investment Choice

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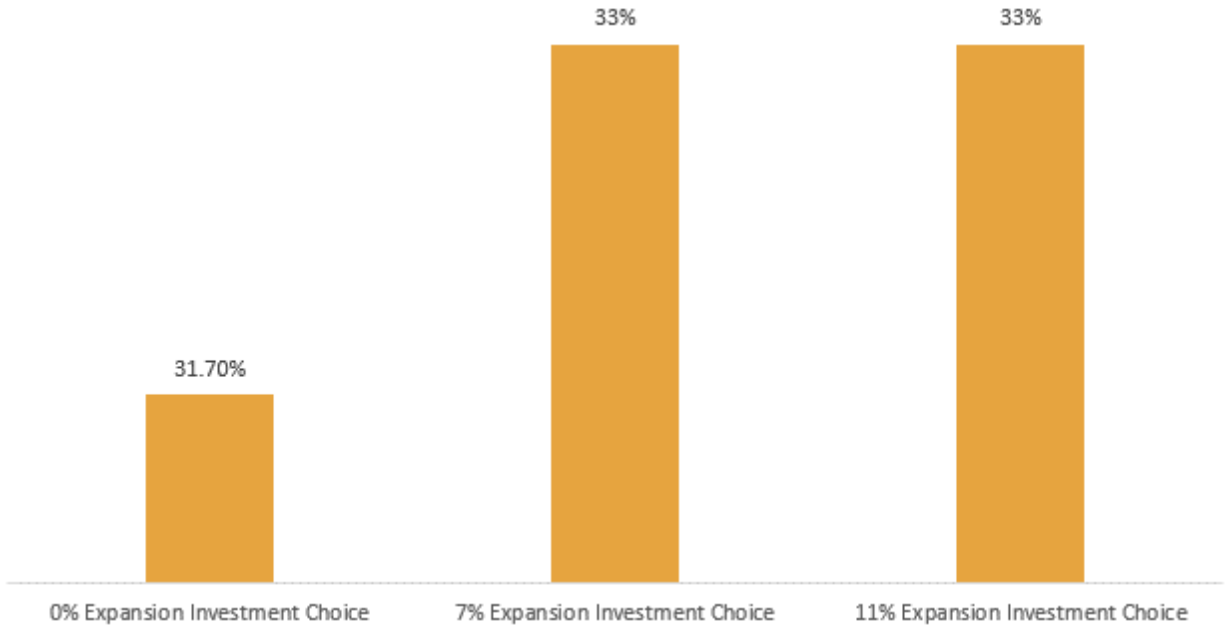
6.3.4 Mobility Results

Mobility improvements are the major objective of expansion investments. Evaluation of the mobility impacts from each investment choice rely on the percent of need reduced based on the investment amounts. **Figure 23** shows the percentage of needs reduced with each investment scenario. The 7% Expansion Investment and 11% Expansion Investment result in higher results due to the higher investment in expansion.

Figure 23: Mobility Results by Investment Choice

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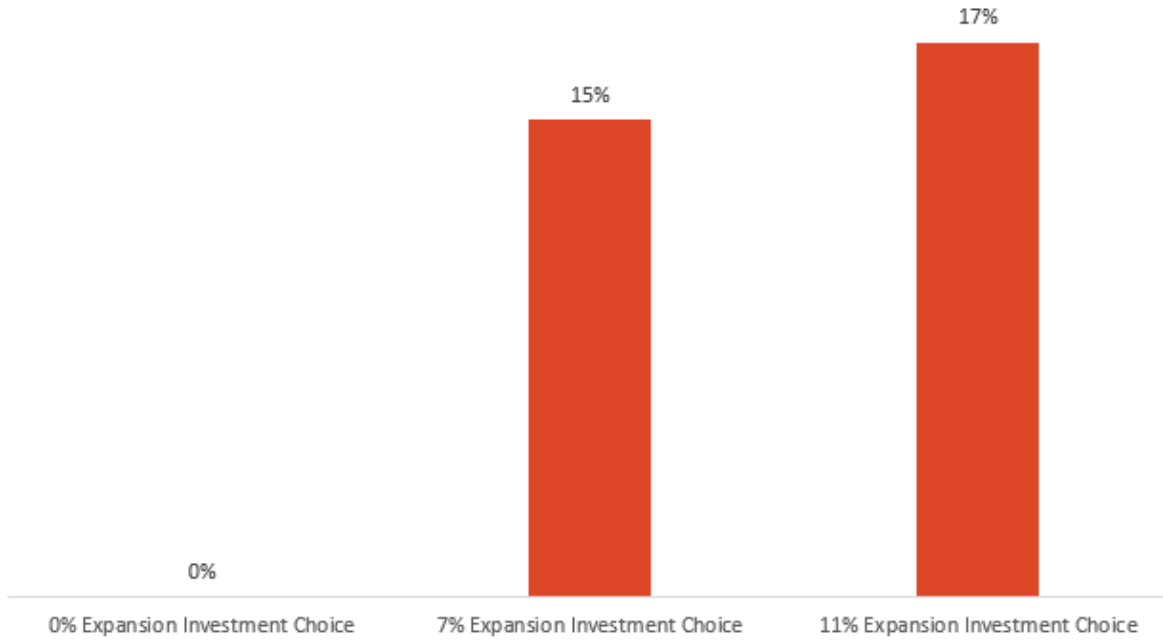
6.4   Summary

Over the next 25 years, the LRTP identifies $29.7 billion available for ADOT Infrastructure funding for Greater Arizona. The investment choices analyzed provide a range in investments between preservation, modernization, and expansion with each providing independent results in pavement, bridge, safety, freight, and mobility. **Figure 24** summarizes the corresponding system performance impacts to the ADOT Transportation System for each investment choice.

Figure 24: Aggregated Impacts by Investment Choice

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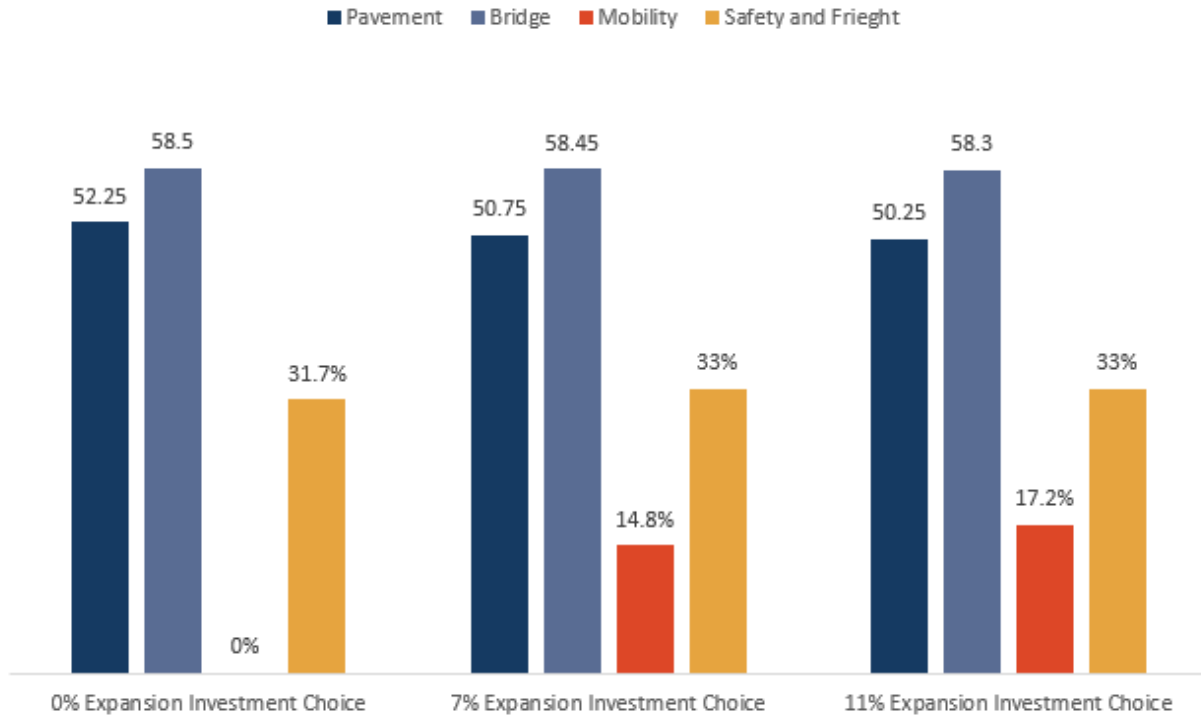
7 Recommended Investment Choice

The recommendation of a preferred investment choice was based on all input and analyses contained herein with the recognition that preservation of the existing system is ADOT's highest priority. However, there is a need to continue to support economic growth outside the MAG and PAG regions and the statewide public input supports additional investments in targeted expansion. The "7% Expansion Investment Choice" provides a balanced approach to the future LRTP implementation. This recommendation includes a statewide investment of 40% ($24.6 B) preservation, 24% ($15 B) modernization, and 36% ($22.6 B) expansion. Outside of MAG and PAG, the investment is focused more on preservation with 78% ($23 B) preservation, 15% ($4.2 B) modernization, and 7% ($2.1 B) expansion. Within the urban MAG and PAG areas, greater amounts of local revenue are spent on expansion. The Recommended Investment Choice is shown in **Figure 25**.

Figure 25: Recommended Investment Choice
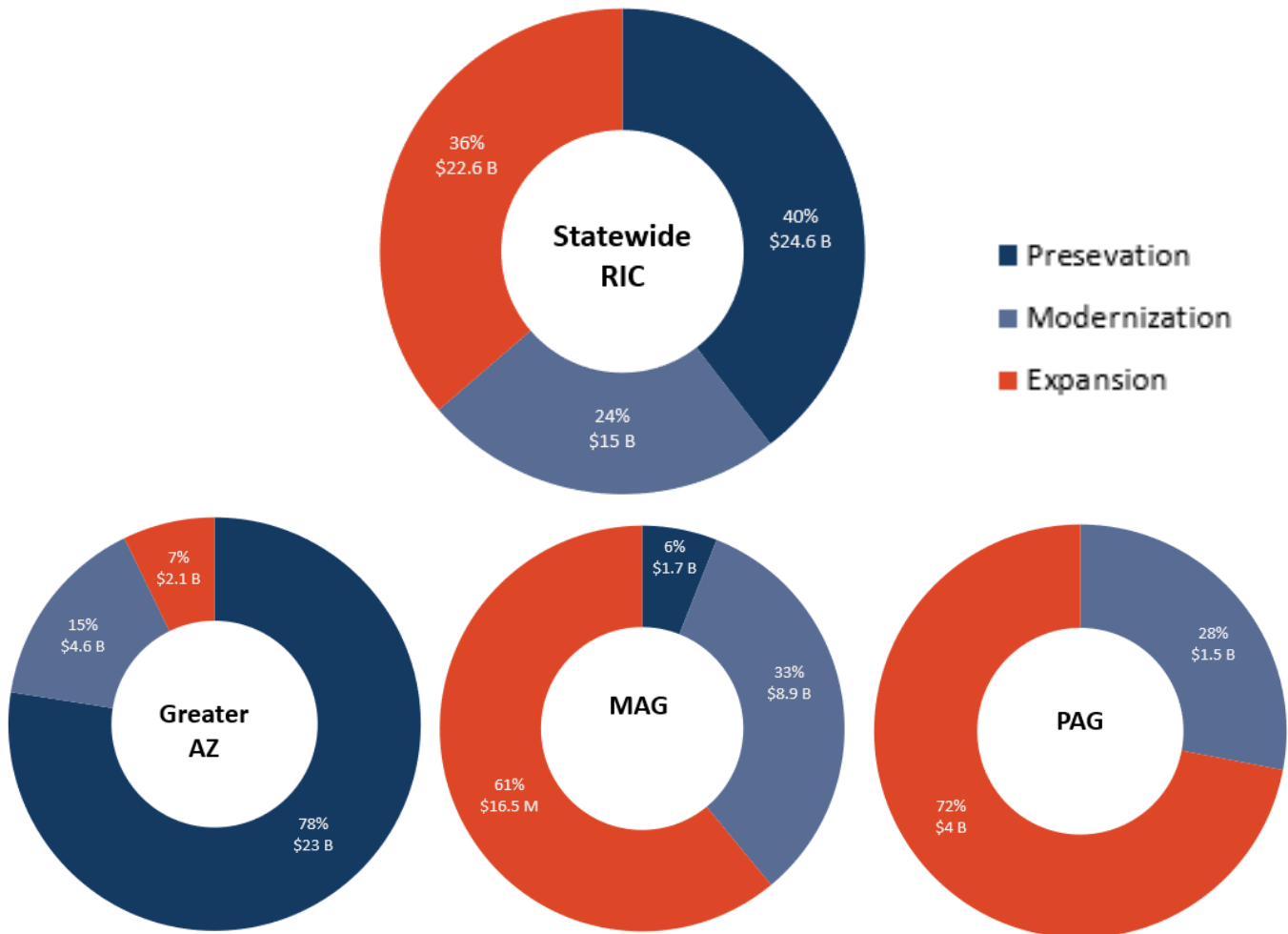
MAG and PAG receive 37% and 13% of discretionary funds respectively, based on the Casa Grande resolves. However, ADOT takes a portion of this funding for preservation projects, which gets distributed into the total Greater Arizona amounts.

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Resilience-oriented investments that qualify under the PROTECT Program have not been specifically identified within each of the investment choice categories. However, there will likely be many components of infrastructure investments within each of these categories, particularly preservation and modernization, that will be resilience funding eligible. The Resilience Improvement Plan (RIP) that ADOT is currently developing will work to identify priority investments for the use of such funding to fill vulnerability gaps identified in the RIP process.

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8   LRTP Strategies

Through the update of the 2050 Arizona Long Range Transportation Plan (LRTP), development of measurable and realistic strategies to achieve the goals and objectives set forth in the plan began in the development of the Vision and Goals document and were assessed in the Multimodal Needs Analysis. This document continues the long-range planning process of developing the recommended policy-based strategies for Arizona's LRTP.

8.1   Integrating Existing Plans

The 2050 LRTP acknowledges the interconnected series of existing plans and other work efforts that have contributed to the development of our current goals and objectives. These existing work efforts serve as the foundation of the update of the LTRP and, consequently, the development of the strategies recommended in this document. It is also recognized that the planning process is cyclical in nature and State statute and Federal guidance dictates how often certain transportation plans and programs should be updated. As shown in Figure 26, three main phases compose the LRTP development cycle:

1. Creation of the Long-Range Transportation Plan. This includes development of vision and goals, performance measurements, identification of needs, and strategies to implement.
2. Implementation, tracking, and measurement are critical components of the development cycle. This phase ensures that the plan is being actualized and determines if it is on track to meet goals.
3. Informed by the outcomes of step two, update/revise and approve, technical plans and studies that intentionally focus on furthering the vision, goals, objectives and strategies of the LRTP.

Figure 26: LRTP 5-Year Development Cycle

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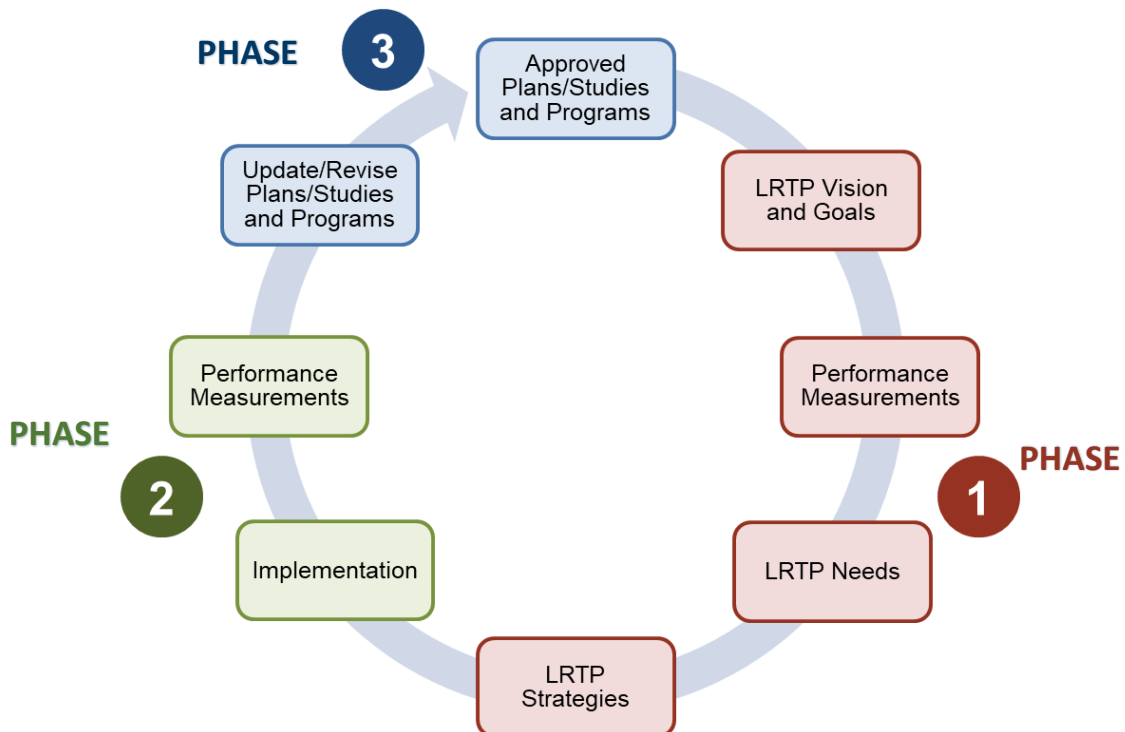
There are twenty-five existing ADOT/statewide plans and studies, supported by more than twelve programs, research, and guidebooks that shape Arizona's State Transportation System. These efforts respond to federal requirements, the public's vision, and ensure ADOT's mission: *We provide highway infrastructure and transportation services* is accomplished. **Figure 27** highlights the various ADOT plans that shaped the LRTP's work from initial goals and objectives to the recommended strategies.

Figure 27: Approved Plan/Studies & Program Timeline

2015
- Climbing & Passing Lane Prioritization Study
- Passenger Rail Study: Tucson to Phx

2017
- Pedestrian Safety Action Plan

2019
- AZ Strategic Traffic Safety Plan
- Truck Parking Study

2022
- State Highway – Rail Grade Crossing Action Plan
- State Rail Plan
- State Freight Plan

2013
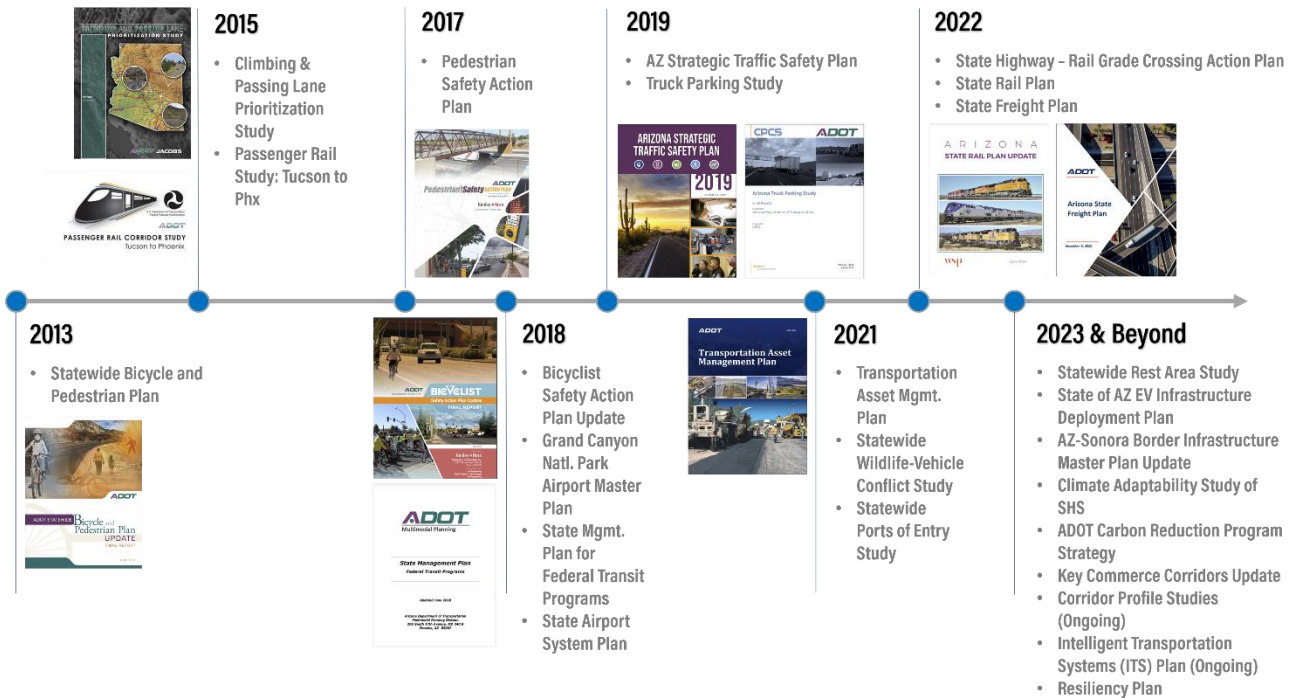- Statewide Bicycle and Pedestrian Plan

2018
- Bicyclist Safety Action Plan Update
- Grand Canyon Natl. Park Airport Master Plan
- State Mgmt. Plan for Federal Transit Programs
- State Airport System Plan

2021
- Transportation Asset Mgmt. Plan
- Statewide Wildlife-Vehicle Conflict Study
- Statewide Ports of Entry Study

2023 & Beyond
- Statewide Rest Area Study
- State of AZ EV Infrastructure Deployment Plan
- AZ-Sonora Border Infrastructure Master Plan Update
- Climate Adaptability Study of SHS
- ADOT Carbon Reduction Program Strategy
- Key Commerce Corridors Update
- Corridor Profile Studies (Ongoing)
- Intelligent Transportation Systems (ITS) Plan (Ongoing)
- Resiliency Plan

The LRTP's vision, goals and objectives integrated many of these plans and programs intentions. These goals and objectives helped guide the LRTP's research, analysis, and public engagement efforts, which lead to the development of the strategies that will influence project development and program implementation, that can be tracked through performance-based metrics.

8.2 Identification of LRTP Vision, Goals, & Objectives

Synthesis and understanding of these plans led to the creation of the Vision and Goals shown in **Figure 28**. Seven overarching goals interrelate to support the ***Connecting Arizona. Building Better Lives Through Better Transportation*** vision.

Additionally, twenty-seven specific objectives were identified supporting the seven goals. These goals complete the planning framework to understand and assess the state's transportation network to meet its goals.

Critical to the development of strategies was the identification of the five State Highway Needs Categories: Pavement, Bridge, Mobility, Safety, and Freight. These transportation areas fall directly in ADOT ownership and/or responsibility.

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Outside of ADOT's jurisdiction, and also a secondary focus of the LRTP is a set of programs known as ADOT stewardship that include: public transit funding, aviation infrastructure funding, passenger rail funding, non-NHS Bridge inspections and funding, statewide planning funding, HSIP/CMAQ/and TA Funding, EV charging and CRP funding, and public at-grad highway-rail crossings safety funding. Additionally, there is a third component of the transportation system, known in the LRTP as the Complementary Transportation Systems: local transportation infrastructure, public transit systems, private transit systems, and private rail facilities, public and private airports, and federal ports of entry. Both components have system needs but were not included in strategy

Figure 28: LRTP Vision & Goals

development. For information of the Needs Identification Process and for thorough explanation and analysis of each need, see the 2050 LRTP Multimodal Needs Analysis.

8.3   Strategy Development

Most of the existing plans and work efforts developed their own set of strategies to accomplish their individual goals specific to their areas of focus. Recognizing the work already completed, and the comprehensive nature of the strategies in previous plans, many of the final LRTP strategies include the recommendations to continue to implement, refine, and update these plans rather than duplicate strategies from these programs. This recognizes the interconnectedness of individual plans which support the transportation system.

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Goal 1: Preserve and Maintain the System

To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services.

This goal links directly to the LRTP's need to Preserve and Maintain the System which aligns with the Transportation Asset Management Plan (TAMP) and the new Resiliency Plan.

Table 4: Goal 1 Strategies

Objectives	Strategies	Applicability				
		State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Achieve and maintain a state of good repair of transportation assets within available resources	*Maintain a state of good repair of transportation infrastructure assets, following the investment strategies in the Transportation Asset Management Plan.*	D	D	I	I	I
Cost-effectively maintain, operate, and upgrade assets to maximize useful life		D	D	I	I	I
Incorporate resiliency, adaptability, and redundancy in the transportation network, systems management, and operation	*Incorporate the strategies, policies, and procedures outlined and recommended in the upcoming ADOT Resiliency Plan*	I	I	I	I	I

D = Directly supports the needs of this transportation element
I = Indirectly supports the needs of this transportation element

Goal 2: Enhance Safety and Security

To provide for and improve the safety and security of transportation customers and the transportation system.

This goal links directly to existing work efforts including the Strategic Highway Safety Plan, Bicyclist Safety Action Plan, Pedestrian Safety Action Plan, Rail Grade Crossing Action Plan, Statewide Rest Area Study, Truck Parking Study, Climbing and Passing Lane Prioritization Study, and Arizona Statewide Wildlife-Vehicle Conflict Study

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Table 5: Goal 2 Strategies

Objectives	Strategies	Applicability				
		State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Incorporate resiliency, adaptability, and redundancy in the transportation network, systems management, and operation	*Reduce the number of lives lost by xx% per year on AZ transportation network*			**I**	**D**	**I**
Reduce the number of lives lost and injuries sustained on Arizona's transportation network, striving for zero	*Continue implementation, connect, and monitor strategies identified in the Strategic Highway Safety Plan, Bicyclist Safety Action Plan, Pedestrian Safety Action Plan, AZ State Highway - Rail Grade Crossing Action Plan, Statewide Rest Area Study, Truck Parking Study, Climbing and Passing Lane Prioritization Study, and Arizona Statewide Wildlife-Vehicle Conflict Study, to reduce the number of lives lost and injuries, striving for zero.*	**I**	**I**	**I**	**I**	**I**
	Identify and prioritize intersections and segments of state and local roadways (including tribal) with the highest number of pedestrian crashes that can be addressed through infrastructure improvements. Conduct RSAs at the locations to identify appropriate countermeasures. Develop and implement projects at the locations.			**I**	**D**	
	Support distracted driving education and awareness efforts, particularly of A.R.S. 28-014, with strong multiple-channel messaging and outreach to discourage distracted driving; may include an education video about A.R.S. 28-014. Consider collaborating with media Editorial Boards to provide information about the dangers of distracted driving, and the new distracted driving statute.			**I**	**D**	
	Rural Areas: Conduct diagnostic evaluations at high-risk railroad crossings, identify locations for unconventional highway-rail crossing countermeasures, and address rural railroad crossing needs.	**I**	**I**	**I**	**D**	**I**

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Foster a community and workplace culture of safety first	*Incorporate regularly scheduled safety training with current employees, emphasize safety in new hire / orientation materials, and consider establishing safety messaging and moments in internal ADOT communication materials and meeting agendas.*				**D**	
Prepare for and implement efficient coordinated response and recovery to emergency and disaster events	*Continue and expand traffic incident management (TIM) training for all agencies— transportation*			**I**	**D**	**I**

D = Directly supports the needs of this transportation element
I = Indirectly supports the needs of this transportation element

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Goal 3: Improve Mobility, Reliability, and Accessibility

Improve the predictable movement of goods and people throughout Arizona with expanded travel choice and application of state-of-the-practice system designs and technologies.

This goal links directly to existing work efforts including the Intelligent Transportation Systems (ITS) Master Plan, Transportation System Management and Operations (TSMO) Program, Travel Demand Management Toolbox, State Highway Safety Plan, and ADOT Resiliency Plan.

Table 6: Goal 3 Strategies

Objectives	Strategies	Applicability				
		State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Advance access and connectivity between modes	Using the Intelligent Transportation Systems (ITS) Master Plan and Transportation System Management and Operations (TSMO) program, incorporate adaptability, and redundancy in the transportation network, systems management, and operations.			D	I	I
Support accessible and equitable modal options for the movement of people	Re-evaluate, update the ADOT Complete Transportation Guidebook and Americans with Disabilities Act: FINAL Transition Plan for Public Rights-of-Way to align with current Federal requirements, and integrate and implement into ADOT project development process. Complete and implement the Arizona Active Transportation Plan and consider creating a state transit plan to support non-highway system needs throughout Arizona.			D	I	
Mitigate travel delays and alleviate congestion to provide predictable, reliable travel times	Update the Travel Demand Management - A Toolbox of Strategies to Reduce Single-Occupancy Vehicle Trips and Increase Alternate Mode Usage in Arizona (2012) and implement suggestions therein at the state level.	I	I	D	I	I

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Leverage technology, communications, and management strategies to maximize safety and operational efficiency of existing systems and keep up with of major travel trends	*Continue to implement the strategies and recommendations outlined in the State highway Safety Plan including the collection of data on pedestrian volumes to help assess safety risk, and the creation of a statewide pedestrian data repository/online database. This may include before/ after pedestrian data at project improvement locations.*			**D**	**I**	**I**
Identify and close redundancy gaps in the network to support continued mobility in the event of disasters or other disruptions	*Incorporate the strategies, policies, and procedures outlined and recommended in the upcoming ADOT Resiliency Plan*			**D**	**I**	

D = Directly supports the needs of this transportation element
I = Indirectly supports the needs of this transportation element

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Goal 4: Promote Environmental and Health Stewardship

To enhance Arizona's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment while improving the quality, resilience, effectiveness, and efficiency of the transportation system.

This goal links directly to existing work efforts including the Strategic Highway Safety Plan, ADOT Complete Transportation Guidebook, Arizona Public Involvement Plan, EV Infrastructure Deployment Plan, ADOT Resiliency Plan, and Pedestrian Safety Action Plan.

Table 7: Goal 4 Strategies

Objectives	Strategies	Applicability				
		State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Create opportunities for safe physical activity, equitable transportation choice, and community engagement	*Continue to implement and adopt the strategies and initiatives focused on pedestrian safety identified in the AZ Strategic Highway Safety Plan, ADOT Complete Transportation Guidebook, and the Pedestrian Safety Action Plan.*			**D**	**D**	
Support flexible and adaptable measures to the transportation system to accommodate anticipated climatic changes and potentially severe climatic events over time	*Incorporate the strategies, policies, and procedures outlined and recommended in the upcoming ADOT Resiliency Plan*			**D**	**D**	
Plan, develop, and maintain transportation facilities in a manner that protects the natural, historic, and cultural environment and avoids or minimizes adverse impacts	*Provide sufficient resources for ADOT's Environmental Planning Division to comprehensively assess and mitigate environmental impacts on all future ADOT Projects*	**I**	**I**	**I**	**I**	**I**
Pursue community-supportive transportation outcomes	*Continue to update and implement policies and procedures from the Arizona Public Involvement Plan to accurately and thoroughly understand the needs of each community a given project will impact.*	**I**	**I**	**I**	**I**	**I**
Strive for cleaner, more efficient, and sustainable energy sources for transportation operations and facilities	*Implement the recommendations from the Electric Vehicle Infrastructure Deployment Plan*	**I**	**I**	**I**	**I**	**I**

D = Directly supports the needs of this transportation element
I = Indirectly supports the needs of this transportation element

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Goal 5: Support Equitable Access to the State Highway System

To support all Arizonans in equitable and convenient access to the statewide transportation network to facilitate access to jobs, education, healthcare, services, recreation, and other destinations.

This goal links directly to existing work efforts including Strategic Highway Safety Plan, ADOT Complete Transportation Guidebook, Arizona Public Involvement Plan, EV Infrastructure Deployment Plan, ADOT Resiliency Plan, and Pedestrian Safety Action Plan.

Table 8: Goal 5 Strategies

Objectives	Strategies	Applicability				
		State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Improve access and choices for all Arizona residents by supporting transportation system access to job opportunity and training, health care, food availability, and recreation	*Update and implement the Complete Transportation Guidebook into project development to identify transportation choices that provide mobility to connect communities and economic opportunity to maximize a limited set of resources, time, and money.*			**D**	**I**	
Support transportation system accessibility to underprivileged populations without damaging community culture or neighborhood integrity	*Through project development, ensure that the NEPA process is followed.*			**I**		
Identify & mitigate transportation burdens for low-income communities, communities of color, people with disabilities, and other disadvantaged groups	*Adopt the methodology from the Arizona Electric Vehicle Infrastructure Deployment Plan, to identify & mitigate transportation burdens of disadvantaged communities (DACs) associated for equitable implementation of the LRTP by assessing impacts aligned with the USDOT categories and the interim Justice40 guidance.*			**I**		

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Goal 6: Strengthen Partnerships

Develop and nurture partnerships that support coordination, integration, and preservation of ADOT's investment.

This goal links directly to existing work efforts including ADOT P3 Initiatives and various Tribal Long-Range Transportation Plans.

Table 9: Goal 6 Strategies

Objectives	Strategies	State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Look for opportunities to partner with the private sector to stretch public funds through public-private partnerships or coordinated program development	*Evaluate, modify, and continue ADOT's partnership efforts that include: P3 Initiatives.*	I	I	I	I	I
Work with appropriate specialists/experts during project development, design, and construction to optimize safety, community health, and climate responsiveness	*Incorporate the recommendations and policies presented in the various tribal long range transportation plans to strengthen the ties between these nations/tribes and ADOT, and to optimize the delivery of future projects on tribal lands*	I	I	I	I	I
Strengthen partnerships throughout the State to encourage and support existing and new opportunities as the demographic base expands	*Establish reoccurring meetings with COGs, MPOs, cities/towns to ensure coordination on major community, population, and residential & commercial land use changes as they relate to the State transportation system.*	I	I	I	I	I

D = Directly supports the needs of this transportation element
I = Indirectly supports the needs of this transportation element
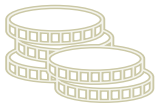
Goal 7: Support Economic Vitality

To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a diverse and prosperous economy.

This goal links directly to existing work efforts including various Tribal Long-Range Transportation Plans, Key Commerce Corridor Plan, AZ State Freight Plan, and the Complete Transportation Guidebook.

Table 10: Goal 7 Strategies

Objectives	Strategies	State Highway Needs				
		Pavement	Bridge	Mobility	Safety	Freight
Pursue transportation asset and operational improvements that will expand access to economic opportunities, jobs, and core services	*Implement and update the infrastructure improvements identified in the AZ Key Commerce Corridor Report*	I	D			D
Improve transportation connectivity to established and emerging activity centers and tourist destinations	*Collaborate with AZ Office of Tourism to identify and promote travel, maintenance priorities, and overall connectivity to established and emerging activity centers and tourist destinations*	I	I	I		
Create and enlarge competitive advantage for Arizona supply chains through higher productivity and reliability in the state freight system, supporting economic growth, and strengthening economic resilience	*Continue to implement and enhance the strategies and improvements identified in the AZ State Freight Plan and continue coordination with the Arizona Commerce Authority*	I	I			D
Coordinate transportation systems with land use for efficient and sustainable use of resources	*Update and implement the Complete Transportation Guidebook into project development to identify transportation choices that provide mobility to connect communities and economic opportunity to maximize a limited set of resources, time, and money.*				I	

D = Directly supports the needs of this transportation element
I = Indirectly supports the needs of this transportation element