
Development Scenarios

◀ SUMMARY ▶

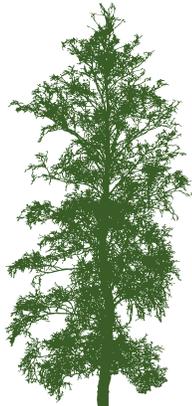


FLAGSTAFF
REGIONAL
PLAN 2012



FLAGSTAFF REGIONAL Plan 2012

OCTOBER 2011



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► Introduction

Arizona Growing Smarter statutes (A.R.S. 9-461.05) require updates to general and comprehensive plans a minimum of every 10 years. The Flagstaff Area Regional Plan 2012 will update the existing Flagstaff Area Regional Land Use and Transportation Plan (November 2001).

While the Regional Plan will meet A.R.S. requirements for all mandated plan elements, a goal of the City of Flagstaff (City), Coconino County, and the Flagstaff Metropolitan Planning Organization (FMPO) is to incorporate “livability principles” that are broadly supported by the community, including the integration of transportation, urban form, and economic development. The Regional Plan will lead to a sustainable land-use and development pattern, and a context-sensitive and efficient multimodal transportation system that supports economic development, improved safety, and accessibility.

The Regional Plan will establish a vision and guide the City of Flagstaff, Coconino County, and FMPO to developing and implementing the policies, improvements, and priorities of the community to make the area an attractive place for residents to live and businesses to prosper.

The Regional Plan is following a regional visioning and scenario-based planning process that facilitates analysis of, and public input on, three distinct scenarios that exemplify differences in how the region could grow over the coming decades. Each of the three scenarios reflect differences in land use, density and open space, and the transportation network. A scenario approach to Plan development enables an assessment of

the relationship between land use choices and transportation and other outcomes, and provides residents, business leaders, and elected officials the opportunity to explore and debate the regional growth visions, their tradeoffs, and alternative futures.

Scenario planning is used in comprehensive planning to assist in identifying regional goals and community values, as well as exploring alternatives for growth, development, and transportation investments in and around Flagstaff.

A preferred development scenario(s) and supporting recommendations will be available to contemplate future updates to their plans and ordinances. Much work will need to be done at the local level to evaluate the preferred development scenario and support recommendations before they might become reality. Additional sub-area scenario analyses, based on the preferred scenario, will be completed at a later time to more fully understand different growth and transportation alternatives in key focus areas around the city and region.

The purpose of this document, Development Scenario Summary, is to inform stakeholders about the planning process and to describe the three alternative development scenarios being considered for the Flagstaff area. The document serves as a resource to stakeholder groups as they contemplate the region’s future, and select a preferred development scenario that meets community-stated initiatives to link development with quality of life and improve community cohesiveness and supporting infrastructure.



► Scenario Planning Overview

Scenario planning provides a forum, process, set of tools, and measurable outcomes for the region to contemplate future possibilities. Development scenarios prepared for the region are fictional stories about the future—they are not forecasts or predictions. They are possible future outcomes that might come to pass based on what already exists, on trends that are evident, or on regional goals and community values stated during the study. The essential requirement of any development scenario is that it be plausible, within the realm of what exists or what could be. Scenario planning also allows the community to measure results and evaluate the trade-offs associated with competing development scenarios. This ability provides stakeholders with an opportunity to identify and discuss strengths and weaknesses associated with the various development scenarios, and enables more informed decision-making for formulating the region's preferred development scenarios prepared for the Flagstaff Comprehensive Plan that are summarized in this document.

SCENARIO DEVELOPMENT PROCESS

Scenario development is an integrative process that involves City staff, regional stakeholders, and citizens. It is important that the development scenarios reflect the issues that are experienced in the Flagstaff area such as transportation, preserving natural and wildlife corridors, and water usage. The project team, along with the Citizen Advisory Committee (CAC), worked with citizens and several working groups to understand the challenges and opportunities facing the region and help create the three alternative development scenarios.

STAKEHOLDER AND CITIZEN INPUT

The project team facilitated several citizen workshops in a charrette format from July 14 – 22, 2011 to capture community values and attitudes toward growth in the region. At each event, a brief presentation by the project team was followed by a hands-on, table-top exercise (i.e., development chip game) used to idealize three different growth scenarios that could be possible in the Flagstaff region. Groups worked together to identify general development themes and to place new growth¹ anticipated through 2050 in areas of the region most suited for new development or redevelopment. The project team collected the development chip game maps at the end of each event for the purpose of building the three alternative development scenarios. These maps were used to determine the collective development goals for each scenario.

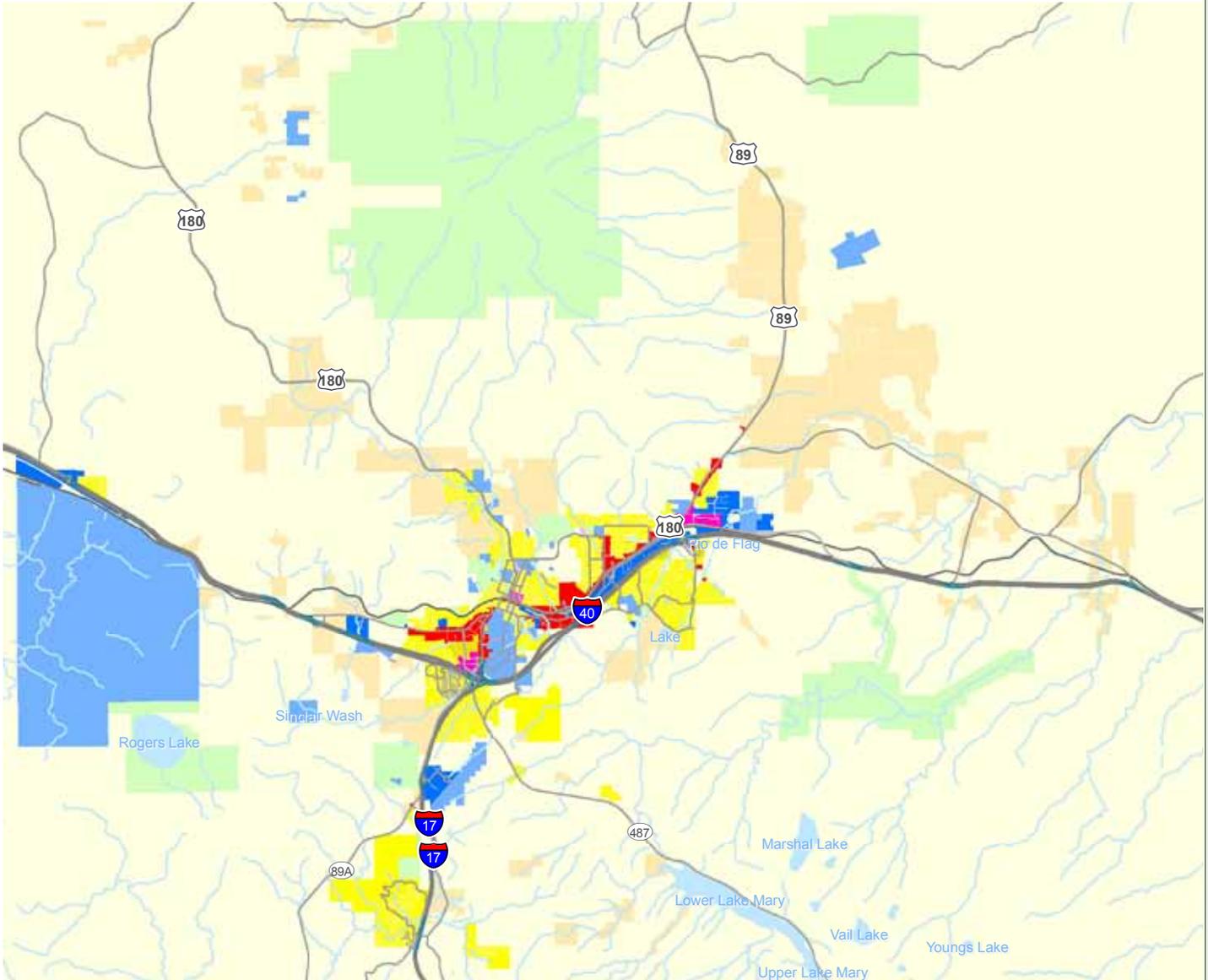
DEVELOPMENT CHIP GAME

The scenario development chip game used in the community workshops involved using place types chips or stickers that represent a future population and employment growth outlook for 2050. Identified here within each scenario is a different distribution of place types or chips. It is possible that in 2050, the population and employment of Flagstaff could increase by 70,000 people and up to 37,000 jobs. This population and employment change, also known as the “control totals,” are the same for each scenario which allows each scenario to be compared equally as the growth allocation is distributed uniquely.

¹ Population and Employment projections for this scenario development process were based on a 2050 population of 150,000 people and xx,xxx amount of employment.



EXISTING LAND USES



Legend

	Rural/Mountain Estates		Industrial - Heavy		Urban Mixed-Use
	Suburban Neighborhood		Commercial Corridor		Suburban Mixed-Use
	Urban Neighborhood		Urban Center		Open Space - Protected
	Institutional		Regional Center		Open Space - Unprotected
	Business Park		Neighborhood Center		

PLACE TYPES



RURAL NEIGHBORHOODS/ MOUNTAIN ESTATES – Predominantly single-family housing on the urban fringe. Livestock and horses are permitted and they are typically abutting National Forest lands. Most of the natural features are retained and public services are not required such as water and sewer. There are no industrial uses present in this place type and limited commercial activity is present as a result of the limited population density.



SUBURBAN NEIGHBORHOODS – Predominant housing type is single-family home; however there are areas of mixed housing type such as duplexes, townhomes, low-rise apartments, and manufactured homes. Neighborhood shopping and services are present along with religious and education institutions, such as churches and schools. Typical City services are available such as water, sewer service, and recreation facilities.



URBAN NEIGHBORHOODS – Consists of small block, mixed-use, walkable neighborhoods with housing types that include townhomes and apartments/condominiums. Neighborhood shopping and services are present along with religious and educational institutions, such as churches and schools. Typical City services are available such as water, sewer service, and recreation facilities.



INDUSTRIAL BUSINESS INSTITUTIONAL PARK – This place types involves a variety of work places that include light industrial, research and development, offices, institutions, secondary processing of materials, finished product assembly, transportation, and wholesale/warehouse. This place type can also have heavy industrial which includes hazardous uses which can be offensive or unsightly.



COMMERCIAL CORRIDOR – All the commercial and service uses that serve the needs of the entire region, which include tourism and travel related businesses. This place type tends to be auto-oriented and the businesses and services serve the day-to-day needs of the surrounding neighborhoods.



URBAN CENTER – Provides services to residents and visitors beyond the immediate area and has twice the number of jobs as typical commercial locations. This place type is the center for government, business, institution, and places for culture and entertainment. This is the most intense building and civic place type.





REGIONAL CENTER – Provides services to residents and visitors beyond the immediate area and is accessible to multiple modes of travel such as cars, transit, pedestrians, and cyclists.



NEIGHBORHOOD CENTER – Provides services to local residents and pass-by traffic and includes a proportion of housing in the form of townhomes and apartments. This place type is accessible by all modes of travel.

To display mixed-use land uses, participants were instructed to layer chips upon each other. As a result, to accurately represent the mixing of these land use concepts in the model, two new mixed-use place types were added—suburban mixed-use and urban mixed-use. In addition, participants placed “Industrial, Business Park, and Institutional” chips during the workshop to represent future service, and industrial and institutional jobs in the region. In the CommunityVIZ scenario planning process, this place type was split into three separate place types: Business Park, Industrial-Heavy, and Institutional to differentiate between the three separate employment types in the model. Below are more detailed descriptions of each of the additional place types used in the CommunityVIZ model.

BUSINESS PARK – This place type includes office uses that are mostly included in the service industry classification and light industrial.

INDUSTRIAL-HEAVY – Provides a distribution of future uses that can include hazardous uses which can be offensive or unsightly.

INSTITUTIONAL – All government, educational, and even large-scale religious campus development would be considered institutional.

SUBURBAN MIXED-USE – This provides a mix of land uses and housing types in more periphery locations of the city with lower densities than found in the center city. These areas can be conducive to multimodal transportation techniques and walkable neighborhoods.

URBAN MIXED-USE – Much like Suburban Mixed-Use, there is a variety of housing types and land use types, however they are found in more dense locations of the city that have access to frequent transit, regional bike networks and higher job concentrations.

► Development Scenario Summaries

The project team prepared three development scenarios for the Flagstaff Regional Plan 2012 using general themes development in the planning process and other information volunteered by partnering groups. Each scenario was different enough to pose real choices for how the region could develop under one or more planning initiatives. The three development scenarios are:

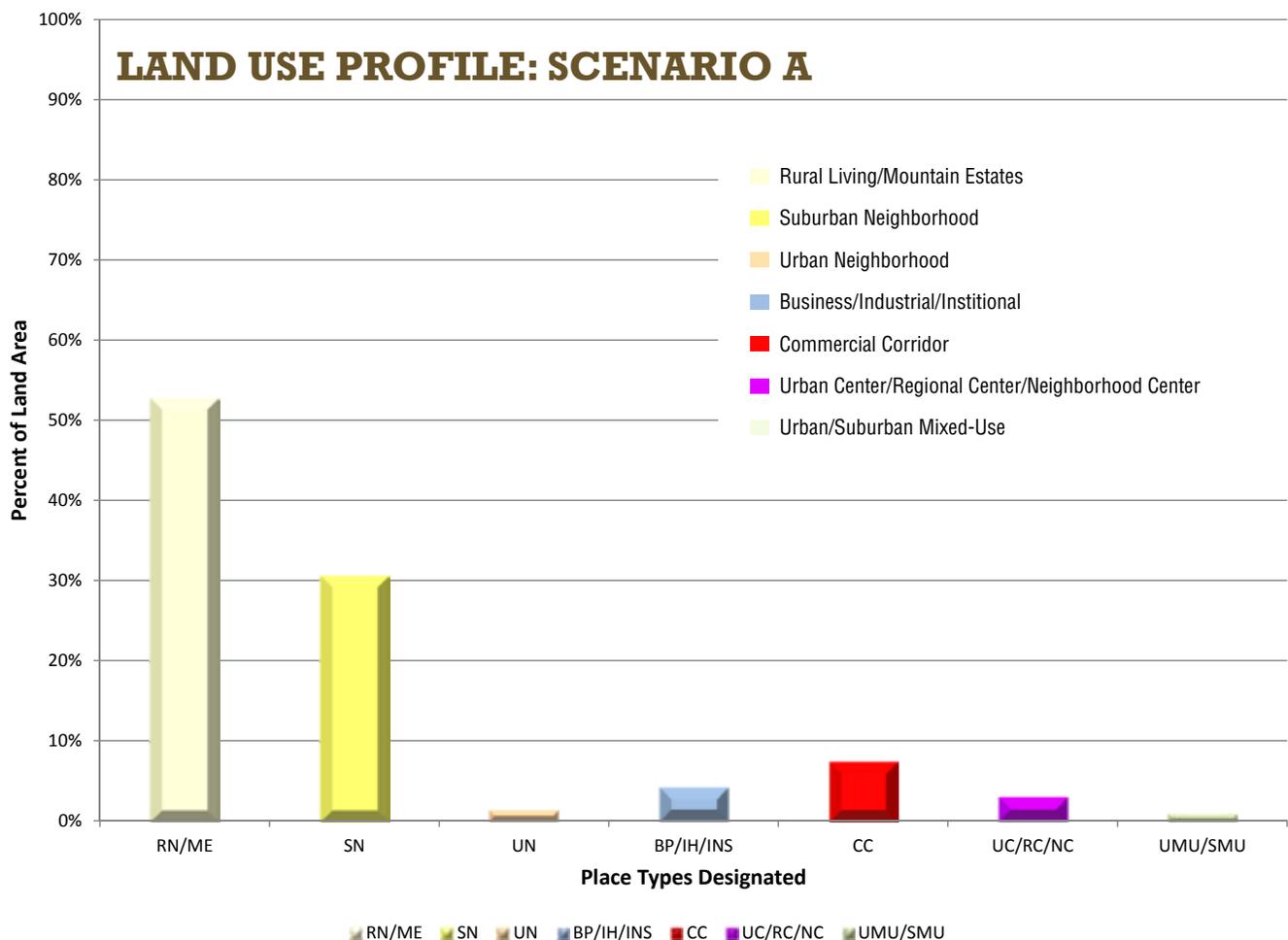
SCENARIO A: GROWING OUT

Scenario A identifies how the region will look if development occurs in a dispersed pattern of development that is similar to what is currently seen in Flagstaff. New growth would largely take

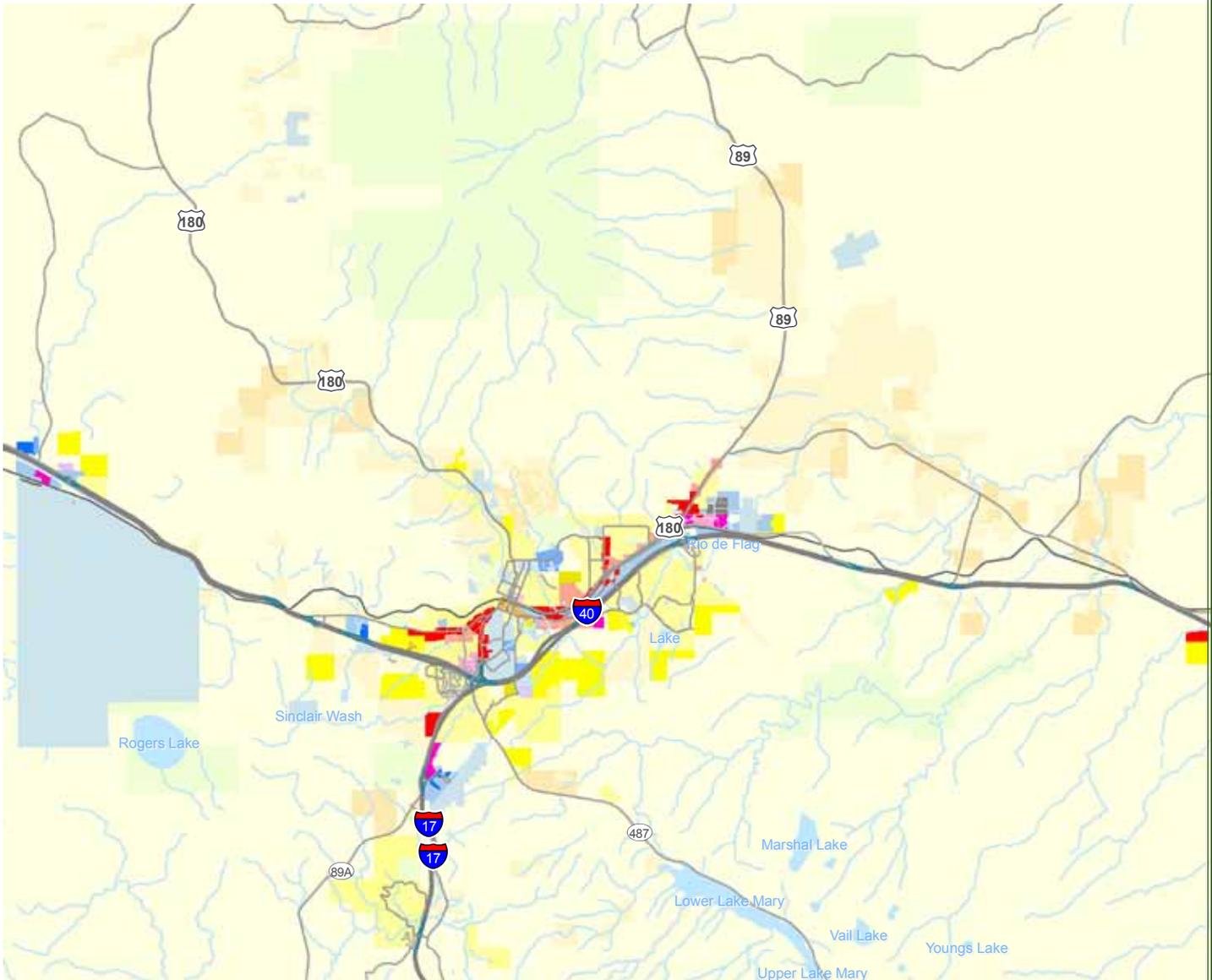
the form of single-use, low-density development that is generally isolated and automobile-oriented.

Common features of Scenario A include: green field development patterns, outward expansion of public utilities, and transportation investments that favor the automobile over other modes of travel such as transit, walking, and biking. Place types and the distributions of the place types follow closely the existing pattern of development found currently in the Flagstaff region.

SCENARIO A	
Population	70,873
Avg. Residential Density	3.10
Employment	37,204
Avg. Non-Residential Density	0.29



SCENARIO A + EXISTING LAND USES MAP



Legend

 Rural/Mountain Estates	 Industrial - Heavy	 Urban Mixed-Use
 Suburban Neighborhood	 Commercial Corridor	 Suburban Mixed-Use
 Urban Neighborhood	 Urban Center	 Open Space - Protected
 Institutional	 Regional Center	 Open Space - Unprotected
 Business Park	 Neighborhood Center	

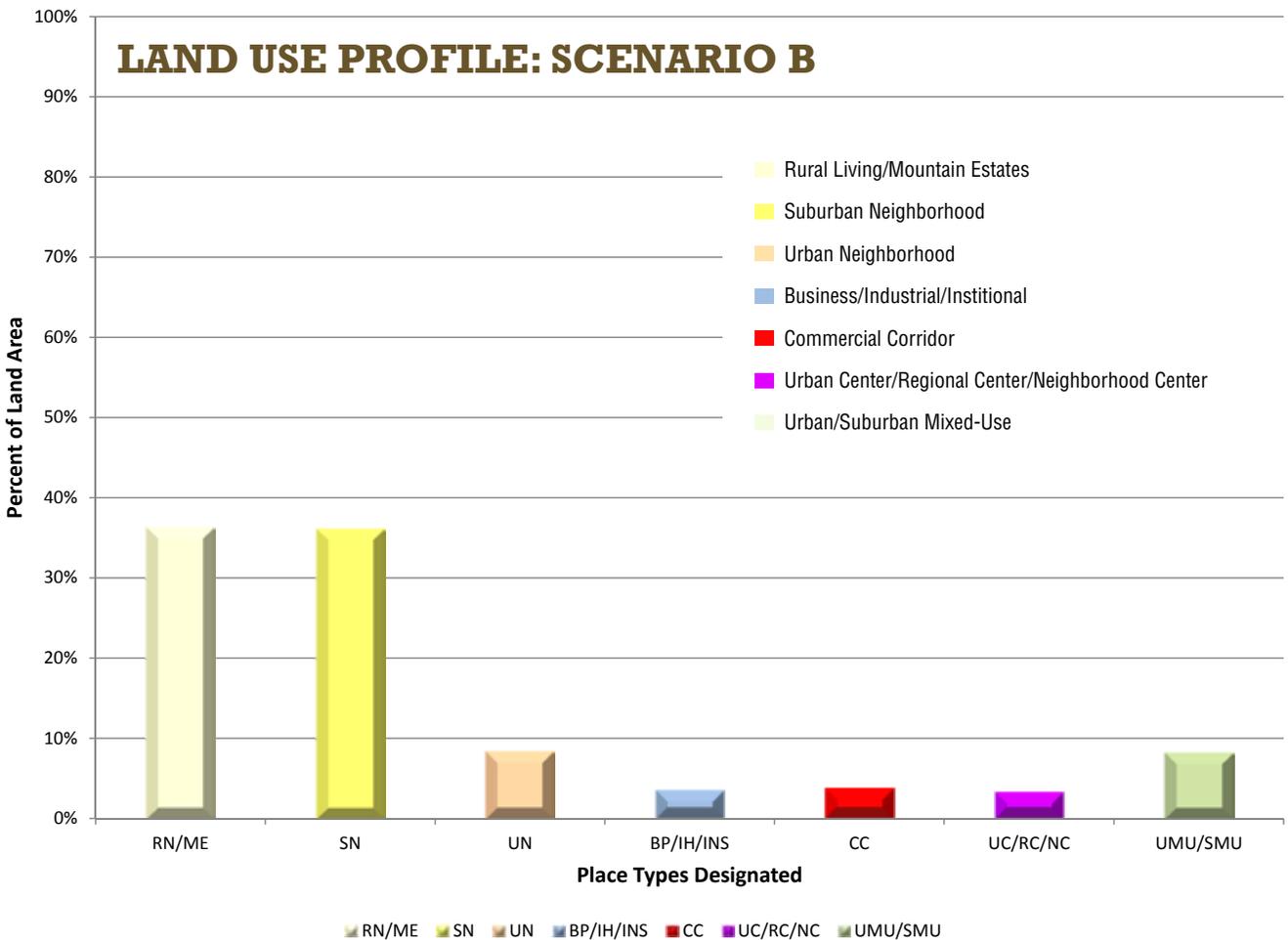
Development Scenario Summaries (continued)

SCENARIO B: GROWING IN AND OUT

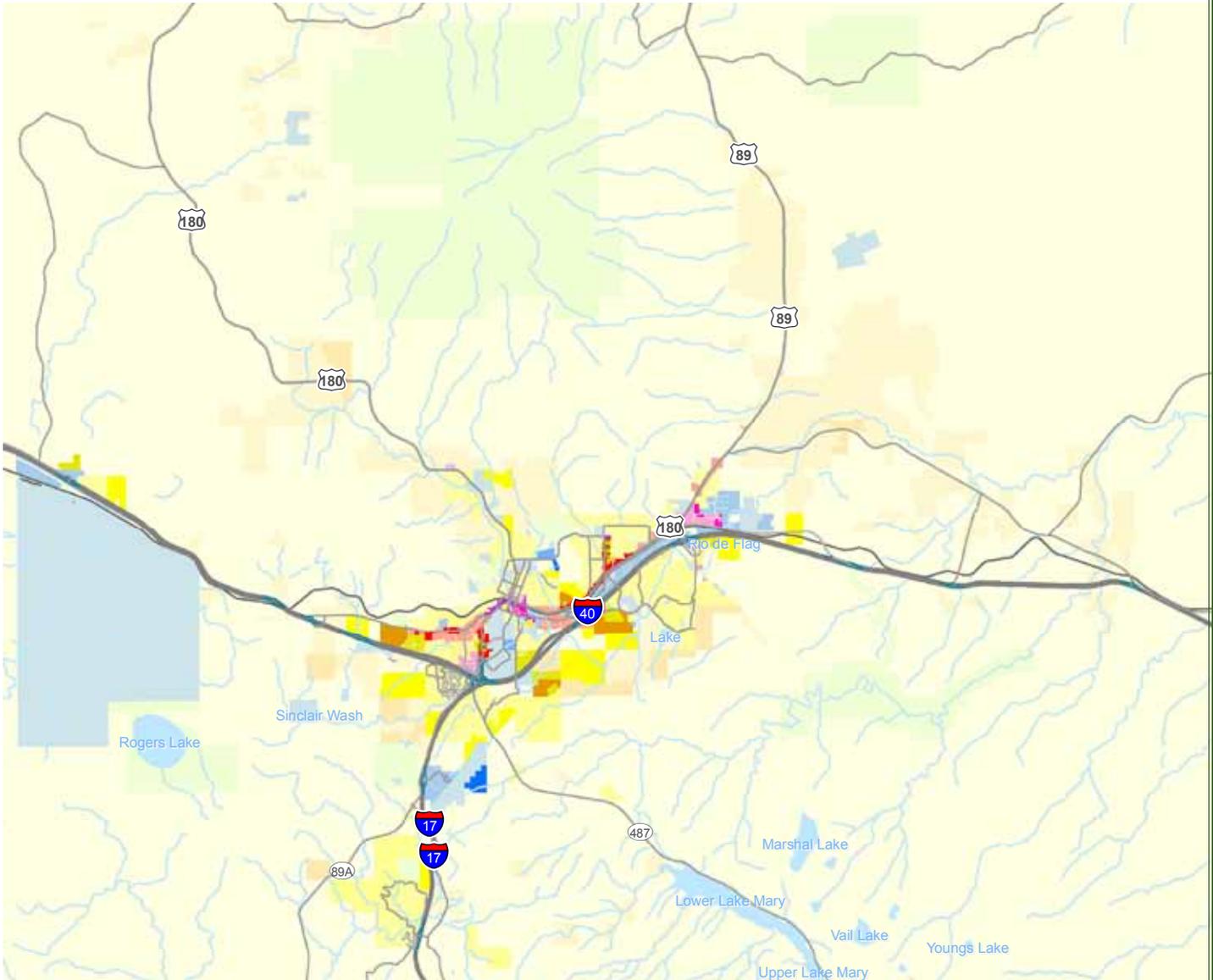
Scenario B identifies how the region will look with increased emphasis on higher-density housing types than what is currently found in Flagstaff, allowing for changes to transportation patterns and access to jobs. New growth would still consist primarily of single-use, low-density development; however, an increased supply of mixed-use and higher-density housing and employment will allow for more walkable communities and alternative modes of travel.

Common features of the scenario include: green field development patterns with an increase in infill development, reduced expansion of public utilities, and transportation investments that begin focusing on other modes while still giving the automobile the majority of infrastructure funding. New place types and land use concepts are introduced in the scenario, such as vertical mixed-use development in areas of concentrated population and employment.

SCENARIO B	
Population	69,561
Avg. Residential Density	5.30
Employment	36,830
Avg. Non-Residential Density	0.39



SCENARIO B + EXISTING LAND USES MAP



Legend

 Rural/Mountain Estates	 Industrial - Heavy	 Urban Mixed-Use
 Suburban Neighborhood	 Commercial Corridor	 Suburban Mixed-Use
 Urban Neighborhood	 Urban Center	 Open Space - Protected
 Institutional	 Regional Center	 Open Space - Unprotected
 Business Park	 Neighborhood Center	

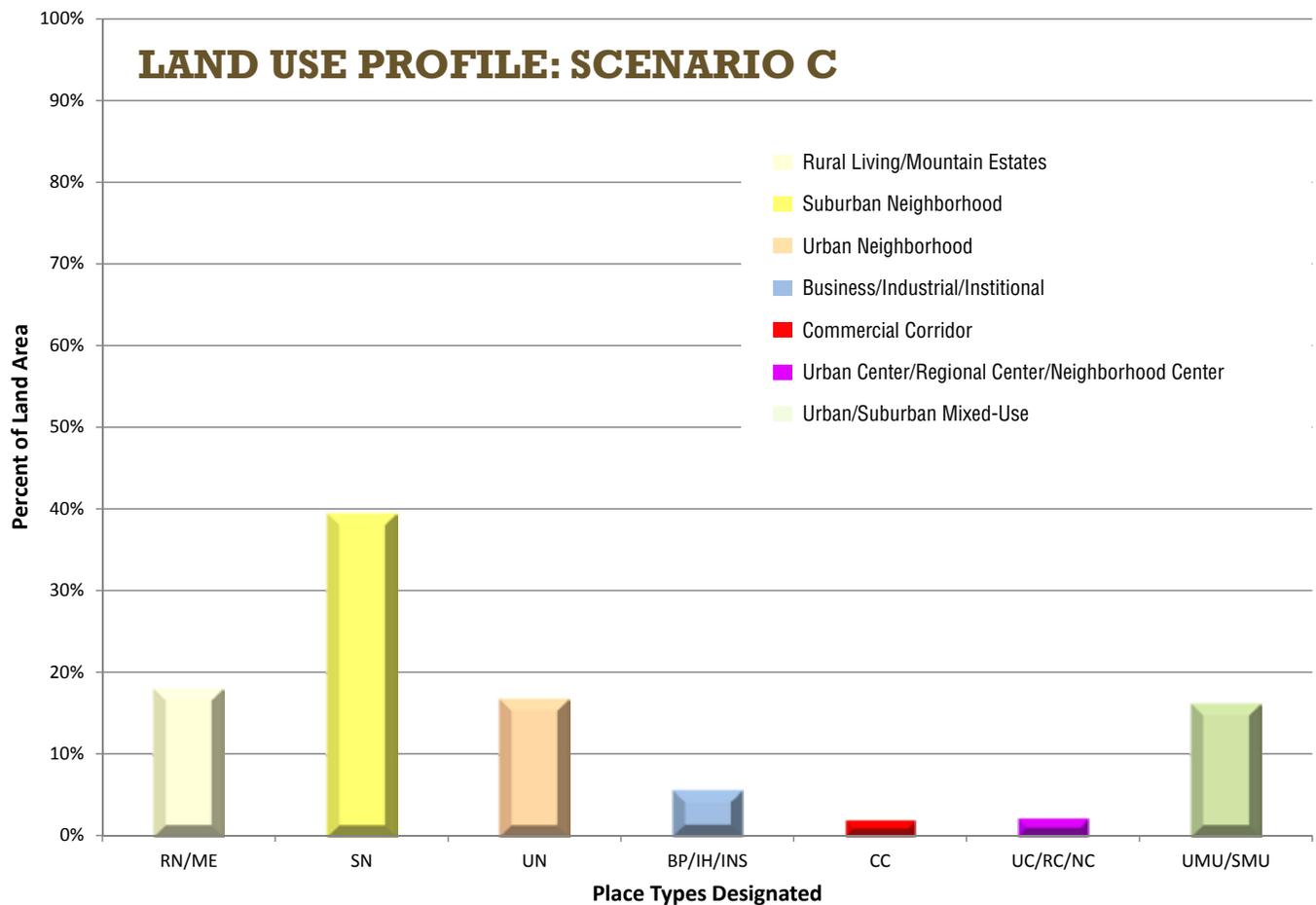
Development Scenario Summaries (continued)

SCENARIO C: GROWING IN

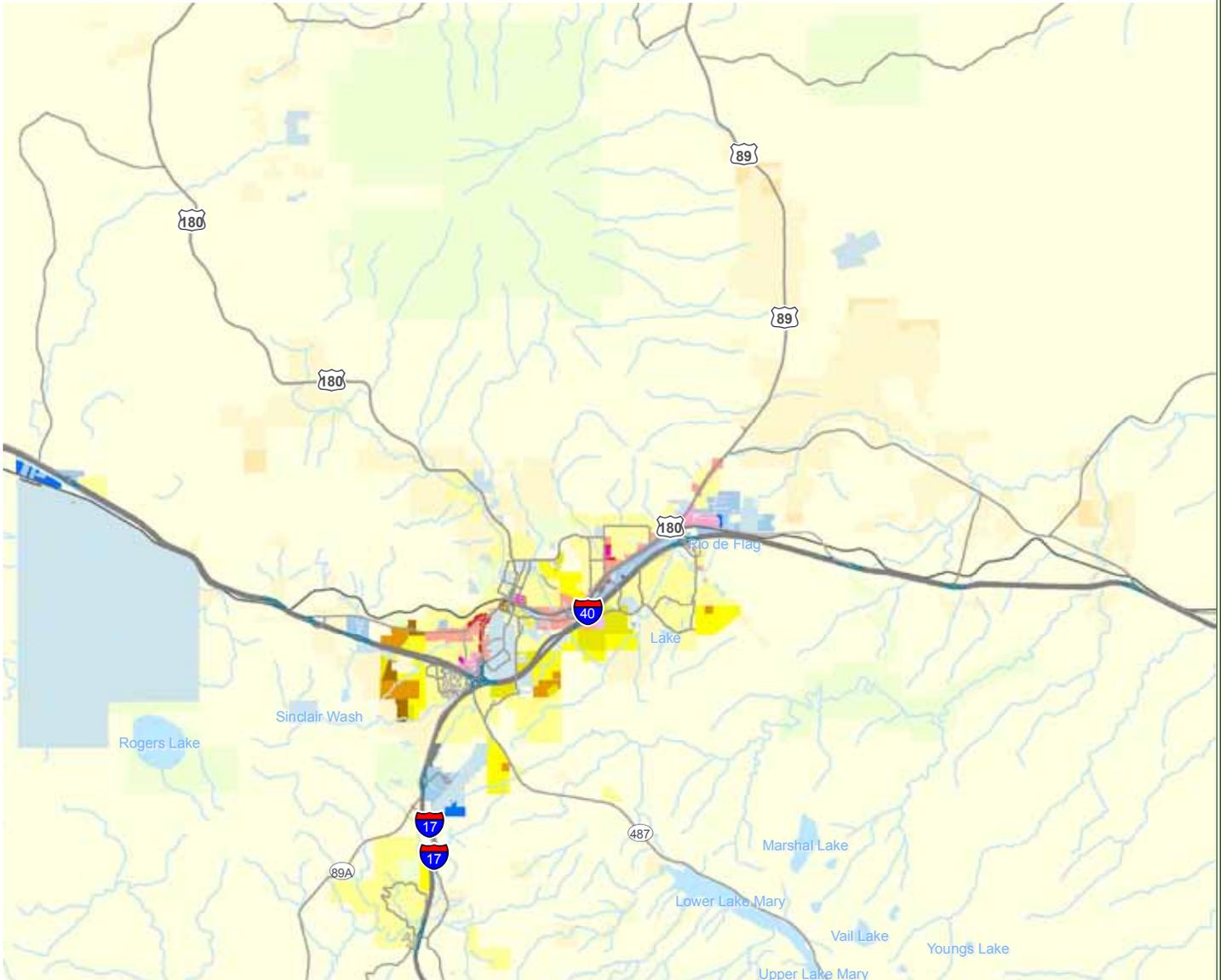
Scenario C has even more high-density housing and employment opportunities, which limits the amount of land needed for new development and reduces the impact to both the transportation and public utility networks. Single-use development is still available but not at the same proportion available in scenario A.

Common features of this development scenario include: concentrated development areas, land preservation outside developed centers, a variety of development types and intensities, and more travel options (i.e. walking, bicycle, transit and automobile).

SCENARIO C	
Population	71,784
Avg. Residential Density	8.20
Employment	39,652
Avg. Non-Residential Density	0.43



SCENARIO C + EXISTING LAND USES MAP



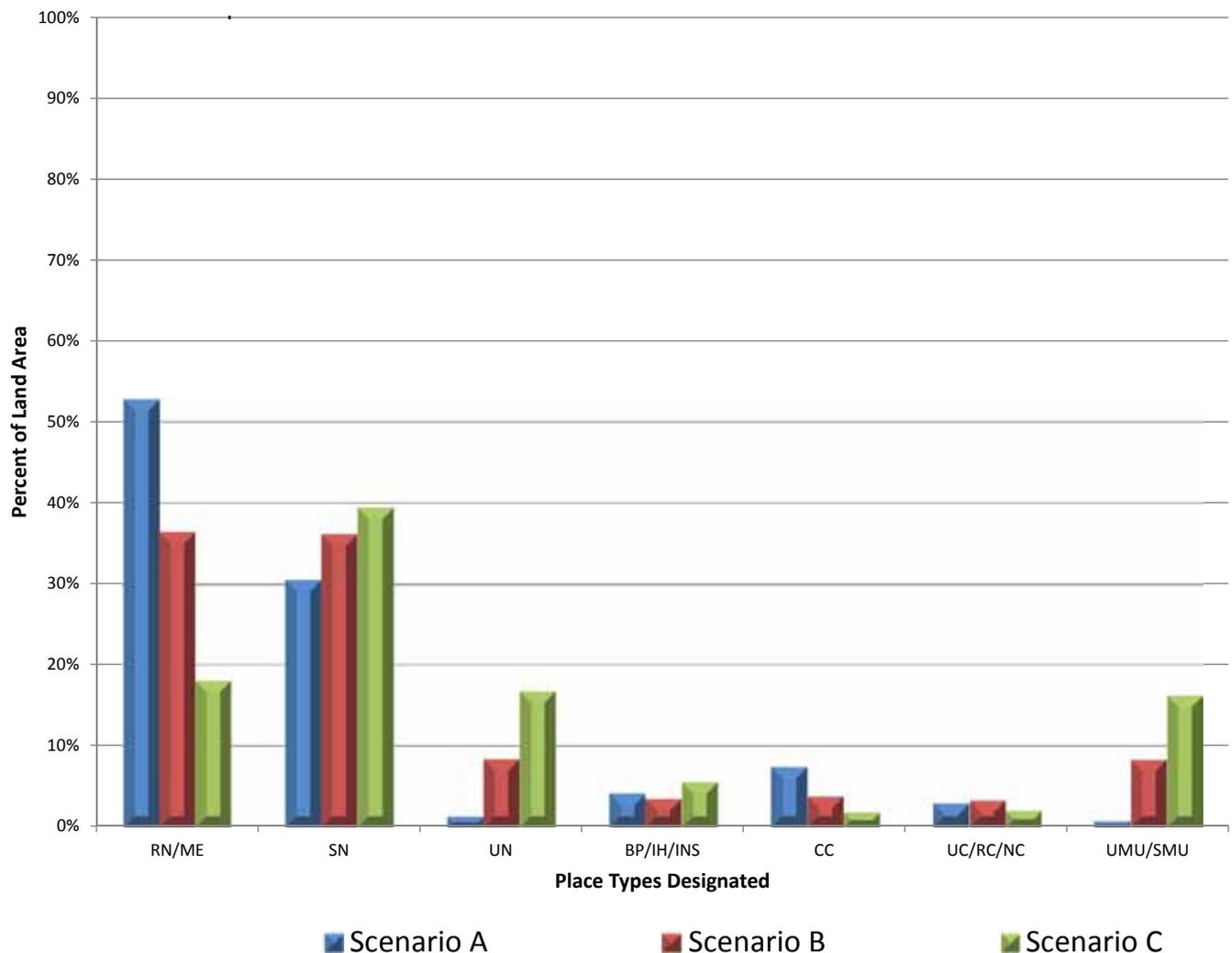
Legend

 Rural/Mountain Estates	 Industrial - Heavy	 Urban Mixed-Use
 Suburban Neighborhood	 Commercial Corridor	 Suburban Mixed-Use
 Urban Neighborhood	 Urban Center	 Open Space - Protected
 Institutional	 Regional Center	 Open Space - Unprotected
 Business Park	 Neighborhood Center	

► Land Use Summary

Overall, there are apparent land use differences between all of the scenarios. Rural living and mountain estates, which are prevalent in scenario A, are limited and are replaced by an increased number of urban and mixed-use development types in scenarios B and C. The addition of these new place types into the land use toolbox allows Flagstaff to adapt to some of the changes in national patterns of land use and transportation planning.

On the non-residential side of the land use discussion, we see below that the form of retail uses is moving from being located in the automobile-oriented ‘commercial corridor’ in scenario A to be located in the mixed-use land use types in scenarios B and C. This can have a dramatic effect in the look and the vibrancy of our urban environments as this land use change occurs.



Development Scenario Indicators

The project team refined general themes identified in the scenario development process and these themes have been summarized in the following section. Performance measures for each growth principle were created to quantify and explain the differences between the development scenarios. Summary statistics for comparing the output of performance measures for each regional growth principle were created using CommunityVIZ software.

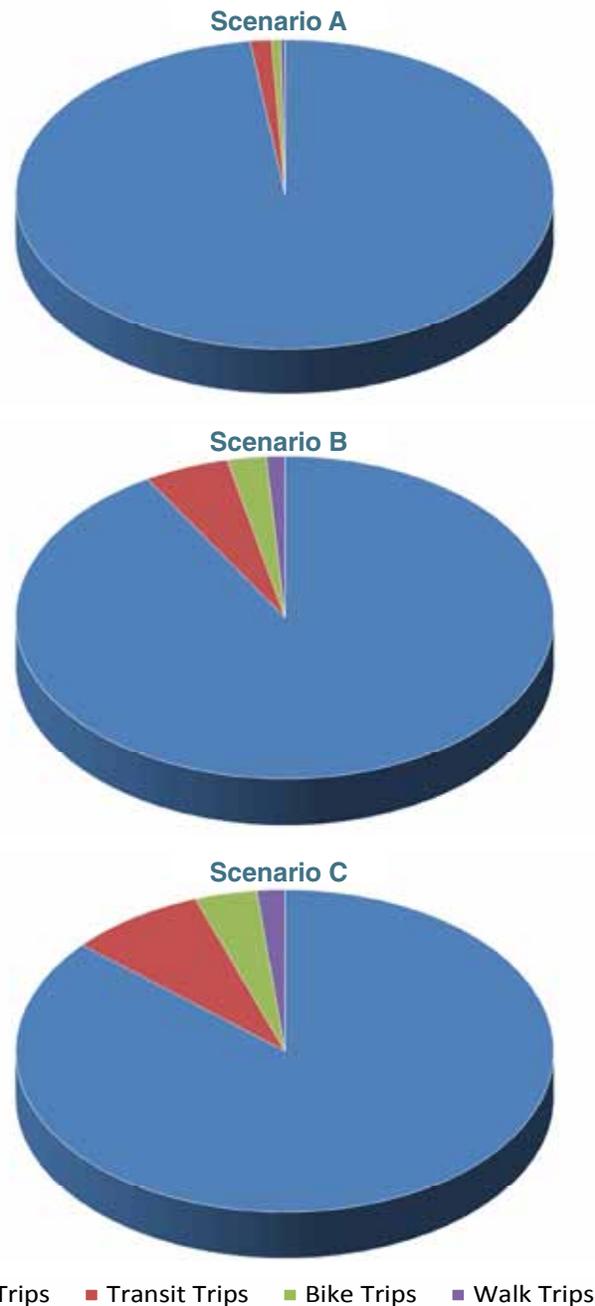
MOBILITY

Mobility generally refers to the ability of residents and visitors to move from place to place within and to points outside of the region. Performance measures used to evaluate the principle of mobility include: daily trips by mode, vehicle miles traveled, annual fuel consumption, and trips generated in congested areas.

Mobility indicators at this level of analysis identify comparisons between scenarios at the broadest level in scenario planning. However, using the Metropolitan Planning Organization's Travel Demand Model to provide inputs, we can further understand potential mobility impacts at even the corridor level.

As land use patterns shift from less dense to more dense in Scenarios A to C and as land use form changes from a more single-use to a mixed-use form, trip patterns begin to change. Increased desire to bike, walk, or take transit becomes apparent.

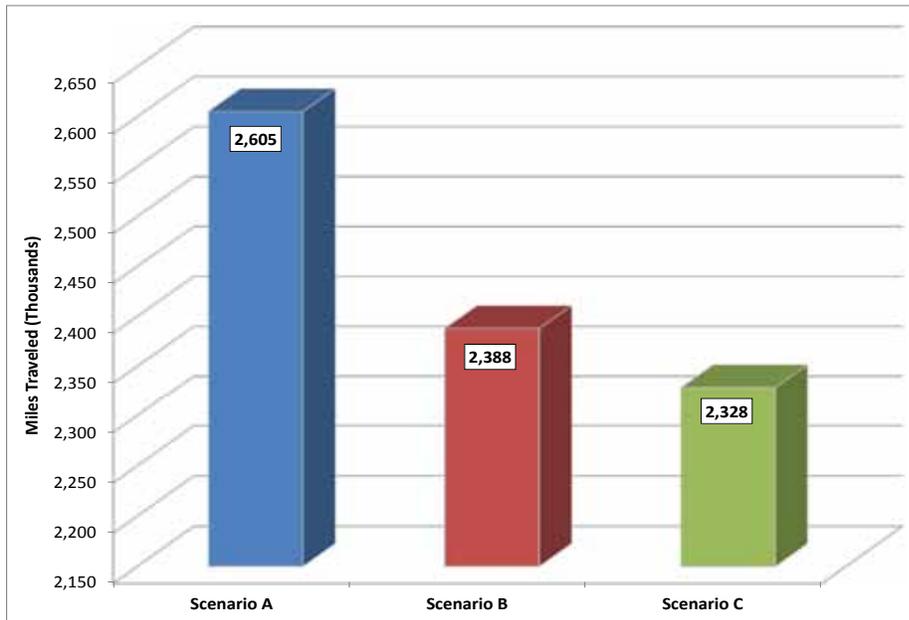
Daily Person Trips by Mode



	SCENARIO A	SCENARIO B	SCENARIO C
PersonTrips Generated (Daily)	272,588	267,543	276,093
Auto Trips (Daily)	266,894	244,650	238,570
Transit Trips (Daily)	3,441	13,654	22,584
Bike Trips (Daily)	1,530	6,238	10,296
Walk Trips (Daily)	724	3,000	4,644

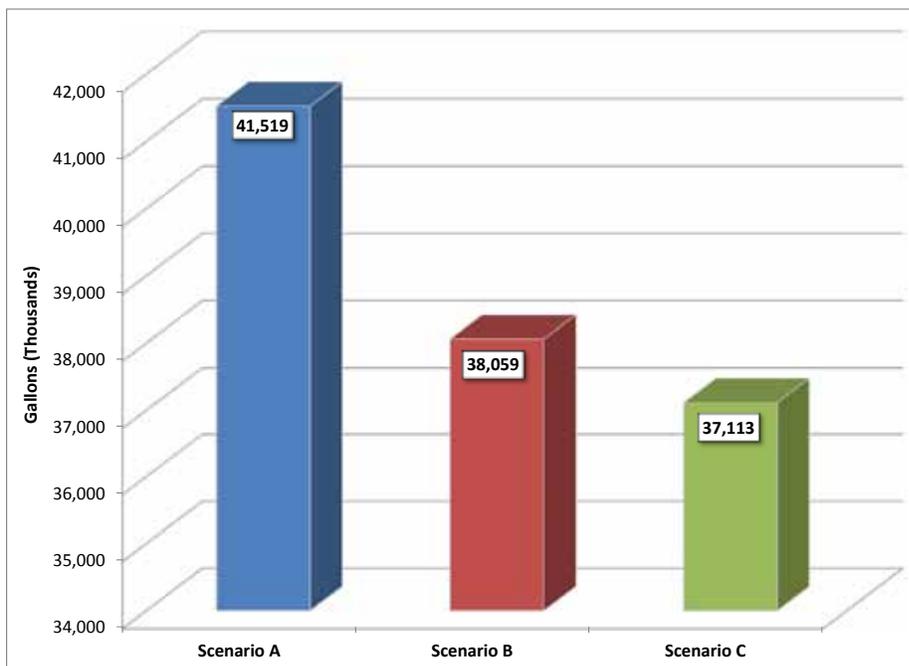
Development Scenario Indicators (continued)

Vehicle Miles Traveled



As a larger proportion of new growth shifts from locating in more suburban areas to urban areas, the VMT of the people living in new development will be reduced as trip patterns change and traveled distance changes.

Fuel Consumption



In Scenarios B and C, fuel consumption decreases as a result of fewer automobile trips and increased transit, bike, and pedestrians trips.

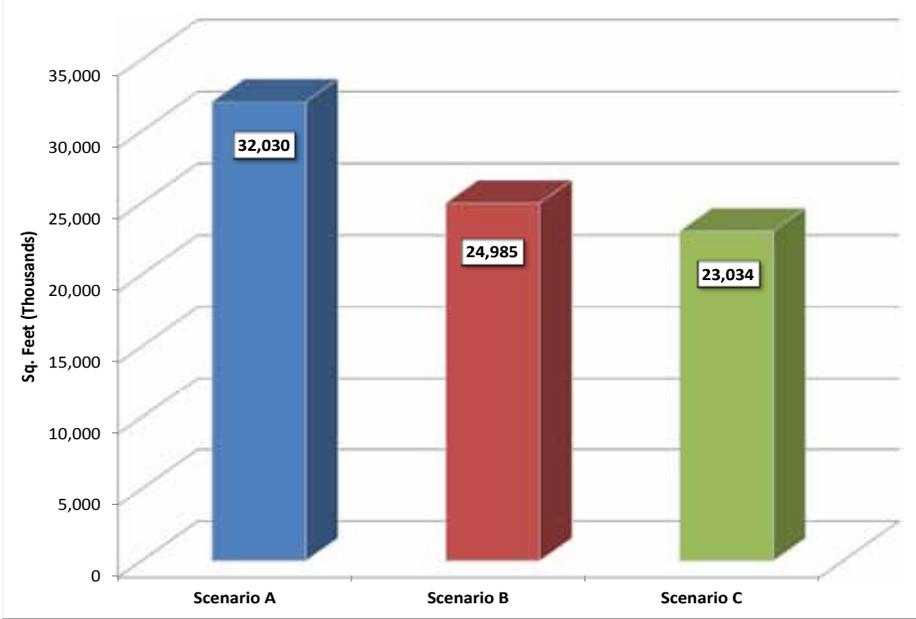


ENVIRONMENT

Environment is a broad category that includes the physical features of the region and the ability of policies and programs to protect certain environmentally-sensitive areas. Performance measures used to evaluate the principle of environment include: building footprint, air quality emissions, and developed area.

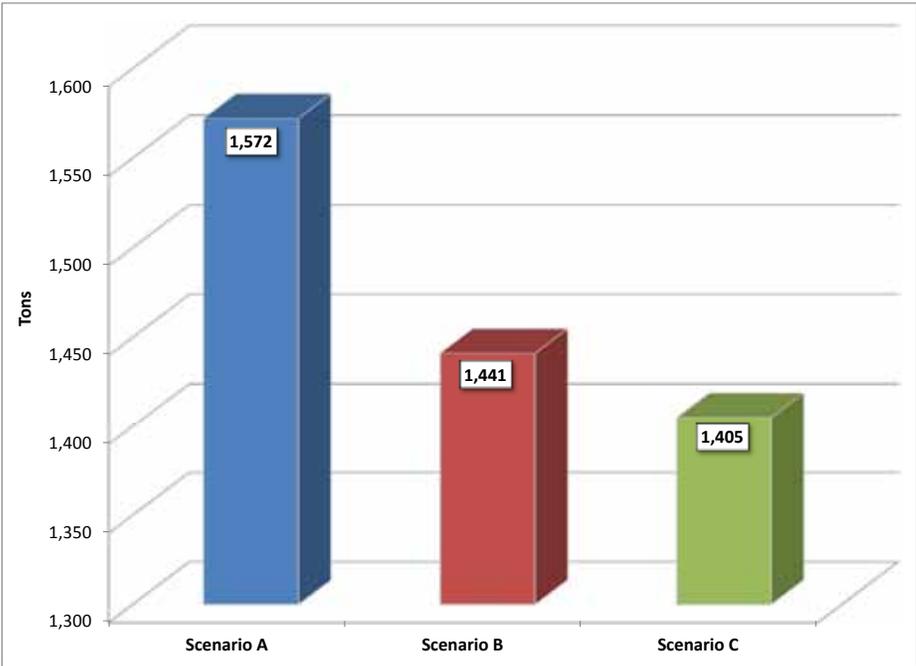
Building footprint indicates the amount of land that is needed to allow for the building to sit on, opposed to the development footprint which consists of the land and the building. The decrease in building footprint from A to C is associated with the higher residential and non-residential densities found in that latter scenarios.

Building Footprint



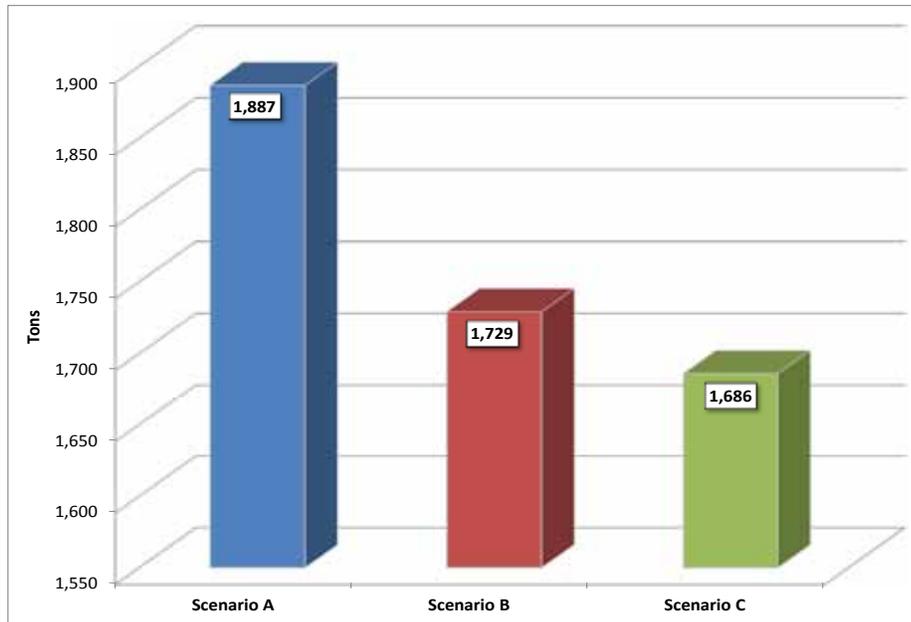
Nitrogen Oxides (NOx) is a collection of gases that are produced from cars, trucks and buses, power plants and off-road equipment. As the demand for the private automobile increases so will the amount of NOx that are produced in our region.

Annual NOx Emissions



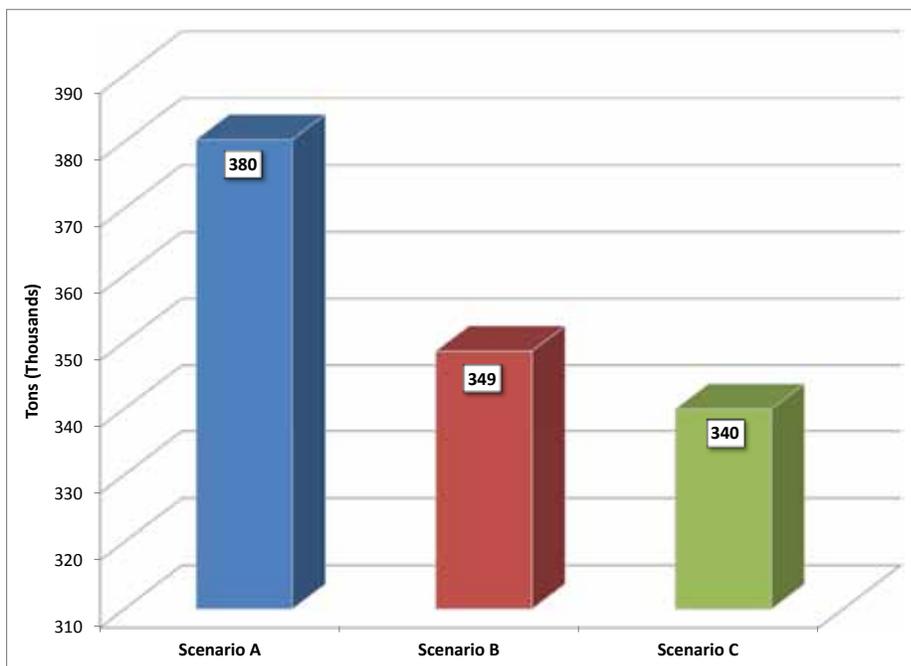
Development Scenario Indicators (continued)

Annual VOC Emissions



Volatile Organic Compounds (VOC) also contribute to poor air quality in the region and lead to increased levels of ground-level ozone.

Annual CO2 Emissions

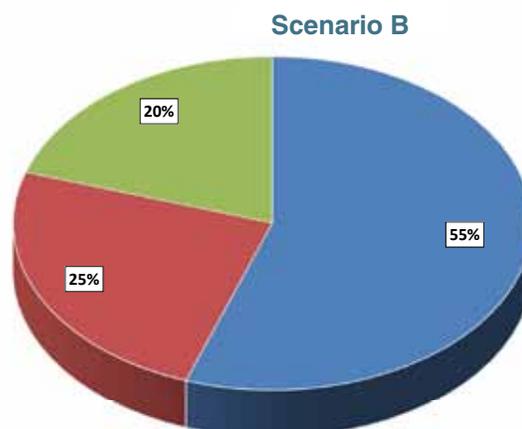
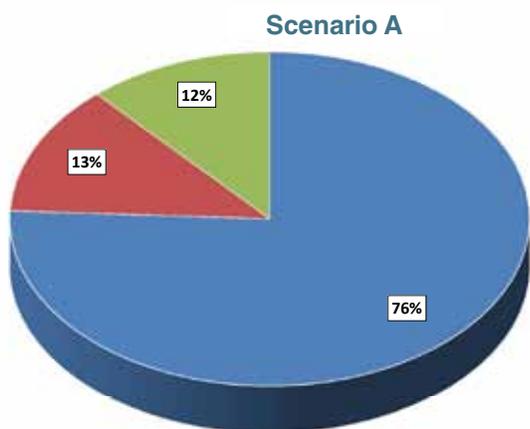


Carbon Dioxide (CO₂) is a naturally occurring gas produced in the earth's atmosphere. CO₂ concentrations have increased as a result of the increased burning of fossil fuels.

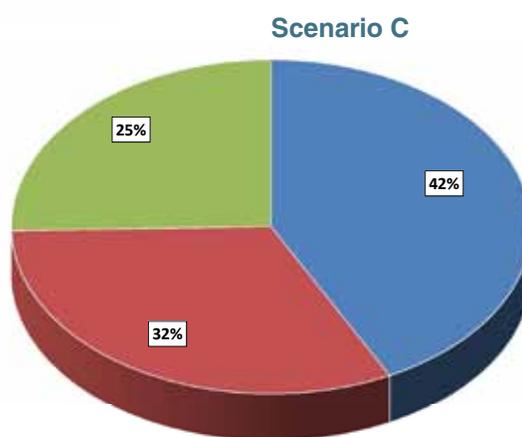


HOUSING MIX

A place to live versus a community are very different concepts. Communities offer places for residents to live, work, and play. They also are distinguished by the physical and design characteristics of the buildings and neighborhoods they contain, and the social and qualitative aspects of human interaction that they nurture. Housing mix is the performance measure for this indicator.



■ Single Family ■ Multifamily - Apartment ■ Multifamily - Townhome

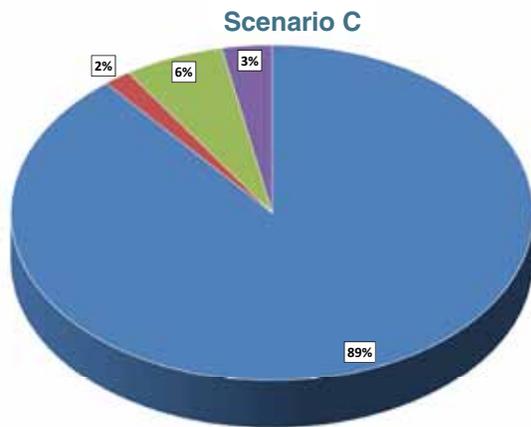
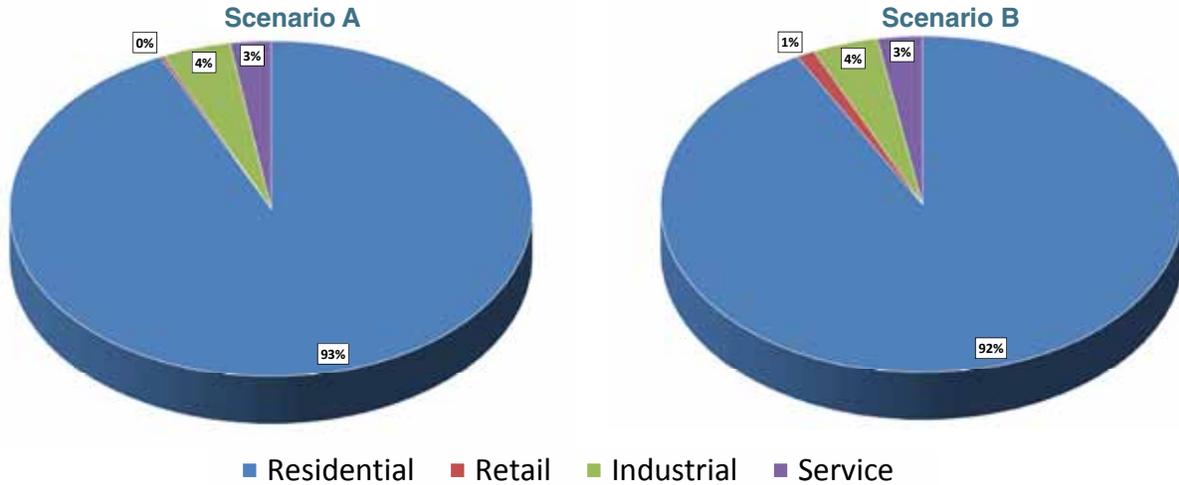


Diversity in housing mix is an important characteristic of cities. Housing mix can accommodate people of different incomes, household composition and age. Families may prefer single-family homes, while young single professional's may prefer apartments.

	SCENARIO A	SCENARIO B	SCENARIO C
Single Family	20,650	14,823	11,726
Multifamily - Apartment	3,449	6,565	8,871
Multifamily - Townhome	3,159	5,366	7,013
Total Households	27,259	26,754	27,609

WATER DEMAND

In the Flagstaff area, water is an essential element that can either limit future growth or enable it. Preserving our precious resources including water is an important concept to compare when looking at future growth. As our communities develop, finding ways to preserve water is an important consideration as the scenario development process progresses.



	WATER USE RATES	GALLONS PER DAY
RESIDENTIAL HOUSEHOLDS	Rural Neighborhood/ Suburban Neighborhood	218/Household
	Urban Neighborhood/ Regional Center/ Neighborhood Center/ Suburban Mixed-Use	174/Household
	Urban Center/ Urban Mixed-Use	161/Household
NON-RESIDENTIAL USES	Retail	874/Acre
	Industrial	5497/Acre
	Office	874/Acre

For non-residential uses, water use rates do not change in the Flagstaff region, however for residential uses, water usage rates go down as development becomes more urban. Comparing rates among the scenarios, we can see that residential water rates decrease from Scenarios A to C.

WATER USAGE	SCENARIO A	SCENARIO B	SCENARIO C
Daily Residential Water Demand (gallons)	5,833,682	5,390,394	5,337,704
Daily Retail Water Demand (gallons)	14,331	65,860	100,438
Daily Industrial Water Demand (gallons)	264,214	237,253	370,393
Daily Service Water Demand (gallons)	159,412	162,665	186,599
Daily Total Water Demand (gallons)	6,271,639	5,856,172	5,995,134





► Conclusions & Recommendations

Scenario development is a planning tool that allows citizens, elected officials, public administrators and other stakeholders the ability to compare future growth opportunities. Using CommunityVIZ® scenario software and the results gathered through the public input process we were able to analyze the strengths and weaknesses of the three alternative growth scenarios. These alternatives ranged from a more typical growth pattern of single-family housing and automobile-oriented retail, to a more mixed-use growth pattern with increased demand for alternative modes of travel such as walking, biking and taking transit. This is just one of several analyses that are being used as qualitative assessments against the guiding principles and assumptions developed through the Flagstaff Regional Plan 2012.

The goal of this document is to serve as a resource for decision-makers including citizens to move toward establishing a future vision for growth in the Flagstaff Region. The next steps in the scenario planning process is take the information in this report and begin developing the preferred scenario, one that fits within the guiding principles of the Flagstaff Regional Plan.

APPENDIX - COMMUNITY ASSUMPTION TABLE

PLACE TYPES													
	RN	ME	SN	UN	BP	IH	INS	CC	UC	RC	NC	SMU	UMU
	RURAL NEIGHBORHOOD	MOUNTAIN ESTATES	SUBURBAN NEIGHBORHOOD	URBAN NEIGHBORHOOD	BUSINESS PARK	HEAVY INDUSTRIAL	INSTITUTIONAL	COMMERCIAL CORRIDOR	URBAN CENTER	REGIONAL CENTER	NEIGHBORHOOD CENTER	SUBURBAN MIXED-USE	URBAN MIXED-USE
Site Efficiency	0.99	0.99	0.95	0.95	0.80	0.90	0.80	0.80	0.80	0.80	0.80	0.90	0.90
FAR	0.10	0.10	0.15	0.30	0.40	0.25	0.40	0.23	0.45	0.30	0.30	0.50	0.70
DENSITY	0.25	1	7	18	--	--	--	--	13	10	10	12	22
% Residential	1	1	1	0.85	--	--	--	--	--	--	0.25	0.30	0.40
% Non Residential	--	--	--	0.15	1	1	1	1	1	1	0.75	0.70	0.60
Building Height	2	1	2	3	4	3	3	3	5	4	3	2	5
Single Family Ratio	1	1	0.80	0.10	--	--	--	--	--	--	--	0.20	--
Townhouse Ratio	--	--	0.10	0.50	--	--	--	--	--	--	0.40	0.30	0.40
Apartment Ratio	--	--	0.10	0.40	--	--	--	--	--	--	0.60	0.50	0.60
Household Size	2.60												
% Office	--	--	--	0.25	0.15	0.10	0.10	0.30	0.25	0.00	0.00	0.25	0.25
% Retail	--	--	--	0.25	0.00	--	0.10	0.50	0.30	0.75	0.75	0.40	0.40
% Industrial	--	--	--	0.10	0.70	0.90	--	--	0.05	--	--	0.05	--
% Service	--	--	--	0.30	0.15	--	0.10	0.20	0.20	0.25	0.25	0.15	0.10
% Institutional	--	--	--	0.10	--	--	0.70	--	0.20	--	--	0.15	0.25
Retail Employment Rate	1 Employee for Every 900 square feet of floor space												
Industrial Employment Rate	1 Employee for Every 370 square feet of floor space												
Service Employment Rate	1 Employee for Every 320 square feet of floor space												
Office Employment Rate	1 Employee for Every 320 square feet of floor space												
Institutional Employment Rate	1 Employee for Every 400 square feet of floor space												
Trip Generation	10	10	10	7	--	--	--	7	6	6	6	8	6
Average Trip Length (mile)*	9.76												
Average Passenger Car Fuel Efficiency (miles/gallon)**	22.90												
* Average length of trip for vehicles associated with the dwelling units. Default value is from the US Bureau of Transportation Statistics (2006).													
** Average fuel efficiency of cars used by residents. Default value is from the US Bureau of Transportation Statistics (2005).													

APPENDIX - COMMUNITY ASSUMPTION TABLE

PLACE TYPES	
New Households	Parcel Area * Site Efficiency by Place Type * % Residential by Place Type / 43,560 * Density by Place Type
Population	New Households * Average Household Size
Average Residential Density	(Sum (Total Residential Area by Place Type * Density by Place Type) / (Sum (Total Residential Area by Place Type))
Non-Residential Square Feet	Parcel Area * Site Efficiency by Place Type * FAR by Place Type * % Non-Residential
Employment	Sum ((Non-Residential Square Feet * Percent Institutional) + (Non-Residential Square Feet * Percent Industrial) + (Non-Residential Square Feet * Percent Office) + (Non-Residential Square Feet * Percent Retail) + (Non-Residential Square Feet * Percent Service))
Average Non-Residential Density	(Sum (Total Non-Residential Area by Place Type * FAR by Place Type) / (Sum (Total Non-Residential Area by Place Type))
Person Trips	New Households * Person Trip Generation
Transit Trips	New Households * Person Trip Generation * % Transit Mode Share by Place Type
Bicycle Trips	New Households * Person Trip Generation * % Bike Mode Share by Place Type
Walk Trips	New Households * Person Trip Generation * % Pedestrian Mode Share by Place Type
Vehicle Trips	New Households * Vehicle Trip Generation
VMT	New Households * Vehicle Trip Generation * Average Vehicle Trip Length
Fuel Consumption	VMT * Passenger Car Fuel Efficiency * 365
Building Footprint	Parcel Area * Site Efficiency by Place Type * FAR by Place Type / Number of Stories by Place Type
Annual NOx Emissions	VMT * 1.5 * 365 * 0.0022046226 / 2000
Annual VOC Emissions	VMT * 1.8 * 365 * 0.0022046226 / 2000
Annual CO2 Emissions	VMT * 0.8 * 365 / 2000
Housing Mix	New Households * Single Family Ratio by Place Type, New Households * Townhome Ratio by Place Type, New Households * Apartment Ratio by Place Type
Water Demand	(New Households * Daily Water Usage by Place Type) + (Retail Square Feet Area * Retail Daily Water Usage per Acre / 43,560) + (Industrial Square Feet Area * Industrial Daily Water Usage per Acre / 43,560) + (Service Square Feet Area * Service Daily Water Usage per Acre / 43,560)

