CITY OF SEDONA

Transportation Master Plan

Prepared by: Kimley»Horn • January 2018

CITY OF SEDONA TRANSPORTATION MASTER PLAN

FINAL REPORT

JANUARY 2018

Prepared for:

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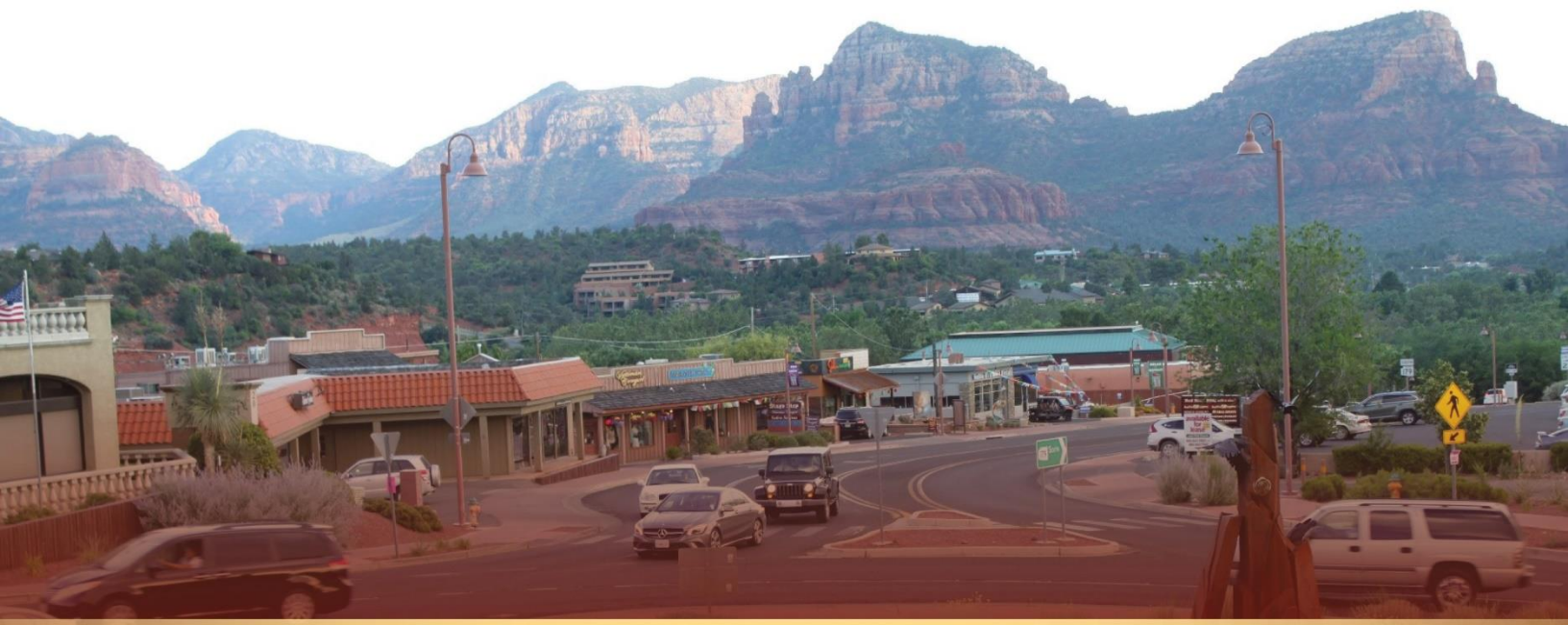


Chapter 1 – Introduction

As Sedona's residential and visitor population grows, transportation and quality of life goals are being challenged and, in many ways, conflict. The success of the tourism industry inherently brings people to Sedona who require access to destinations including trailheads, hotels, restaurants, shopping, and commercial districts. Employees, many of whom live in neighboring Verde Valley communities, travel between their homes and work place. Businesses must be able to efficiently receive goods and products from suppliers located outside Sedona. Residents desire to move around the city with minimal inconvenience and delay.

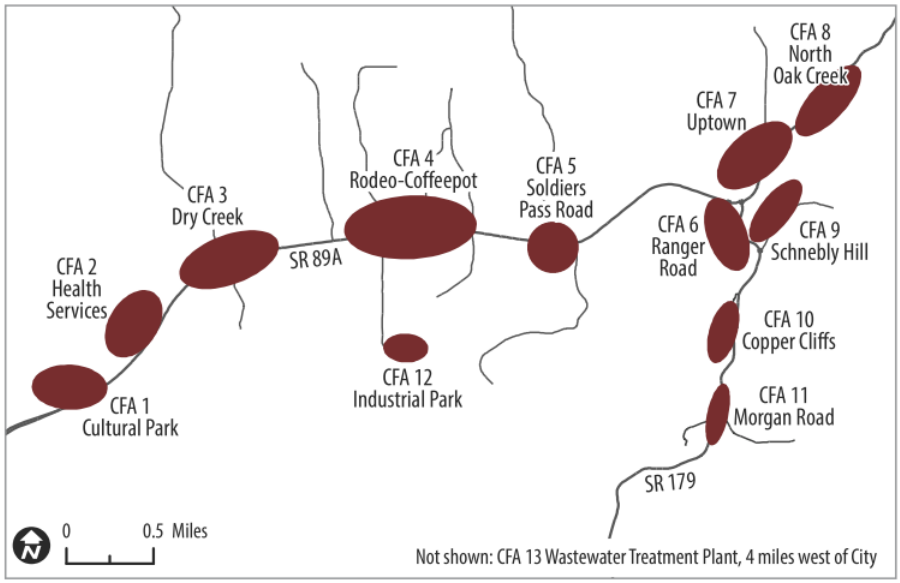
Community Values

The City of Sedona represents the best of community values set amidst the natural environment of one of the most beautiful places on earth. The community captured their values in the Sedona Community Plan as:

- Environmental Stewardship
- Community Connections
- Improved Traffic Flow
- Walkability
- Economic Diversity
- Sense of Place

The City of Sedona Transportation Master Plan (TMP) recommends a set of multi-modal transportation strategies and guidance to address congestion and mobility needs of residents, visitors, and commuters. The strategies will be considered for implementation as funding (Capital Improvement Program, local and federal grants, dedicated sales tax, etc.) becomes available. The ***Community Values*** captured in the *Sedona Community Plan* are adopted as guiding principles in the development of the Sedona TMP. The Sedona TMP embraces these values to develop a transportation system that supports and complements their intent through implementation of specific transportation strategies.

Community Focus Areas



Strategies were developed in recognition of Community Focus Areas, which are locations defined in the *Sedona Community Plan* that the City will play a proactive role to implement the community's vision.

The TMP considered cost-effective solutions such as those that eliminate or reduce the need for new or wider roadways, where feasible. The plan emphasizes community connectivity, facilities for walking and bicycling, enhanced bus transit service, improved access management, and technology to provide real-time traffic condition information to residents and visitors.

STUDY AREA

The study area (**Figure 1.1)** is defined as the incorporated limits of the City of Sedona. However, the TMP recognizes that congestion does not begin or end at the City boundaries. Holistic strategies extend beyond the City of Sedona boundary and will require collaboration with ADOT, Coconino County, Yavapai County, and the US Forest Service.

PLANNING PROCESS

The Sedona Transportation Master Plan was developed in a three-phase process.

1. **Inform** provides the City and study team the context and character of the current transportation system and the aspirations of the community.
2. **Analyze** includes detailed analysis of needs and public input to shape alternative strategies.
3. **Implement** is critical to reaching an informed agreement on a recommended plan of action.

The planning process (**Figure 1.2**) provides for the thorough analysis of technical solutions, community engagement, and transparent decision making to enlist support. These tasks were designed to identify current and future needs and opportunities and develop solutions consistent with guiding principles.

Figure 1.1: Study Area

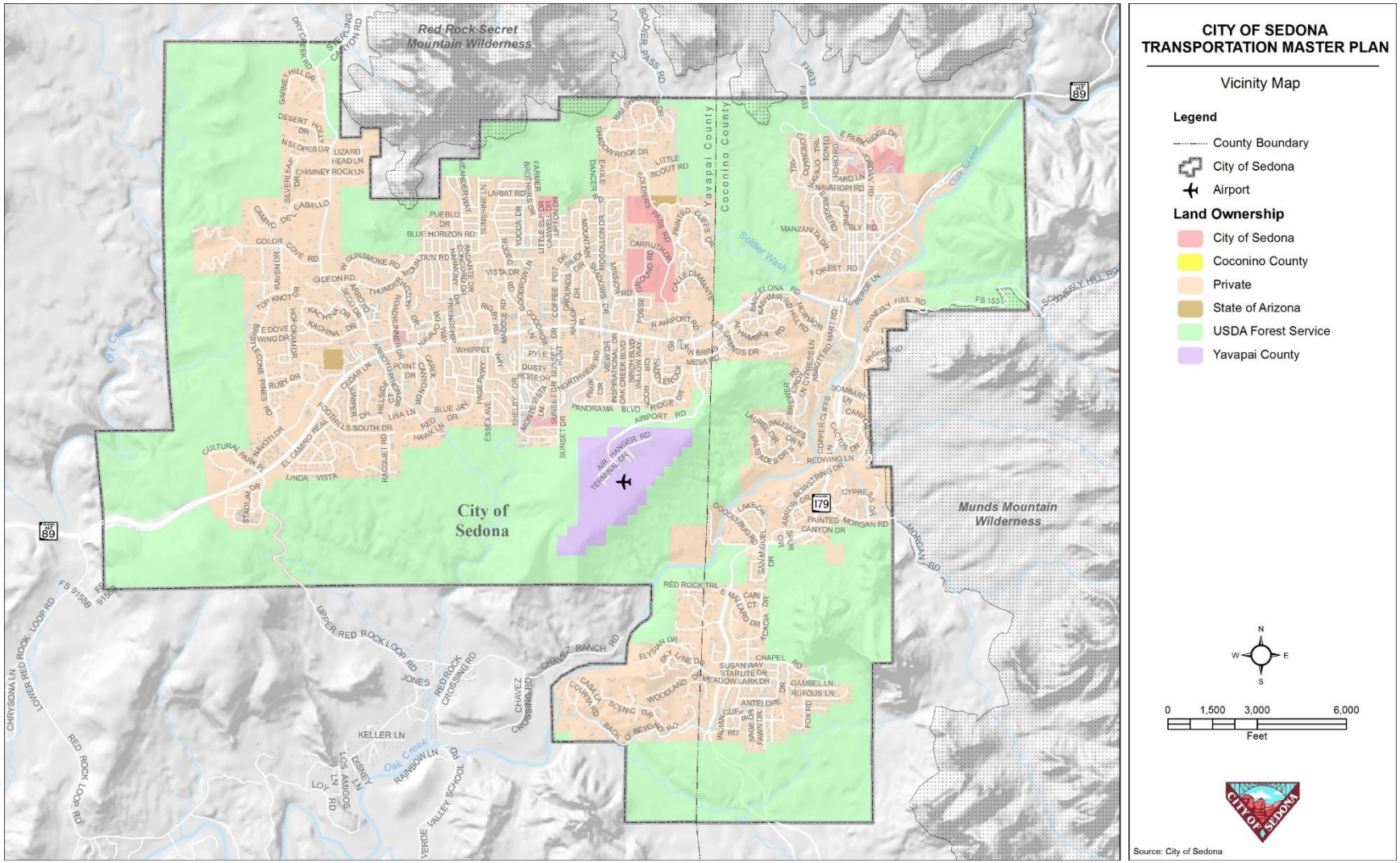
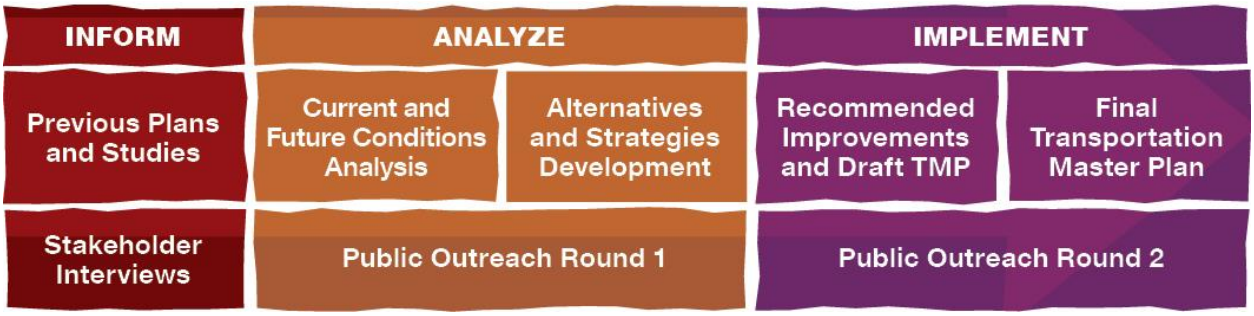


Figure 1.2: Planning Process



The process was overseen by a management team consisting of representatives from City of Sedona Public Works and the City Manager's office. A Technical Advisory Committee (TAC) supported plan development. The TAC was comprised of representatives from the City of Sedona, Cottonwood/Verde Lynx, Coconino County, Yavapai County, Arizona Department of Transportation (ADOT), and Northern Arizona Council of Governments.

INFORM

The inform phase tasks were to summarize previous plans and studies and to conduct stakeholder interviews.

Previous plans and studies: A number of studies and plans have been completed over the past two decades that are relevant to the TMP. These studies relate to different transportation issues within the City including traffic operations, safety, parking, bicycling, and walking.

Key recommendations from these studies were summarized and presented to the TAC. Recommendations with TAC comments that were advanced for consideration in the Sedona TMP are included in **Appendix A.**

***Stakeholder interviews*:** Stakeholder interviews were used to better understand the community's issues and concerns with the current transportation system and gather ideas for engaging residents in this transportation study. Stakeholder interviews identified opportunities to address transportation needs. Ideas presented were combined with others identified in the literature review of prior plans and studies, as well as an analysis of current and future conditions in the project's next steps.

Interviews of 21 stakeholders were conducted during May and June of 2016 in a one-on-one or focus group discussion setting. Interviewed stakeholders included business owners and representatives from ADOT, City of Sedona, Cottonwood Area Transit/Verde Lynx, Red Rock News, Sedona Chamber of Commerce, Sedona Lodging Council, and US Forest Service. A list of the people interviewed is included in **Appendix B.**

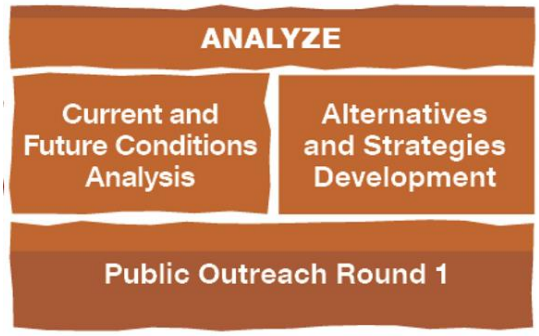
The most salient stakeholder issues were identified from interview notes. Several issues from the discussions were identified as primary concerns facing the transportation network. These are the issues most discussed by the Sedona residents and business owners:

- Stakeholders appear to be split on the issue of whether traffic congestion in Sedona is a problem or not. For those who agree there is a congestion problem, they do not agree on the magnitude of the problem.
- The majority of stakeholders believe that it is time to evaluate previously proposed ideas to determine which ideas are feasible based on data-driven analysis.
- The majority of stakeholders agree that an alternate route from SR 179 to SR 89A is needed; however, there is controversy over an appropriate solution.
- All stakeholders agree that there are parking issues in Uptown; however, many disagreed over what the appropriate solution would entail.
- All stakeholders agree that there is a traffic problem in Oak Creek Canyon, especially on weekends and summer holidays.
- The majority of stakeholders believe more connections between neighborhoods are necessary.
- The majority of stakeholders are supportive of public transit but are split over whether it should primarily serve residents, visitors, or both.
- Stakeholders who engaged in discussion regarding the need for bicycle paths and/or urban trail systems noted that bicycle safety, lack of bicycle infrastructure, and limited pedestrian connections from neighborhoods to SR 89A are primary issues.

A detailed summary of stakeholder interview comments is included in **Appendix B**.

ANALYZE

The purpose of this phase was to assess traffic and mobility data to identify critical transportation needs. The Analyze phase was founded on robust data collection and analysis.



A *data-driven process* was used to identify specific congestion and safety problems and their causes. This was a foundation for developing and analyzing transportation alternatives and strategies.

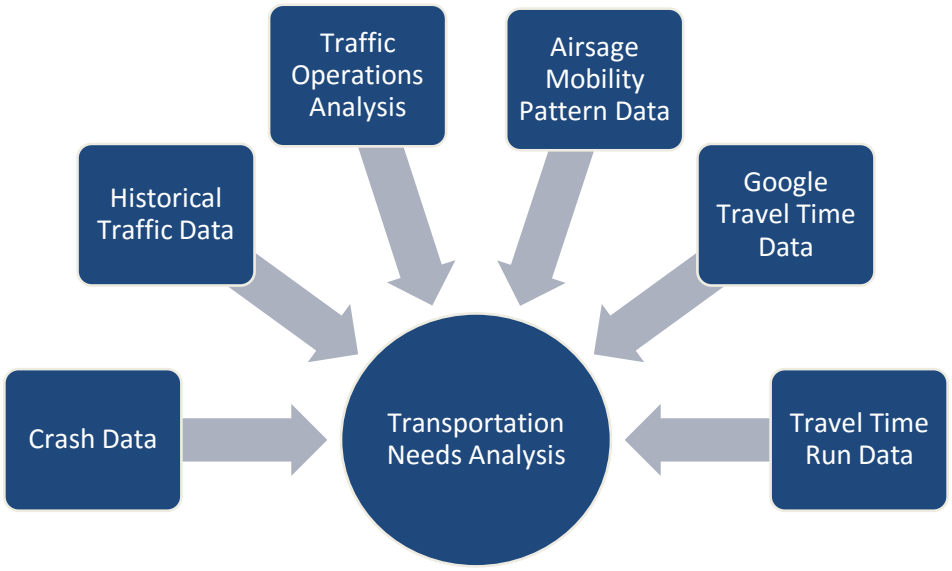
This analysis process involved state-of-the-art data and analysis techniques. The process led to the identification of the following key mobility challenges in Sedona:

- Delay and congestion on SR 179 between the “Y” and City limits,
- Delay and congestion through Uptown,
- Delay and congestion in Oak Creek Canyon,
- Traffic and pedestrian safety in West Sedona,
- Limited parking supply in Uptown,
- Lack of comfortable and safe bicycle and pedestrian choices throughout Sedona,
- Lack of convenient transit options for residents and commuters,

- Lack of convenient transit options for visitors,
- Lack of route choices between Sedona and VOC, and
- Lack of street connectivity in West Sedona.

An overview of the data sources and analysis used in this study are summarized below and described in detail in Chapter 2.

Figure 1.3: Analysis Data Sources



AIRSAGE MOBILITY PATTERN DATA

Understanding the mobility patterns of residents, commuters, and visitors is important to development of efficient and effective transportation solutions. Insight to understanding mobility patterns in Sedona was provided through origin-destination mobility pattern data provided by AirSage, a wireless information and data provider. AirSage processed anonymous location and movement data of mobile cell phones from wireless signaling data in the City for the month of March 2016.

Data was collected for 10 internal zones (within City limits) and 13 zones outside of City limits. The external zones allowed the study team to capture the interaction between Sedona and neighboring communities such as Village of Oak Creek (VOC), Cottonwood, Camp Verde, and Flagstaff.

A complete data set is included in **Appendix D**. The data provided several insights into mobility patterns of residents, visitors, and commuters during the peak tourist season in Sedona.

What is a "person trip"?

A worker traveling to work is a single trip; as he travels to lunch is a second trip, back to work from lunch is a third trip; and then home for the evening is a fourth trip.

HOW MANY PERSON TRIPS OCCUR BETWEEN SEDONA AND OTHER COMMUNITIES? HOW MANY PERSON TRIPS OCCUR WITHIN SEDONA?

The aggregated data identified the average number of weekday and weekend trips that are made by individuals arriving, departing, and staying in Sedona. Trips represented in the data are person trips. A person trip may be a captured trip of a user walking, riding a bicycle, driver/passenger in a car, jeep tour, bus, or any other mode. Three individuals riding in the same vehicle would be identified as three person trips.

- On an average weekend day in March 2016, residents and visitors made approximately 101,700 person trips to, from, and within the City of Sedona.
- Of the total person trips, approximately 25,000 are local trips made entirely within the City of Sedona. Local trips begin and end within City limits. The other 72,600 trips are people who travel to and from Sedona and destinations outside of City limits.

This data tells us that most travelers do not spend their entire day within Sedona City limits. They visit other nearby attractions, or commute in from other communities.

HOW MANY PEOPLE COMMUTE BETWEEN COTTONWOOD AND SEDONA EACH DAY? OTHER NEIGHBORING COMMUNITIES? WHAT ARE THE MOST DESIRED TRIP ORIGINS AND DESTINATIONS TO/FROM THE CITY OF SEDONA?

The patterns observed from the origin-destination data show distinct trip pairs within and around Sedona. Origin and destination pairs with a high number of trips are listed in **Table 1.1**.

Table 1.1. AirSage Origin and Destination Data Summary

TRIP PAIR	Weekday Daily Trips	Visitors		Commuters		Weekend Daily Trips	Visitors		Commuters	
		Visitors	% Visitors	Commuters	% Commuters		Visitors	% Visitors	Commuters	% Commuters
Sedona and Cottonwood	17,866	8,817	49%	6,623	37%	11,644	6,828	59%	3,287	28%
Sedona and Flagstaff	7,230	6,169	85%	589	8%	7,247	6,703	92%	265	4%
Sedona and Camp Verde	5,080	4,147	82%	751	15%	4,610	4,013	87%	364	8%
Sedona and Village of Oak Creek	14,558	10,302	71%	2,896	20%	11,359	9,303	82%	1,442	13%
Sedona and Oak Creek Canyon	5,968	5,713	96%	77	1%	6,265	6,069	97%	57	1%
Oak Creek Canyon and areas outside of Sedona	7,342	7,282	99%	43	1%	10,136	10,048	99%	74	1%

WITHIN THE CITY, WHERE DO MOST PEOPLE BEGIN AND END THEIR TRIP?

- Most trips begin and end within the same zone (e.g. within West Sedona or within Uptown). The short distances for travel within zones present opportunities for non-vehicular travel by bicycle, walking, or transit.

- West Sedona has the highest number of trips that begin and end in different zones. Top destinations for these West Sedona-originated or destination trips are the Gallery District south of the "Y" (20% of West Sedona trips), and Uptown (18% of West Sedona trips). This emphasizes the importance of enhancing multimodal connections between West Sedona and hotel/lodging destinations along SR 179, and with the Uptown area.

GOOGLE TRAVEL TIME DATA

Travel time is a simple measure understood by a wide variety of audiences including engineers and planners, residents and commuters, tourists and visitors, and administrators and elected officials. Residents and commuters frequently use travel time to make travel decisions.

In Sedona during peak visitor season, travel time on SR 179 and SR 89A can vary considerably. Residents frequently reported delays of one hour or more in Oak Creek Canyon. Others reported that it commonly takes 45 minutes to travel from VOC to Uptown when a traffic-free trip should take about 12 minutes.

To confirm this input, Kimley-Horn utilized Google Maps Directions API service to record how long a trip took from a defined start and end point on each day in Sedona between March 1, 2017 and May 31, 2017. The data was recorded in 5-minute increments between 7AM and 7PM. Key start and end points for which data was recorded were:

- SR 89A, Rainbow Trout Farm to "Y" intersection
- SR 89A, from Lower Red Rock Loop Road to "Y" intersection
- SR 179, from Bell Rock Blvd in VOC to "Y" intersection

The data was used for the following analyses:

- Estimate travel time between the start and end points under congested conditions
- How frequently the travel time met or exceeded the travel time for congested conditions
- How long did travel times meet or exceed the congested conditions travel time on the most congested days

The data showed that on several of the most congested days, travel time on SR 179 between VOC and Sedona exceeded 30 minutes, as compared to 12 minutes in uncongested condition. Specifically, the data showed that between March 1, 2017 and May 31, 2017, travel time for this trip exceeded 30[1] minutes for periods of 14 different days during this 3-month period, and exceeded 45 minutes on 2 different days.

[1] For benefits analysis documented in Chapter 4, congested travel time for a trip from VOC to the "Y" was assumed to be 36 minutes. Travel time exceeded 36 minutes on 6 days within the analysis period.

The data showed that on the most congested days, travel time on SR 89A in Oak Creek Canyon between Trout Farm and Uptown exceeded 42 minutes, as compared to 7 minutes in uncongested conditions, on a hand full of days. Specifically, the data showed that between March 1, 2017 and May 31, 2017, travel time for this trip exceeded 40[2] minutes for periods of 12 different days during this 3-month period, and exceeded 45 minutes for periods of 7 days during this 3-month period.

TRAVEL TIME RUN DATA

City staff utilized the KITSMobile App[3] (App) to conduct over 30 travel time runs on SR 179 and SR 89A. The App automatically recorded the data collection vehicle's speed, travel time, and distance at preset check points.

The data helped answer the following questions:

1. Where are the bottlenecks on SR 179 and SR 89A?
2. Where do vehicle speeds approach the speed limit and where, under congested conditions, are vehicle speeds much slower than the speed limit?
3. Does the collected travel time correspond and validate the Google Travel Time data collected?

The data showed that key bottlenecks are at the Schnebly Hill Road roundabout and the pedestrian crossings in Uptown. The data confirmed the validity of the Google Travel Time data.

TRAFFIC OPERATIONS ANALYSIS

24-Hour Average Daily Traffic (ADT) volumes were collected at seven locations on SR 89A and SR 179. The data was collected on both a weekend, Saturday, April 16, 2016, and a weekday, Thursday, April 14, 2016. The traffic data was used to evaluate the corridors' performance in terms of daily volume-to-capacity or V/C ratio.

The 24-hour data collected was used to determine the representative peak-hour, during which peak-hour turning movement counts should be collected. The data showed that Sedona doesn't experience a typical AM/PM peak hour as would be experienced in a typical urban area. Peak traffic hour conditions occur on Friday evenings and Saturday afternoons.

Peak-hour turning movement counts (TMC) were collected at 15 major intersections on SR 89A and SR 179. The data showed that traffic patterns typically peak during the weekend mid-day to early afternoon, approximately noon to 3PM, especially at intersections within Uptown Sedona and the Gallery District on SR 179, just south of SR 89A.

ADOT HISTORICAL TRAFFIC DATA

Historical traffic volume data were obtained from the two ADOT continuous traffic count locations located within Sedona on SR 89A and SR 179. The SR 89A permanent count station is located east of

[2] For benefits analysis documented in Chapter 4, congested travel time for a trip from Trout Farm to the "Y" was assumed to be 42 minutes. Travel time exceeded 45 minutes on 8 days within the analysis period.

[3] http://kits.kimley-horn.com/kitsmobile

Airport Road. The SR 179 location is south of Chapel Road. Archived data available through the ADOT Transportation Data Management System allowed the study team to review traffic volumes by hour, day, or month for both 2017 (to date) and previous years.

These data showed continuous growth in traffic on SR 89A and SR 179, which is anticipated to continue in the future.

CRASH DATA

Crash data for all public roads within the Sedona city limits was analyzed for the five-year period of January 2011 to December 2015. These data were used to identify the types of crashes occurring, high-crash intersections, and road segments.

The data showed that most crashes occurred on SR 89A in West Sedona. SR 89A in West Sedona is a five-lane undivided roadway. SR 179 (two lanes and a median barrier) experienced very few crashes over the five-year analysis period.

IMPLEMENT

The purpose of the Implement phase was to identify strategies and projects to be considered by the City as funding becomes available. Strategies were developed considering

- Results of the Inform phase data collection.
  - Which segments and intersections are the most congested?
  - What is the cause of the congestion?
  - What strategies would be effective to reduce the congestion?
- Strategies Workshop, held in October 2016 with members of the Technical Advisory Committee and specialty discipline representatives.
- Public outreach Round 2, conducted in June 2017, which requested community feedback on draft transportation strategies.
- City Council discussion on each recommended strategy, as presented to the City Council between January 2017 and May 2017. Direction from the City Council influenced the strategies recommended in the TMP.

The planning process led to the identification and development of 12 strategies (**Table 1.2**) recommended for implementation as funding becomes available. An additional strategy, Red Rock Crossing, is recommended in the long-term; however, considering the costs and anticipated benefits, it is a lower priority than the other recommended strategies. In addition, this project would be the responsibility of Yavapai County as it is located outside of the City of Sedona.

Table 1.2. Sedona Transportation Master Plan Strategy Summary

STRATEGY	STRATEGY DESCRIPTION	NEEDS ADDRESSED
Strategy 1. Uptown Sedona Roadway Improvements	• Construct a raised median with decorative barrier to direct pedestrians to controlled crossings. • Construct an additional southbound travel lane on SR 89A through Uptown. • Construct a turnaround or roundabout at the north end (e.g. at Art Barn). • Construct a roundabout at the south end (Jordan Road) of Uptown on SR 89A. • Create one-way access from 89A to free parking via Schnebly Road (NOT Schnebly Hill Road).	• Delay and congestion through Uptown
Strategy 2. Uptown Sedona Pedestrian Improvements	• Remove crosswalk at Arroyo Roble and Wayside Chapel and direct pedestrians to Wayside bridge crossing. • Construct a pedestrian bridge over 89A at Wayside Chapel. • Construct a pedestrian bridge over 89A at Jordan Road.	• Delay and congestion through Uptown
Strategy 3. Uptown Sedona Parking Improvements	• Expand parking areas through additional parking lots, on-street parking, or a new parking garage. • Enhance signs that provide directions to City parking lots.	• Limited parking supply in Uptown • Delay and congestion through Uptown
Strategy 4. SR 179 Improvements, Schnebly Hill roundabout to the "Y"	• Schnebly Hill Road roundabout is expanded to two lanes. • SR 179 from Schnebly Hill roundabout to the "Y" is expanded to two lanes in each direction. • A pedestrian tunnel or bridge is added at Tlaquepaque, replacing the existing crosswalk. • Addition of separated right-turn lane towards southbound SR 179 and a separated right-turn lane towards Uptown.	• Delay and congestion on SR 179 between the "Y" and City limits
Strategy 5. Major Roadway Connections	• Make Portal Lane one-way in to Tlaquepaque/Los Abrigados area. • Connect Tlaquepaque parking lot to Ranger Road/Brewer Road for exiting vehicles. • Extend the west end of Forest Road to connect to Southbound SR 89A.	• Delay and congestion on SR 179 between the "Y" and City limits • Forest Road addresses delay and congestion through Uptown
Strategy 6. Neighborhood Vehicular Connections	• Set of new neighborhood vehicular connections meant to accommodate local residents and keep short trips off SR 89A**.** Several possible street connections are identified.	• Lack of street connectivity in West Sedona
Strategy 7. Enhanced Transit Service - Commuter/Resident Focused	• Extend Verde Lynx bus service to VOC.	• Lack of convenient transit options for residents and commuters

STRATEGY	STRATEGY DESCRIPTION	NEEDS ADDRESSED
Strategy 8. Enhanced Transit Service - Tourism Focused Shuttle Service	• Implement a tourist-focused bus shuttle system from VOC to Slide Rock State Park. • Park-and-Ride lot near Red Rock Ranger Station with additional stops and pick-up points along SR 179 and SR 89A.	• Lack of convenient transit options for visitors • Delay and congestion through Uptown and on SR 179 between the "Y" and City limits
Strategy 9. Neighborhood Vehicles - Tourism Focused	• Neighborhood vehicle flexible service supplements the Verde Lynx or Oak Creek Canyon Shuttle.	• Lack of convenient transit options for visitors • Limited parking supply in Uptown • Potential trailhead circulator
Strategy 10. SR 89A/West Sedona Access Improvements	• Eliminate or consolidate redundant driveway access points. • Construct a raised median to control certain left turn movements to and from SR 89A.	• Traffic and pedestrian safety in West Sedona
Strategy 11. Bicycle and Pedestrian Improvements	• Shared use path from Uptown to West Sedona. • Wide paved shoulders on Dry Creek Road. • Bicycle boulevard parallel both north and south of SR 89A using existing streets and some new connecting pathways. • Various sidewalk connections.	• Lack of comfortable and safe bicycle and pedestrian choices throughout Sedona
Strategy 12. Traveler Information	• Electronic message signs on I-17 at Camp Verde and at SR 89A south of Flagstaff to display travel time information to Sedona.	• Delay and congestion through Uptown and on SR 179 between the "Y" and City limits
Strategy 13. Red Rock Crossing	• Construct new bridge or crossing of Oak Creek and roadway improvements; possible location is at end of Verde Valley School Road to connect to Red Rock Crossing Road.	• Lack of route choices between Sedona and VOC • Delay and congestion on SR 179 between the "Y" and City limits

Chapter 2 – Mobility Conditions

Chapter 2 summarizes the data-driven process that was used to assess mobility conditions in Sedona and identify mobility needs. The following analysis areas are discussed:

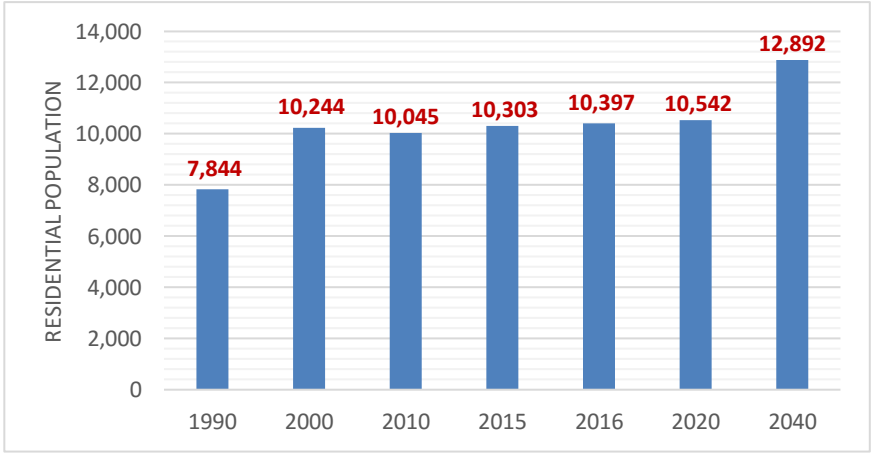
- Population and Visitors
- Roadway System
- Bicycle and Pedestrian System
- Public Transportation
- Parking

POPULATION

SEDONA'S RESIDENTIAL POPULATION HAS REMAINED RELATIVELY FLAT SINCE THE YEAR 2000.

Sedona's population fluctuates throughout the year due to part-time residents. According to Sedona's Community Plan, the number of part-time residents increased from 892 to 1,674 between 2000 and 2010; however, overall population decreased from 10,244 to 10,045 during the same period. According to US Census data, Sedona's population increased by about 300 residents between 2010 and 2015.

Figure 2.1: Sedona Population Estimates and Forecast, 2010-2040



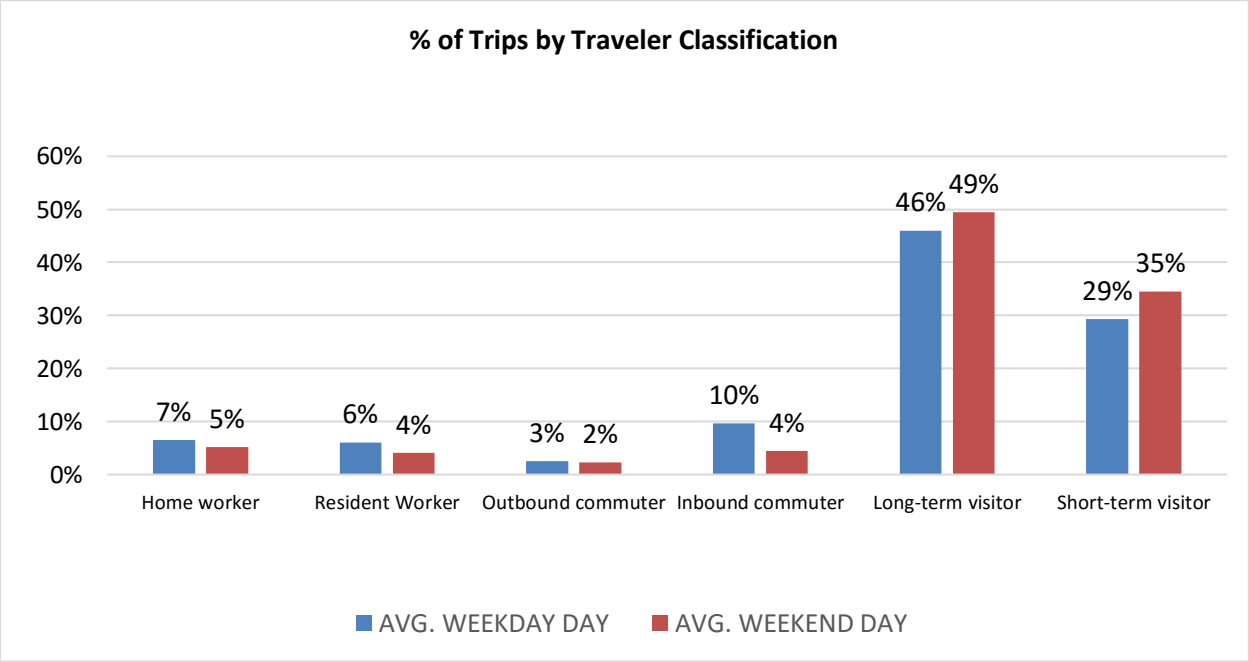
As demonstrated in **Figure 2.1** modest population growth is anticipated over the coming decades. The Arizona Demographers office forecasts a population of approximately 12,900 residents by the year 2040, a nearly 25% increase from today's population.

VISITORS

APPROXIMATELY 80% OF TRIPS IN SEDONA ARE MADE BY VISITORS

Figure 2.2 provides information about trips made by residents and visitors to Sedona, based on analysis of AirSage mobility pattern data. Short-term visitors (two days or less) and long-term (multi-day) visitors make over 80% of trips in Sedona as they travel to and from different tourist attractions throughout the day. For example, these are trips made to and from Uptown Sedona, West Sedona, the Gallery District, and other locations around the City.

Figure 2.2: Mobility Pattern Trip Data, Trips by Traveler Classification



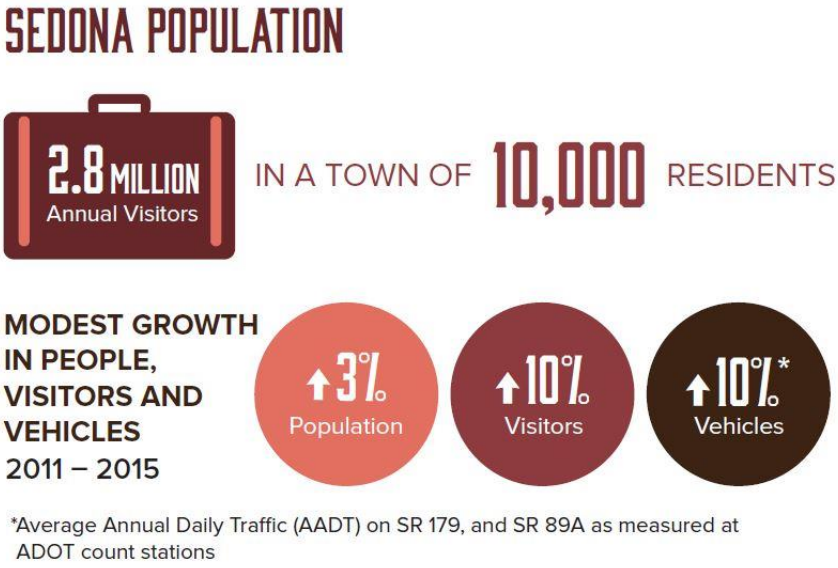
Traveler Category	Definition
Home Worker	Home worker is one whose day and night time location are the same and are both within Sedona.
Resident Worker	Resident worker lives and works within Sedona.
Outbound commuter	Outbound commuter is a resident of Sedona, with a work location outside of Sedona.
Inbound commuter	Inbound commuter has a home location in the external area surrounding Sedona, but the work location is Sedona.
Long-term Visitor	Long term visitors stay more than 2 days in Sedona within the 30-day analysis period.
Short-term Visitor	Short-terms visitors are 'through' travelers who stay less than 2 days in Sedona within the 30-day analysis period.

TOURISM AND TRAFFIC GROWTH

TOURISM GROWTH HAS APPROXIMATED THE INCREASE IN TRAFFIC VOLUMES ON SR 179 & SR 89A.

Figure 2.3 and **Figure 2.4** demonstrate a corresponding pattern between the number of visitors to Sedona and average annual daily traffic (AADT).

From 2011 to 2015, annual visitors to Sedona grew by 10% or about 2% per year from 2.5 million in 2011, to more than 2.8 million in 2015.



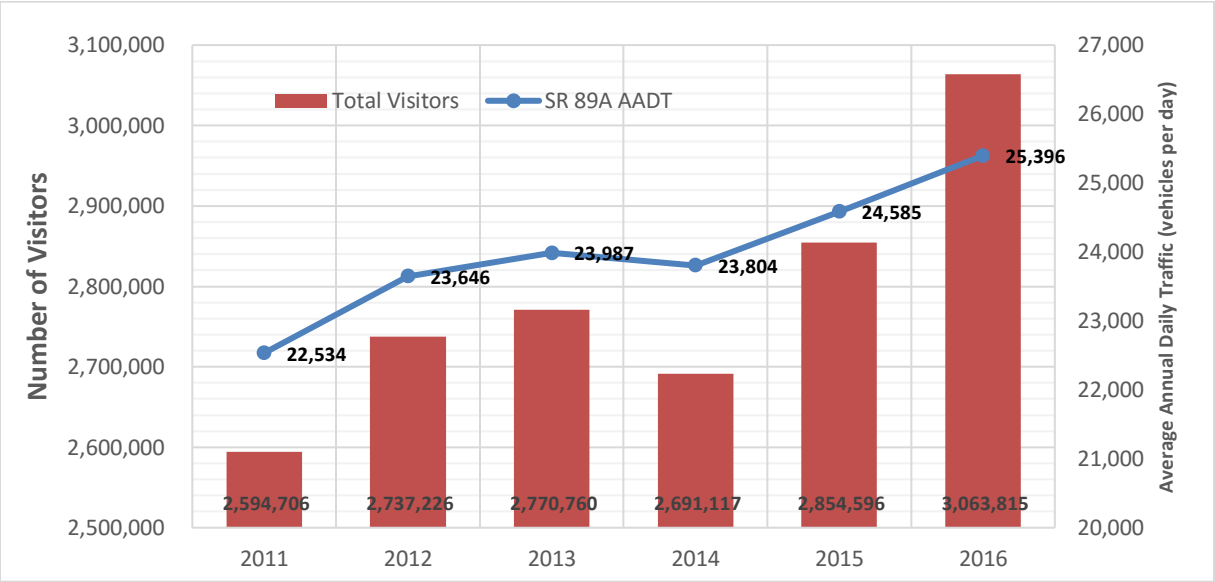
For the same period, traffic on SR 89A grew an average of 2.2% per year, a similar rate to tourism growth. As illustrated in the figures, AADT dipped in 2014, as well as the estimated number of visitors; however, in 2015, with an increase in visitation, average daily traffic has also increased.

On SR 179, the pattern is not as consistent. Traffic data showed a consistent increase between 2011 and 2015, even when the estimated number of visitors declined in 2014. It is notable that overall, from 2011 to 2015, both tourism and traffic volumes grew by 10%.

CHALLENGE

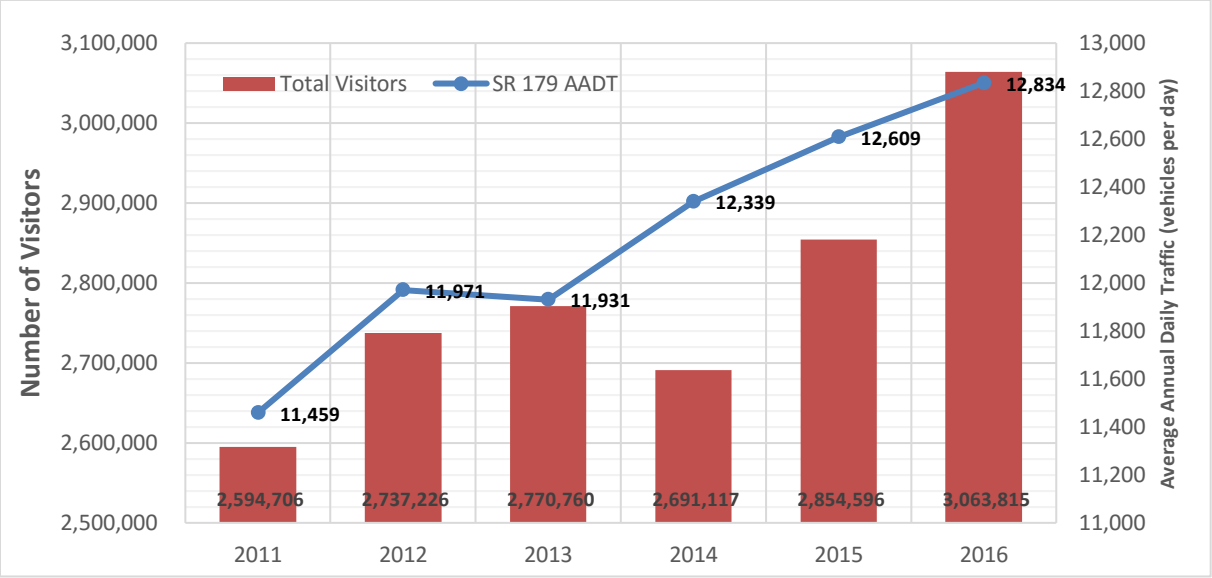
As tourism, visitor, and commuter growth has increased, in conjunction with modest population growth, it is increasingly important to identify Transportation Demand Management (TDM) strategies that reduce peak period auto trips and encourage use of modes such as biking, walking, and transit.

Figure 2.3: Visitor Trends and Traffic on SR 89A



Count station located east of Airport Road on SR 89A
Source: Sedona Chamber of Commerce (Visitor Information), Arizona department of Transportation (Traffic Volume Data)

Figure 2.4: Visitor Trends and Traffic on SR 179



Count station located south of Chapel Road on SR 179
Source: Sedona Chamber of Commerce (Visitor Information), Arizona department of Transportation (Traffic Volume Data)

ROADWAY SYSTEM

SR 179 AND SR 89A SERVE AS THE BACKBONE OF SEDONA'S TRANSPORTATION NETWORK. SR 89A AND SR 179 MUST SERVE BOTH REGIONAL TRIPS AND LOCAL TRAFFIC.

SR 179

Widely recognized as one of the most scenic drives in Arizona, SR 179 follows a meandering corridor with breathtaking views of the surrounding red rock scenery. In 2006, the US Department of Transportation awarded SR 179 its highest designation within the National Scenic Byways Program, the All-American Road designation. The corridor includes urban commercial centers at the north end and transitions to suburban residential and forest land as it extends south toward the VOC. Improved in 2010, the previously existing roadway was two lanes, undivided, with little or no shoulder, significant horizontal and vertical curvature, few passing opportunities, and limited sight distance at many locations. Today, the roadway includes a raised median and one travel lane in each direction. SR 179 is owned by the Arizona Department of Transportation (ADOT).

SR 179 at MP 312. SR 179 consists of one lane in each direction, a raised median, and a bicycle lane.

SR 89A

SR 89A through West Sedona consists of five lanes (two lanes in each direction and a two-way center left turn lane). A raised median was constructed in 2002 between Juniper Drive and west of Upper Red Rock Loop. West of Upper Red Rock Loop, SR 89A transitions to a divided roadway with a traversable flush median.

In Uptown, north of Forest Road, SR 89A transitions into a three-lane road with a two-way center left turn lane. This segment of SR 89A traverses through one of Sedona's most popular tourism areas. This segment includes angled parking, wide sidewalks, and pedestrian-focused landscape and hardscape features. There are four marked pedestrian crosswalks through this segment, one of which is a mid-block pedestrian-only traffic signal approximately 350 feet north of Jordan Road. The other three crosswalks are not signalized. There is also a traffic signal with a crosswalk located at Forest Road. This segment is lined with shopping, food, and lodging establishments. North of Arroyo Roble Road, SR 89A transitions into a two-lane road that extends to city limits and then transitions into Oak Creek Canyon. SR 89A is owned by ADOT, except for the segment between L'Auberge Lane and just north of Art Barn Road (milepost 374.20 to milepost 374.84). This segment is owned by the City of Sedona.

SR 89A in West Sedona

SR 179/SR 89A Intersection (the "Y")

SR 89A in Uptown Sedona includes on-street parking, one lane in each direction, and a continuous two-way left turn lane. North of Uptown, SR 89A transitions to a two-lane rural roadway as it enters Oak Creek Canyon.

INTERSECTIONS

SR 89A includes nine traffic signals within city limits, seven of which are under the control of ADOT. The City operates and maintains a traffic signal at Forest Road/SR 89A, as well as a mid-block pedestrian signal located on SR 89A approximately 350 feet north of Jordan Road. Signalized intersections are listed in **Table 2.1.**

There are six roundabout intersections within city limits on SR 179, and one roundabout on SR 89A. These were all constructed as part of the SR 179 roadway improvements project, completed in 2010. Roundabout intersections are listed in **Table 2.2** and illustrated in **Figure 2.5.**

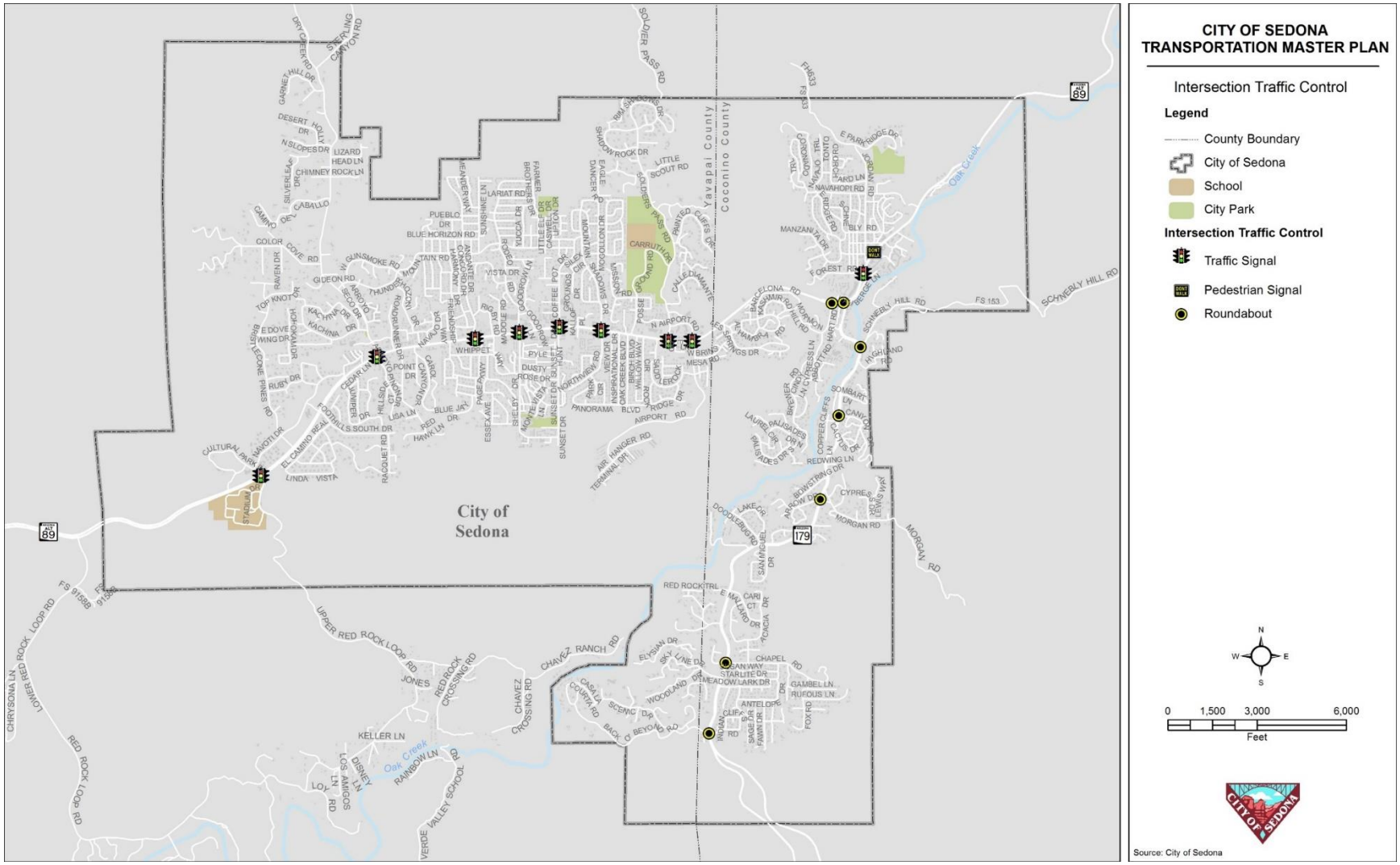
Table 2.1. Intersection Control – Traffic Signals

Signalized Intersections
SR 89A at Cultural Park Place/Upper Red Rock Loop Road
SR 89A at Dry Creek Road/Arroyo Pinon Drive
SR 89A at Andante Drive
SR 89A at Rodeo Road/Shelby Drive
SR 89A at Sunset Drive/Coffee Pot Drive
SR 89A at Northview Road/Mountain Shadows Drive
SR 89A at Soldiers Pass Road
SR 89A at Airport Road
SR 89A at Forest Road
SR 89A Mid-Block Pedestrian Signal

Table 2.2. Intersection Control – Roundabouts

Roundabouts
SR 89A at Brewer Road
SR 179 at SR 89A
SR 179 at Schnebly Hill Road
SR 179 at Canyon Drive
SR 179 at Morgan Road/Arrow Drive
SR 179 at Chapel Road
SR 179 at Back O Beyond Road/Indian Cliffs Road

Figure 2.5: Roadway Network – Intersection Control



STREET CONNECTIVITY

LIMITED STREET CONNECTIVITY BETWEEN NEIGHBORHOODS MEANS THERE ARE NO ALTERNATIVES TO SR 179 OR SR 89A DURING CONGESTED CONDITIONS.

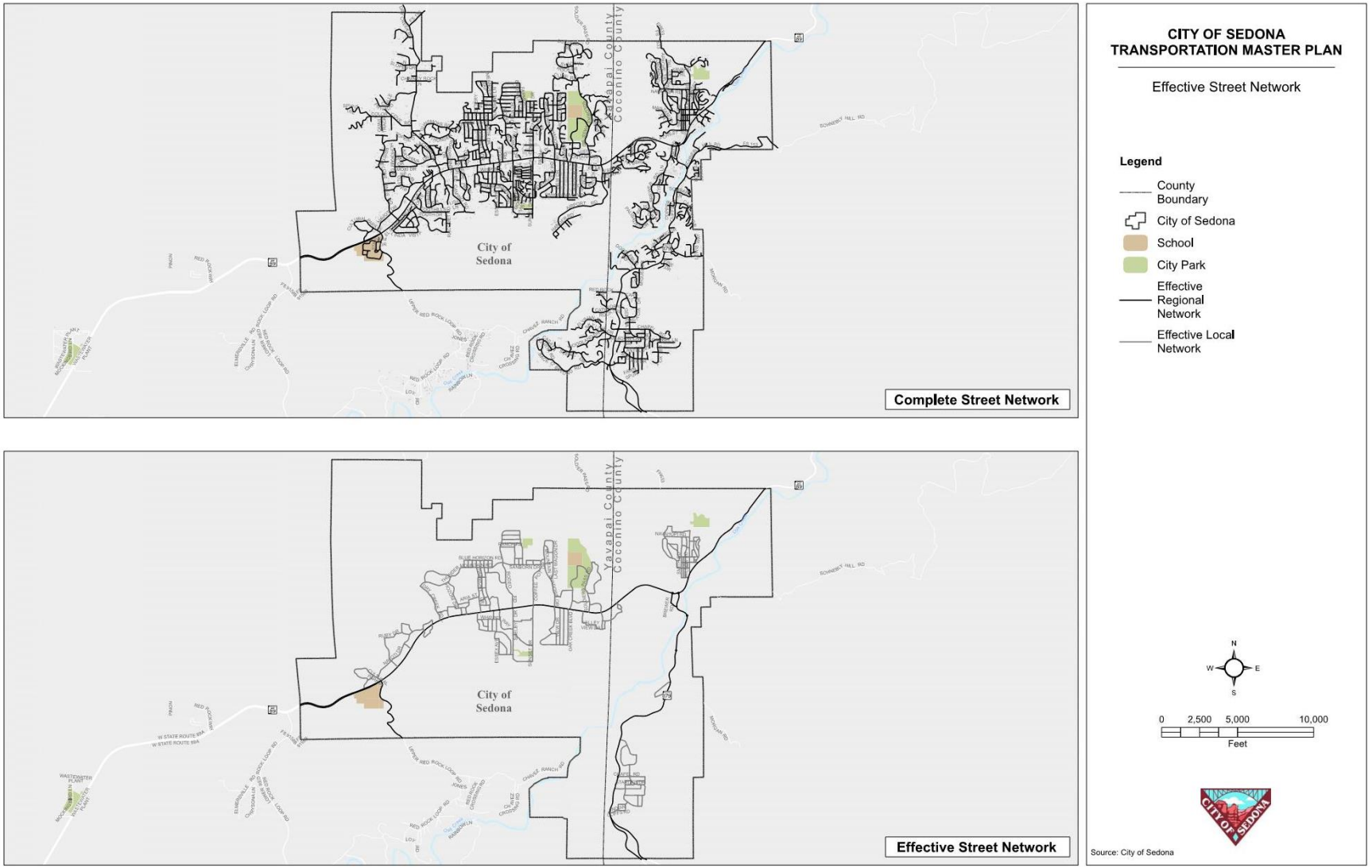
Street connectivity relates to the density of connections within a roadway network and how direct paths are between places. A well-connected network has many short links, numerous intersections, and minimal dead-ends (cul-de-sacs). As connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations and creating a more accessible and resilient transportation network.

The Sedona street network's connectivity was evaluated at a high-level to get a sense of how well the street network connects origins and destinations. A well-connected street network provides multiple routes and connections between residential neighborhoods and destinations such as shopping, entertainment, and employment areas. A connected network reduces transportation impacts by distributing trips. A connectivity network also encourages more walking and the use of bicycles as connected streets are generally not as large and are more comfortable to walk and bike along.

Figure 2.6 demonstrates a need to improve street connectivity within the City. The top map shows the City's entire street network (142 miles of local streets, collectors, and arterials). The bottom map, the effective street network map, removes streets that do not connect to other streets. For example, dead-end streets and cul-de-sacs were removed. The effective street network map is divided into two colors to show local connectivity. The connectivity analysis demonstrates the following observations:

1. Of the 142 miles of existing roads, approximately 56 miles (39.4%) are connected streets.
    a. Approximately 37 miles (66.5%) of connected streets are owned by the City.
    b. Approximately 19 miles (33.5%) of connected streets are owned by ADOT, US Forest Service, or are privately owned.
2. Some local street connections provide alternative route options to portions of SR 89A or SR 179.
3. Brewer Road/Ranger Road is the only alternative that connects SR 89A and SR 179, while there are no connecting streets between West Sedona and Uptown, nor between Uptown and SR 179. All trips that desire to travel between these areas are directed to use SR 89A and/or SR 179.
4. New connections will provide varying degrees of benefit.
5. Some new connections would need to be supported by a complementary traffic calming program to mitigate their impact.

Figure 2.6: Effective Street Network



Functional Classification

Functional classification defines the role a particular roadway segment plays in serving the flow of traffic through a network. Roadways are assigned a functional classification within a hierarchy according to the character of travel service each roadway provides. Planners and engineers use this hierarchy of roadways to properly channel transportation movements through a highway network efficiently and cost-effectively.

Functional classification carries with it expectations about roadway design, including its speed, capacity and relationship to existing and future land use development. Federal legislation utilizes functional classification in determining eligibility for funding under the Federal-aid program. Transportation agencies describe roadway system performance, benchmarks, and targets by functional classification. As agencies continue to move towards a more performance-based management approach, functional classification will be an increasingly important consideration in setting expectations and measuring outcomes for preservation, mobility and safety.

Sedona Functionally Classified Roads are depicted in **Figure 2.7.** Roadways are classified as the following:

1. **Principal Arterials** provide a high degree of mobility and can also provide mobility through rural areas. Abutting land uses can be served directly.

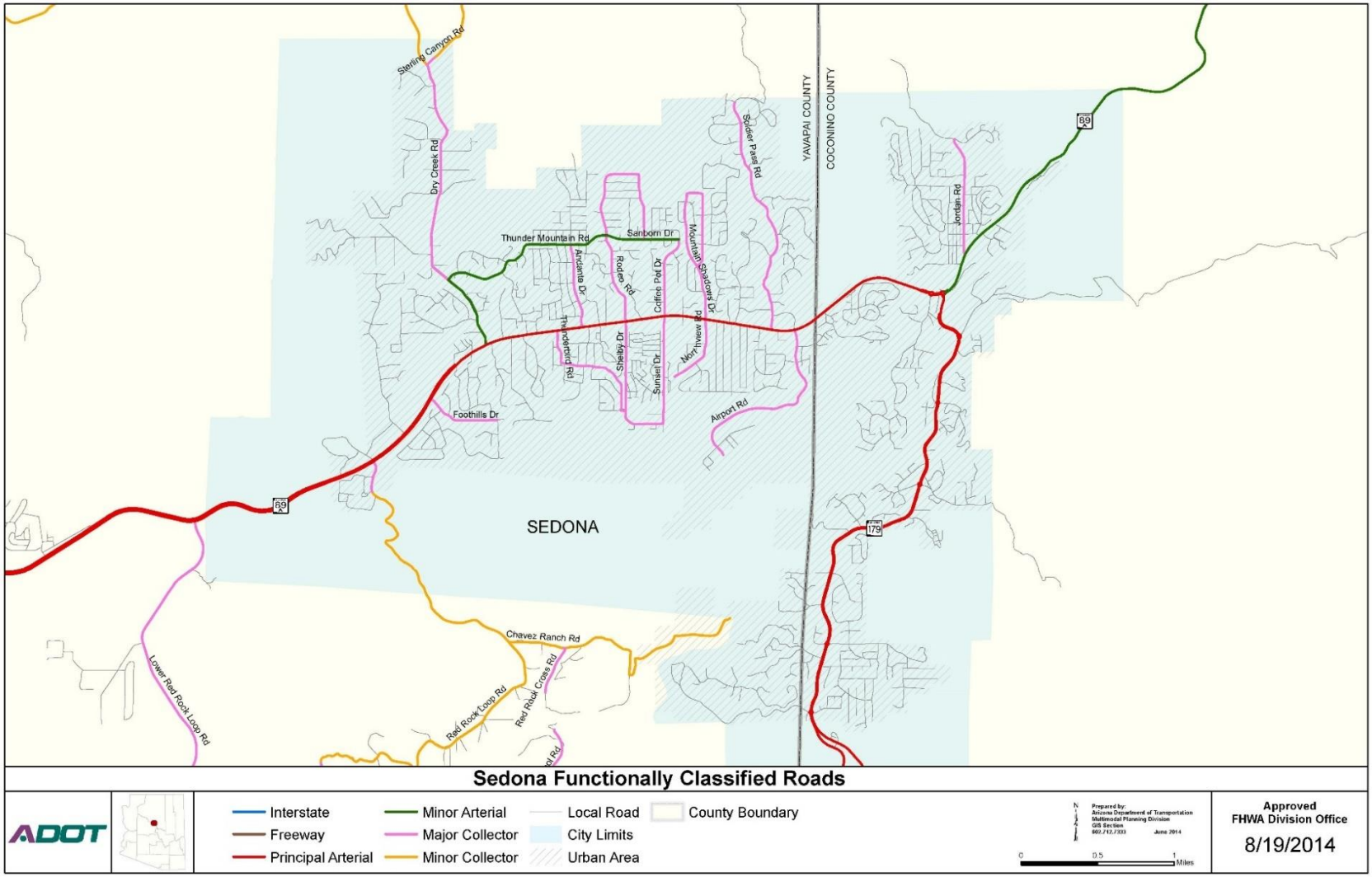
2. **Minor Arterials** provide service for trips of moderate length and offer connectivity to the higher arterial system.

3. **Major and Minor Collectors** gather traffic from local roads and funnel them to the arterial network. Collectors generally constitute those routes on which travel distances are shorter than on arterial routes. As compared to minor collectors, *major collector* routes are longer in length; have lower connecting driveway densities; have higher speed limits; are spaced at greater intervals; have higher annual average traffic volumes; and may have more travel lanes than their minor collector counterparts.

4. **Local Roads** account for the largest percentage of all roadways in terms of mileage. They are intended to serve the origin or destination end of the trip due to their provision of direct access to abutting land.

The City includes two principal arterial roadways: SR 179 and SR 89A. These two roadways are the only through-roadways, and carry a vast majority of local and non-local traffic throughout the City.

Figure 2.7: Functional Classification



ROADWAY SYSTEM PERFORMANCE

This section discusses roadway system performance using several performance measures: existing traffic and level of service analysis on road segments and intersections, travel time data on key corridors, future travel demand and congestion levels, and safety analysis. These analyses were used to determine transportation needs that are addressed by strategies developed later in this plan.

ROADWAY TRAFFIC VOLUMES AND LEVEL OF SERVICE

Traffic volume data for road segments were obtained from several sources:

- ADOT continuous traffic count locations located on SR 89A and SR 179
- Daily 24-hour traffic volume data collected on April 14 and 16, 2016
- Google Travel Time data collected for March 1, 2017 – May 31, 2017

Peak Season versus non-peak season traffic. Table 2.3 shows the difference between peak season, and annual average, January 2016, and July 2016 daily traffic volumes. Traffic volumes are significantly higher during peak season, overwhelming the capacity of the roadway.

Table 2.3. Peak Season Versus Annual Average Traffic on SR 89A and SR 179 (AADT)

Continuous Count Location	Apr 2016 Weekend	Annual Average 2016	% Difference (Apr 2016 / Annual Avg.)	January 2016	% Difference (Apr 2016 / Jan 2016)	July 2016	% Difference (Apr 2016 / Jul 2016)
SR 89A, near Airport Rd	27,490	23,689	16%	21,883	25%	24,814	10%
SR 179, south of Chapel Rd	16,260	12,100	34%	11,115	46%	12,801	27%
Source: ADOT Transportation Data Management System (TDMS), permanent count stations, Field Data Services April 2016							

Weekday vs. weekend traffic. Table 2.4 shows continuous count station AADT for averaged weekdays and averaged weekends for the years 2012 to 2016. The SR 89A location shows slightly higher weekday traffic volumes (2%) as compared to weekend. In contrast, SR 179 shows more weekend traffic.

Table 2.4. Historic AADT Volume Comparison for Weekday and Weekends

	SR 89A				SR 179			
Year	**AADT**	**Average Weekday**	**Average Weekend**	**Weekend Difference**	**AADT**	**Average Weekday**	**Average Weekend**	**Weekend Difference[1]**
2012	23,646	Data not available			11,971	11,625	12,585	8.3 %
2013	23,987	23,642	23,289	-1.5 %	11,931	11,565	12,401	7.2 %
2014	23,804	24,043	23,567	-2.0 %	12,339	11,998	12,956	8.0 %
2015	24,585	24,911	24,277	-2.5 %	12,609	12,145	13,301	9.5 %
2016	23,689	25,871	25,145	-2.8 %	12,834	12,370	13,561	9.6 %
Source: ADOT Transportation Data Management System (TDMS), permanent count stations) *1. % difference change average weekday and weekend*								

PEAK SEASON LEVEL OF SERVICE ANALYSIS

TRAFFIC VOLUMES ARE SIGNIFICANTLY HIGHER DURING PEAK SEASON, OVERWHELMING THE CAPACITY OF THE ROADWAY.

24-Hour Average Daily Traffic (ADT) volumes were collected at seven locations on SR 89A and SR 179. The data was collected on both a weekend, Saturday, April 16, 2016, and a weekday, Thursday, April 14, 2016. **Figure 2.8** illustrates and **Table 2.6** summarizes the April 2016 traffic data, as well as historical traffic volumes obtained from previous plans and studies and from other available count data.

Current traffic congestion levels were analyzed using Level of Service (LOS), a measure which rates the performance of the roadway network in terms of the degree of congestion, using the Letters A through F with A being the best, and F being the worst. LOS D is a commonly accepted rush-hour condition. LOS E or F means travelers experience long delay.

Congested roadway segments that perform at Level of Service (LOS) E or LOS F are summarized in **Table 2.5**. The peak season traffic volume data shows that SR 179 operates at its estimated capacity of 19,500 vehicles per day during the collection period. Traffic volume on segments of SR 89A exceed 30,000 vehicles per day, approaching its capacity of 33,000.

Table 2.5. Existing Congeseted Roadway Segments

Traffic Count Location	LOS	Notes
SR 89A, west of Coffee Pot Drive	Weekday LOS E	This segment includes two lanes in each direction and a two-way center left turn lane (five lanes total).
SR 89A, north of the "Y"	Weekday and weekend LOS E-F	This segment through Uptown is a two-lane facility with high pedestrian activity mixed with heavy vehicular traffic.
SR 179, south of Ranger Road	Weekday and weekend LOS E-F	Traffic congestion on this two-lane divided segment results from over-capacity intersections of SR 89A/SR 179 and SR 179/Schnebly Hill Road. Pedestrians crossing SR 179 at Tlaquepaque create stops in traffic that spills back into adjacent roundabout intersections.

FUTURE TRAFFIC AND LEVELS OF SERVICE

Table 2.6 shows that if traffic continues to grow at a 2.5% pace as it has historically, SR 179 will consistently operate at capacity during weekday peak periods by the year 2020 and weekend peak periods are expected to continually get worse. By 2025, all segments of SR 179 within the City and SR 89A segments (east of Cultural Place Park) will operate at LOS E and LOS F during peak periods in peak season.

Table 2.6. Current and Future Traffic Volumes, Peak Visitor Season, SR 179, near Schnebly Hill Road

	2016	2017	2018	2019	2020
WEEKDAY	17,691	18,133	18,587	19,051	**19,528**[1]
WEEKEND	**19,787**[1]	20,282	20,789	21,308	21,841

1. Roadway segment is at or exceeds estimated roadway capacity of 19,500. 2. Assume 2.5% annual growth rate.

Figure 2.8: Traffic Volume Count Data

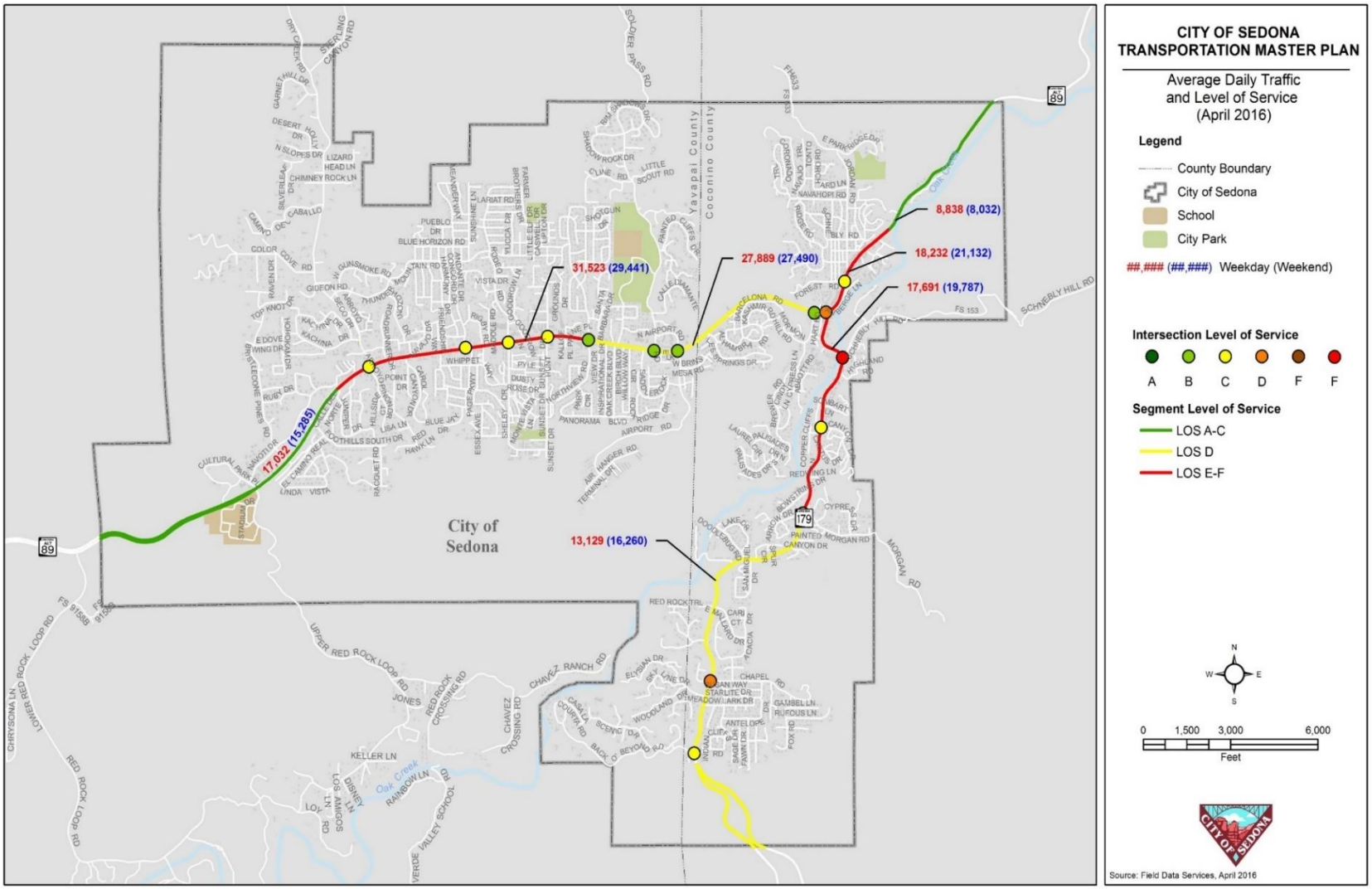


Table 2.7. Daily Traffic Volumes and Level of Service (Segment)

Location	Historical Daily Traffic				2016 Daily Traffic		Future Projected Daily Traffic		Estimated Roadway Capacity	Current V/C	Level of Service		
	1989[1]	1995[1]	2000[5]	Other	Day Collected	April 2016	2025[7]	2040[7]			2016	2025	2040
SR 89A, west of Cultural Park Place	-	12,000	12,158	12,626 (2012)[3]	Saturday	15,285	25,387	28,779	35,500	0.43	A-C	D	D
					Thursday	17,037				0.48	A-C		
SR 89A, west of Coffee Pot Drive	17,900	25,000	27,195	30,654 (2003)[4]	Saturday	29,441	30,376	34,538	33,800	0.87	D	E	F
					Thursday	31,523				0.93	E		
SR 89A, east of Airport Road	21,900	26,952	28,550	22,534 (2011)[3]	Saturday	27,490	37,713	42,294	33,800	0.81	D	F	F
					Thursday	27,889				0.83	D		
SR 89A, east of Art Barn Road	5,800	8,388	-	5,800 (2009)[3] 7,989 (2013)[5]	Saturday	8,032	10,000	Exceeds Capacity	12,480	0.64	A-C	F	F
					Thursday	6,838			12,480	0.55	A-C		
SR 89A, north of the "Y"	-	15,186 (Sept)	13,613 (Nov)	19,034 (2013)[5]	Saturday	21,132	Exceeds capacity		19,500	1.00	E-F	F	F
					Thursday	18,232				0.93	E-F		
SR 179, south of Ranger Road	9,300	13,580	-	15,003 (2011)[3]	Saturday	19,787	24,376	21,690	19,500	1.00	E-F	F	F
					Thursday	17,691				0.91	E-F		
SR 179, north of Mallard Drive	7,900	11,200	-	10,921 (2012)[3]	Saturday	16,260	22,866	28,819	19,500	0.83	D	F	F
					Thursday	15,129				0.78	D		

1. Traffic model only, Sedona Area Transportation Study (July 1991 – Parson Brinckerhoff). Source: ADOT Traffic Counts, July 1989
2. Traffic Counts (November 2000 – City of Sedona). Single 24 hour counts in selected locations.
3. ADOT Annual Average
4. Andante Traffic Signal Study, 2003, Kimley-Horn
5. Traffic projections on SR 89A northeast of Art Barn Road from the regional travel demand model are less than the current traffic volumes. As such, projections shown were calculated through application of a 2% conservative growth rate, consistent with anticipated growth in tourism. Volume shown illustrates the unconstrained volume assuming traffic volumes continue to grow unconstrained by capacity. In reality, traffic volumes will be constrained by the capacity of the roadway.
6. City of Sedona
7. Verde Valley Master Transportation Study, 2016
8. The thresholds used to translate the V/C ratio to LOS are: Good (LOS A-C): < 0.71; Fair (LOS D): 0.71 – 0.89; Poor (LOS E): 0.89 – 1.0; Exceed Capacity (LOS F): >1.0

ROADWAY NEEDS

The LOS analysis for road segments indicated improvement needs in the following areas:

- SR 89A north of the "Y" has congestion during weekday and weekend periods. This area has high pedestrian activity mixed with heavy vehicular traffic.
- SR 179 south of Ranger Road is congested during both the weekday and weekend during peak months. Traffic congestion results from over-capacity intersections at SR 89A/SR 179 and SR 179/Schnebly Hill Road. Pedestrians crossing SR 179 near Portal Lane create stops in traffic that spills back into the adjacent roundabout intersections.
- SR 89A west of Coffee Pot Drive experiences some congestion during weekdays.

Future traffic projections indicate congestion will increase over time on both SR 89A and SR 179.

EXISTING INTERSECTION LEVEL OF SERVICE

Turning movement counts were collected at 14 major intersections on SR 89A and SR 179 during peak traffic hours in 2016. Because of the high visitor composition of traffic, Sedona doesn't experience typical AM/PM peak hours as would be experienced in a typical urban area. Traffic patterns peak at mid-day to early afternoon, particularly at intersections in Uptown Sedona and Hillside.

The capacity analysis shows LOS F conditions at the Schnebly Hill Road/SR 179 roundabout, and LOS D at the SR 89A / SR 179 Roundabout. Issues at these intersections are described in **Table 2.8.**

It was also noted by City staff that the SR 89A / Foothills South intersection is anticipated to meet traffic signal warrants in the near future, based on analysis conducted by the ADOT.

Table 2.9 summarizes the results of the capacity analysis for the 14 major intersections. Roundabouts were analyzed using HCM 2010 methodologies within the intersection analysis software Sidra. The signalized intersections were analyzed using PTV Vistro software.

Table 2.8. Congested Intersections

Traffic Count Location	LOS	Notes
SR 89A/SR 179 roundabout	LOS D	During peak periods, traffic in Uptown north of the intersection impedes vehicles entering and exiting the roundabout. This leads to vehicle queues being formed in the northbound direction, south of the "Y". Overall intersection performance is at LOS D. It was observed that southbound traffic heading onto SR 179 queues downstream of the intersection, creating spill-over into the roundabout. The capacity analysis shows that the northbound movement operates at LOS E during the peak periods.
SR 179/Schnebly Hill Road	LOS F	The northbound and southbound approaches perform at a LOS F. Interruptions in the near-continuous stream of traffic, such as pedestrians crossing at Tlaquepaque, create a shock wave effect impacting traffic upstream.
SR 179/Chapel Road	LOS D	This intersection operates at LOS D; however, the northbound movement operates at LOS E during the peak periods.

Table 2.9. Weekend (April 2016) Intersection Level of Service

	EB			WB			NB			SB			Traffic Control
	L	T	R	L	T	R	L	T	R	L	T	R	
SR 89A/Arroyo Pinon Drive													
Approach Delay (sec)	7.62			7.37			18.01			141.16			Signalized
Approach LOS	A			A			B			**F**			
Intersection Delay (sec)	27.36												
Intersection LOS	C												
SR 89A/Andante Drive													
Approach Delay (sec)	38.67			45.38			21.29			20.91			Signalized
Approach LOS	D			D			C			C			
Intersection Delay (sec)	22.54												
Intersection LOS	C												
SR 89A/Shelby Drive													
Approach Delay (sec)	20.04			18.84			38.66			34.80			Signalized
Approach LOS	C			B			D			C			
Intersection Delay (sec)	21.76												
Intersection LOS	C												
SR 89A/Coffee Pot Drive													
Approach Delay (sec)	22.16			21.20			36.43			36.42			Signalizedf
Approach LOS	C			C			D			D			
Intersection Delay (sec)	24.97												
Intersection LOS	C												
SR 89A/Mountain Shadow Drive													
Approach Delay (sec)	7.75			8.33			19.34			19.47			Signalized
Approach LOS	A			A			B			B			
Intersection Delay (sec)	8.79												
Intersection LOS	A												
SR 89A/Soldiers Pass Road													
Approach Delay (sec)	10.20			14.19			19.55			21.92			Signalized
Approach LOS	B			B			B			C			
Intersection Delay (sec)	12.80												
Intersection LOS	B												
SR 89A/Airport Road													
Approach Delay (sec)	11.13			10.31			22.54			20.24			Signalized
Approach LOS	B			B			C			C			
Intersection Delay (sec)	11.81												
Intersection LOS	B												
SR 89A/Brewer Road													
Approach Delay (sec)	11.4			12.5			11.0			-			Roundabout
Approach LOS	B			B			B						
Intersection Delay (sec)	11.9												
Intersection LOS	B												
SR 89A/SR 179													
Approach Delay (sec)	27.1			27.4			47.3			16.8			Roundabout
Approach LOS	D			D			**E**			C			
Intersection Delay (sec)	34.1												
Intersection LOS	D												
SR 89A/Forest Road													
Approach Delay (sec)	7.92			-			45.86			31.27			Signalized
Approach LOS	A			-			D			C			
Intersection Delay (sec)	26.19												
Intersection LOS	C												
SR 179/Schnebly Hill Road													
Approach Delay (sec)	-			14.4			52.0			54.1			Roundabout
Approach LOS	-			B			**F**			**F**			

	EB			WB			NB			SB			Traffic Control
	L	T	R	L	T	R	L	T	R	L	T	R	
Intersection Delay (sec)	51.0												
Intersection LOS	F												
SR 179/Canyon Drive													
Approach Delay (sec)	-			9.0			21.4			22.3			Roundabout
Approach LOS	-			A			C			C			
Intersection Delay (sec)	21.6												
Intersection LOS	C												
SR 179/Morgan Road													
Approach Delay (sec)	8.0			9.1			22.7			17.4			Roundabout
Approach LOS	A			A			C			C			
Intersection Delay (sec)	19.9												
Intersection LOS	C												
SR 179/Chapel Road													
Approach Delay (sec)	6.9			21.3			42.0			13.0			Roundabout
Approach LOS	A			C			E			B			
Intersection Delay (sec)	29.1												
Intersection LOS	D												
SR 179/Indian Cliffs Road													
Approach Delay (sec)	8.7			9.6			24.8			15.7			Roundabout
Approach LOS	A			A			C			C			
Intersection Delay (sec)	19.9												
Intersection LOS	C												

INTERSECTION NEEDS

The intersection LOS analysis indicates there is a need for operational improvements, infrastructure improvements, or alternate mode improvements to reduce congestion at the SR 89A/SR 179 roundabout and SR 179/Schnebly Hill Road intersection.

TRAVEL TIME DATA

WITH NO TRAFFIC, IT TAKES 12 MINUTES TO TRAVEL FROM VOC TO THE "Y". DURING THE BUSIEST WEEKENDS, TRAVEL TIME FROM VOC TO THE "Y" EXCEEDED 36 MINUTES ON SEVERAL OCCASIONS.

Google Travel Time data for various directional segments in Sedona were collected for a period that spanned from March 1, 2017 to May 31, 2017. Data was analyzed for three key segments:

- Northbound SR 179 (Bell Rock Boulevard in VOC to "Y")
- Southbound SR 89A (Trout Farm to "Y")
- Northbound SR 89A West Sedona (Lower Red Rock Loop Road to "Y")
- Northbound I-17/SR 179 from the SR 260 / I-17 Interchange to the "Y"
- Northbound SR 260 / SR 89A, from the SR 260 / I-17 Interchange to the "Y"

Figure 2.9, Figure 2.10, and **Figure 2.11** illustrate the ten days between March 1 and May 31, 2017 that experienced the highest travel time on each of the above routes. Also shown is the day with the lowest travel time (thick red line) to depict baseline uncongested travel time.

On SR 179, a travel time of 60 minutes was observed on May 28, 2017, Memorial Day weekend. The other most congested days had a travel time of 35 to 40 minutes as compared to a baseline travel time of about 12 minutes.

On SR 89A southbound, a travel time of over one hour and 20 minutes was experienced on May 28, 2017. The other most congested days had a travel time of 45 to 50 minutes with exception to April 15, which experienced about 60-minute travel time. Baseline travel time is 7 minutes.

Travel time on SR 89A northbound in West Sedona is more variable with significantly lower peaks. With a baseline travel time of 12 minutes, congested travel time was 13 to 23 minutes.

Figure 2.9: Northbound SR 179 (Bell Rock Boulevard to "Y") Google Travel Time

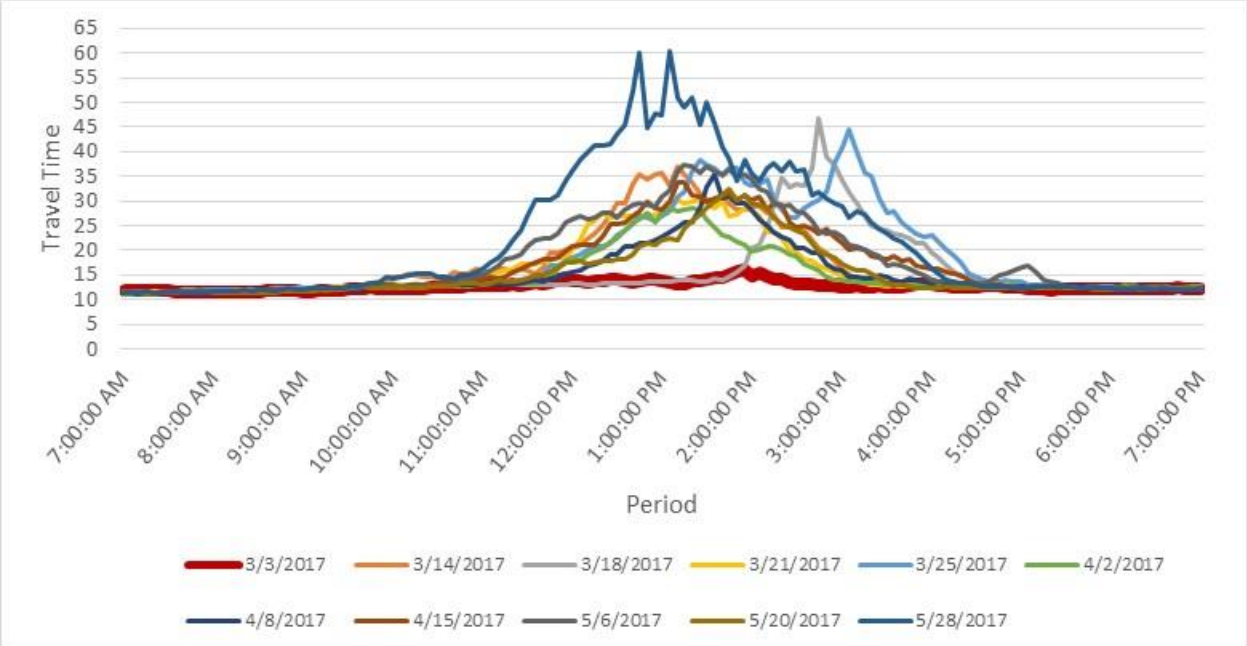


Figure 2.10: Southbound SR 89A (Trout Farms to "Y") Google Travel Time

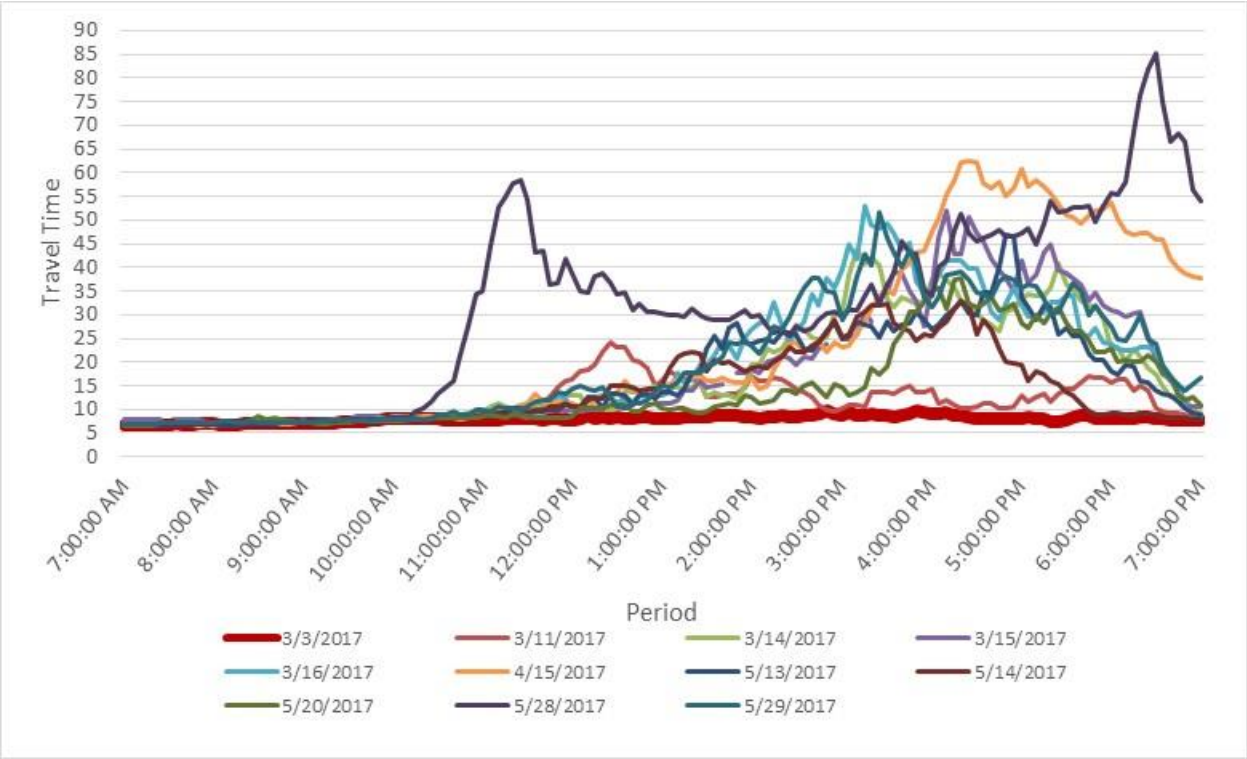


Figure 2.11: Northbound SR 89A West Sedona (Lower Red Rock Loop Road to "Y") Google Travel Time

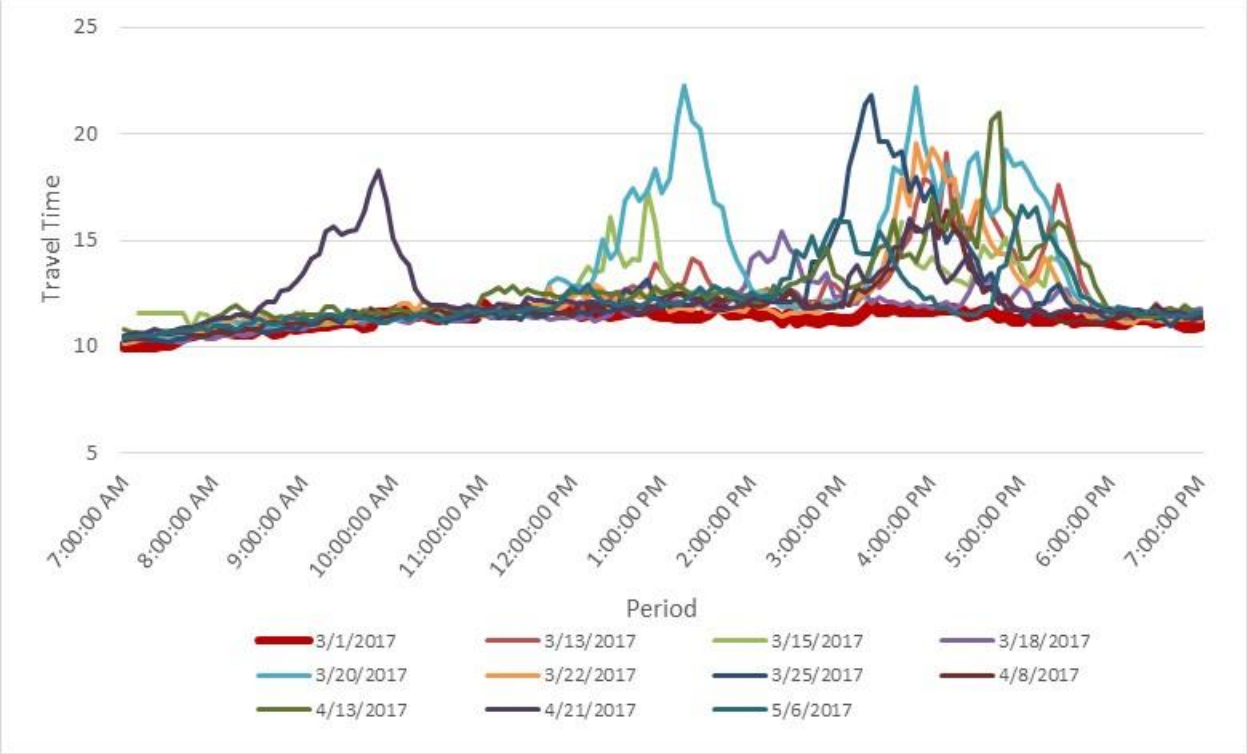


Figure 2.12 and Figure 2.13 illustrate the number of days for which maximum travel time observed on that day fell within a defined ten-minute travel time bin. Southbound SR 89A (Trout Farms Road to "Y") shows significant variability in travel times with multiple days in different bins.

Conversely, northbound SR 89A through West Sedona (Lower Red Rock Loop Road to "Y") shows a much more consistent travel time, with 88 of the 92 days falling within the ten to 20-minute travel time bin.

Figure 2.12: Southbound SR 89A (Trout Farms to "Y") Maximum Travel Time Frequency

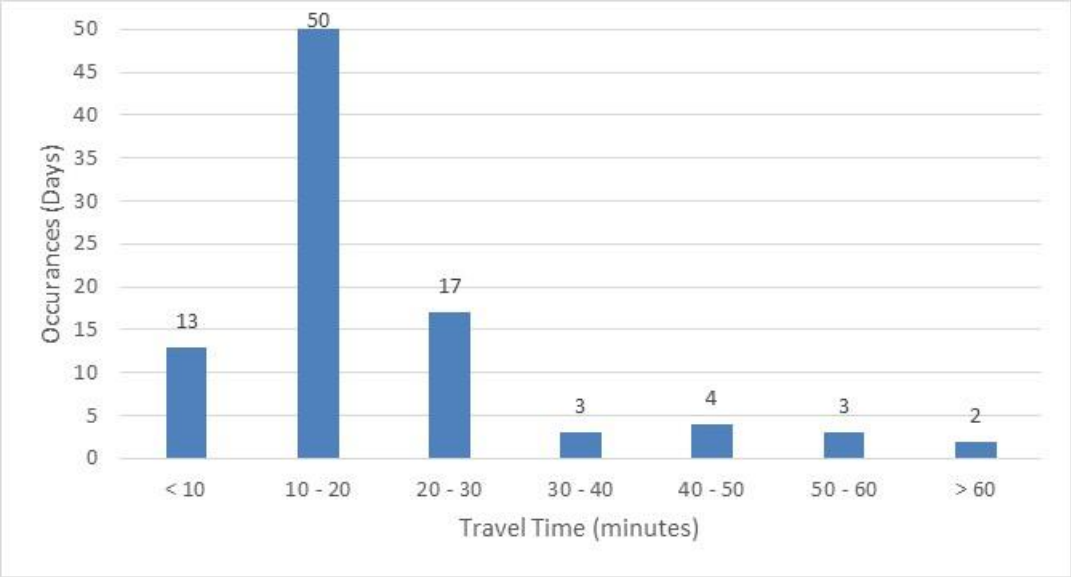
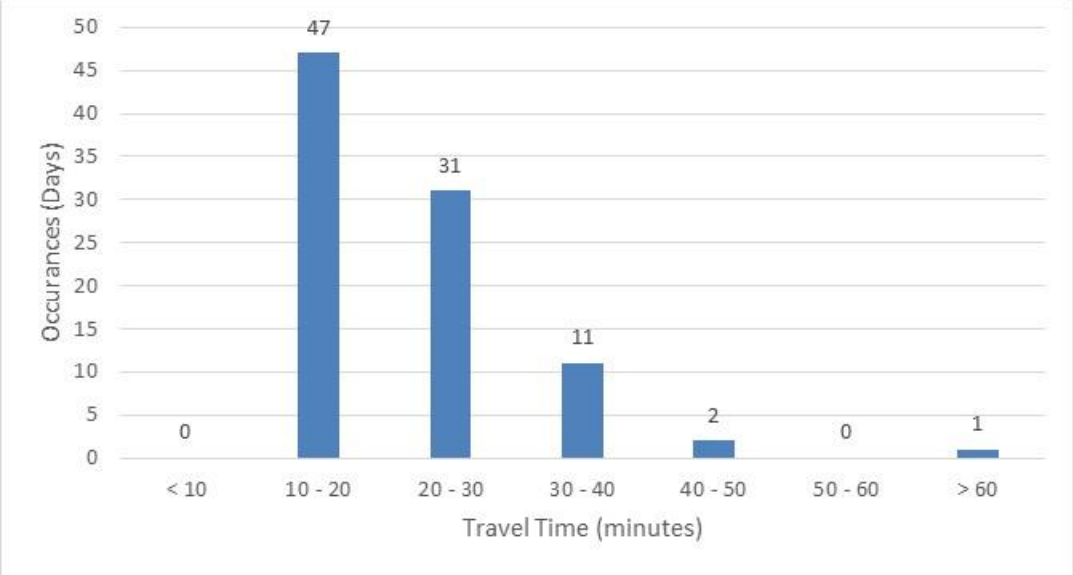


Figure 2.13: Northbound SR 179 (Bell Road Blvd to the "Y") Maximum Travel Time Frequency

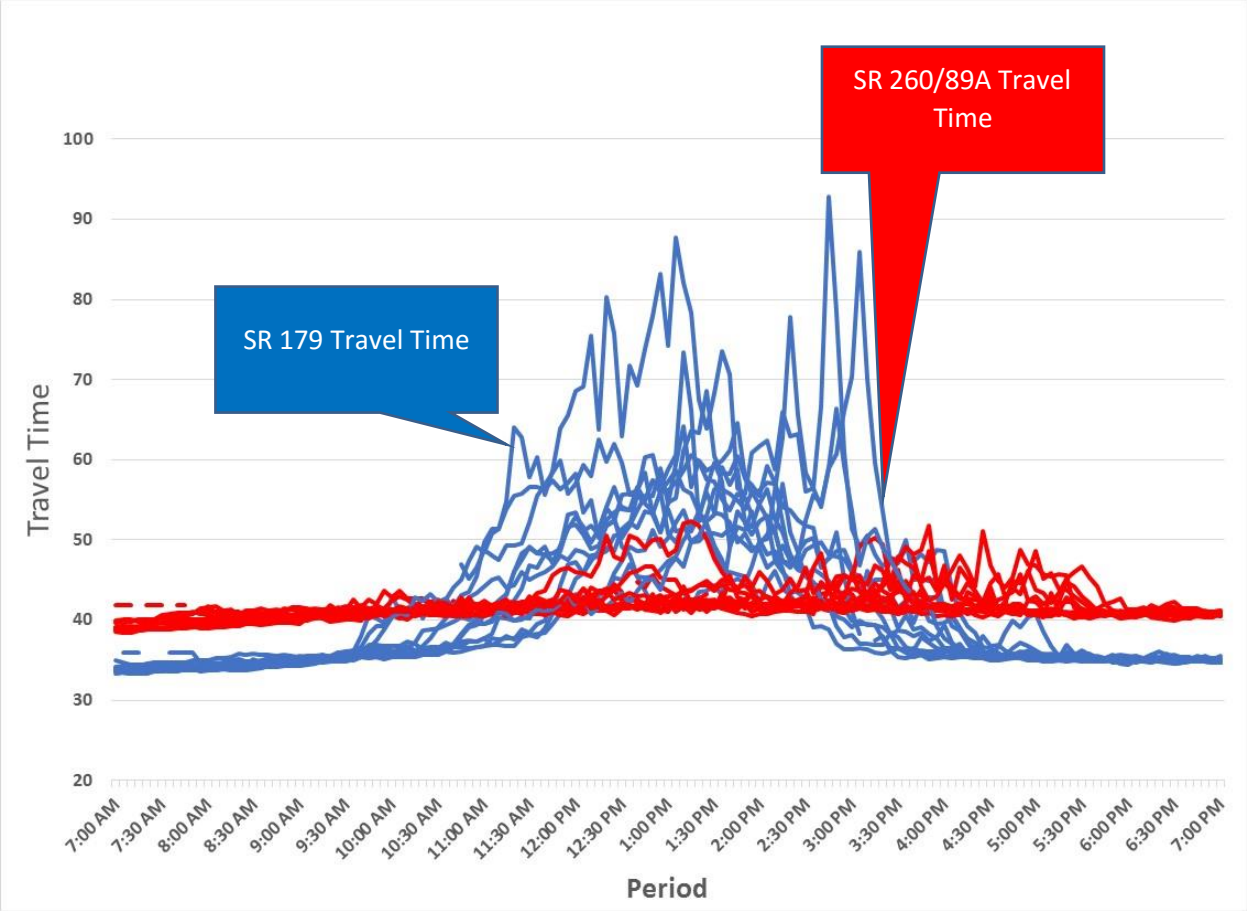


TRAVEL TIME COMPARISON OF SR 179 AS COMPARED TO SR 260

Google Travel Time data shows that during the morning and evening periods, for a traveler beginning their trip near the I-17/SR 260 interchange, SR 179 is a faster route to Sedona than SR 260 (**Figure 2.14**). However, during afternoons of the 10 most-congested days in March and May 2017, SR 260 was a faster way to reach the "Y" from the I-17/SR 260 area.

Mobility pattern data for the month of March 2016 showed that 90% of visitors to Sedona who came from the south (e.g. from Phoenix) used SR 179, while 10% used SR 260. Providing real-time information to motorists about congestion levels on SR 179 and SR 260 will enable them to select their preferred route.

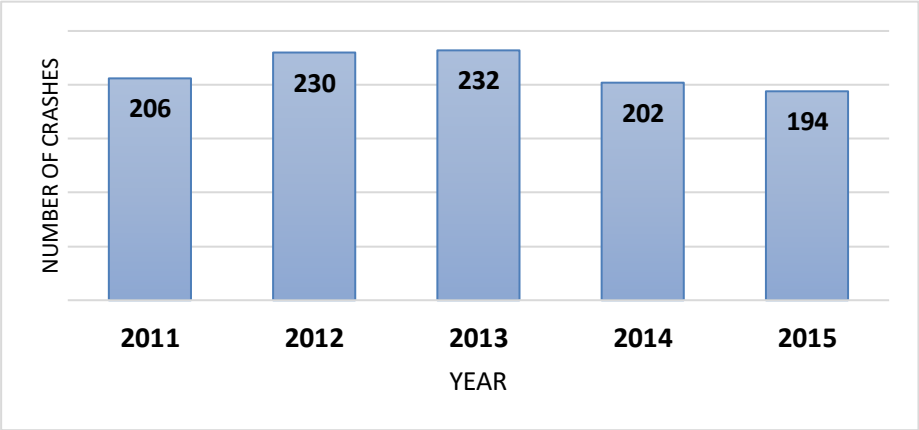
Figure 2.14: Travel Time Comparison between SR 260 and SR 179, Top-10 Congested Days



TRANSPORTATION SAFETY

Crash data for all public roads within the Sedona city limits was obtained for the five-year period of January 2011 to December 2015. During the analysis periods, 1,064 crashes were reported within the City of Sedona. **Figure 2.15** illustrates the total crashes in each analysis year. The data shows that the number of total crashes peaked in 2012 and 2013 and declined in 2014 and 2015.

Figure 2.15: Traffic Crashes (2011-2015)



Locations where a high number of crashes occurred are summarized in **Appendix F.**

Figure 2.16 shows a crash density map of crashes that occurred in the City of Sedona within the past 5 years (2011 to 2015). Six fatal crashes occurred on SR 89A and one fatal crash occurred on SR 179. Of the 21 crashes (2%) that involved an incapacitating injury, 76% occurred on SR 89A and SR 179.

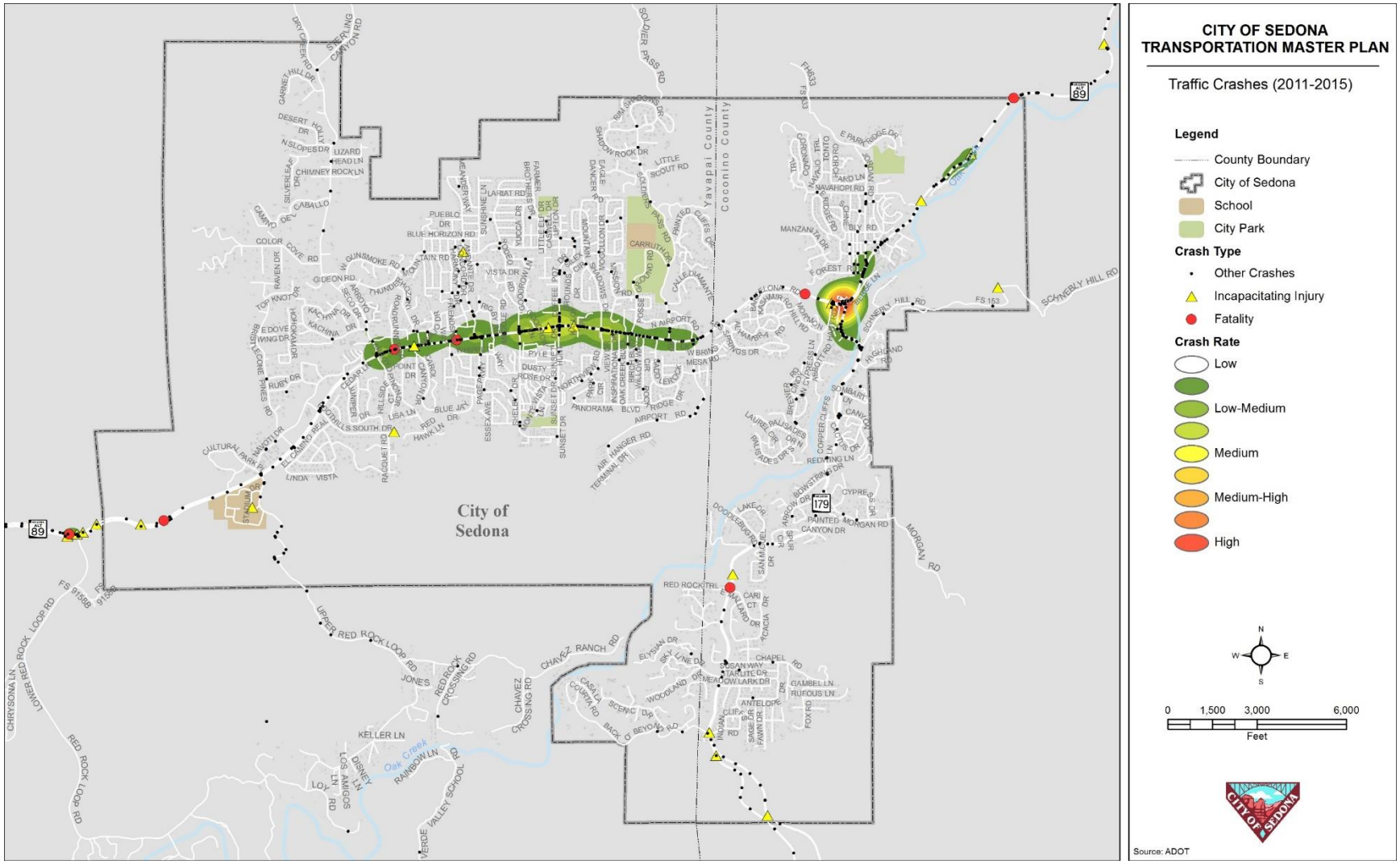
The data in **Appendix F** shows that a common type of collision in the City is a rear-end crash, accounting for 31% of total crashes. Left-turn and angled collisions account for 22% of total crashes. These types of crashes are commonly associated with intersections or driveways.

The data also shows that 60% of crashes within the City occurred on SR 89A or at SR 89A intersections; 22% of total crashes were on SR 179 or at SR 179 intersections. In fact, 132 of the crashes occurred at the SR 89A/SR 179 intersection, five times more than at any other intersection. Notably, 120 of the 132 are property damage only, which indicates that they are low-speed crashes in which no injuries were reported.

NEEDS

The crash data analysis of SR 89A and SR 179 showed that SR 179, with well managed access and a lower number of potential conflict points, had a much lower number of crashes than SR 89A with numerous and closely spaced driveways.

Figure 2.16: Crash Locations



BICYCLE AND PEDESTRIAN FACILITIES

WHILE SR 179 WAS RECONSTRUCTED WITH COMFORTABLE SIDEWALKS AND BIKE LANES, BIKE LANES ON SR 89A WITH HIGH TRAFFIC VOLUMES ARE UNCOMFORTABLE FOR ALL BUT THE MOST ADVANCED BICYCLISTS.

BICYCLE AND PEDESTRIAN INFRASTRUCTURE

Pedestrian and bicycle facilities (shared use paths, bicycle sidewalks, marked bicycle lanes) are an important element of the transportation system. Improving these facilities and networks will encourage residents and visitors to bicycle and walk more, using personal vehicles less. These facilities also provide healthy recreation opportunities.

Figure 2.17 shows existing bike lanes extending along SR 89A from west of Pinon Drive to Forest Road and on SR 179 from the southern city limit north to SR 89A. Note, the width of the bike lane on SR 89A in West Sedona is less than the preferred 4' through some segments of SR 89A as shown in **Figure 2.18.**

The Thunder Mountain Road Bike Route is a designated bikeway that provides access to residential areas north of SR 89A.

PERFORMANCE

The two major corridors, SR 89A and SR 179, have sidewalks along most of their length within the City. Pedestrian facilities are limited elsewhere.

NEEDS

Bicycle and pedestrian needs identified through the study are:

- Alternatives to using SR 89A for bicycle trips, as some areas of SR 89A have narrow shoulders and high speeds and high traffic volumes are less comfortable for the average bicyclist;
- More bicycle and pedestrian facilities to encourage use as an alternative to vehicle trips;
- Separating pedestrian crossings from moving traffic in areas where there are frequent disruptions to traffic on SR 89A. Examples are the Jordan Road and Arroyo Roble Road intersections at SR 89A.

Figure 2.17: Striped Shoulder Width

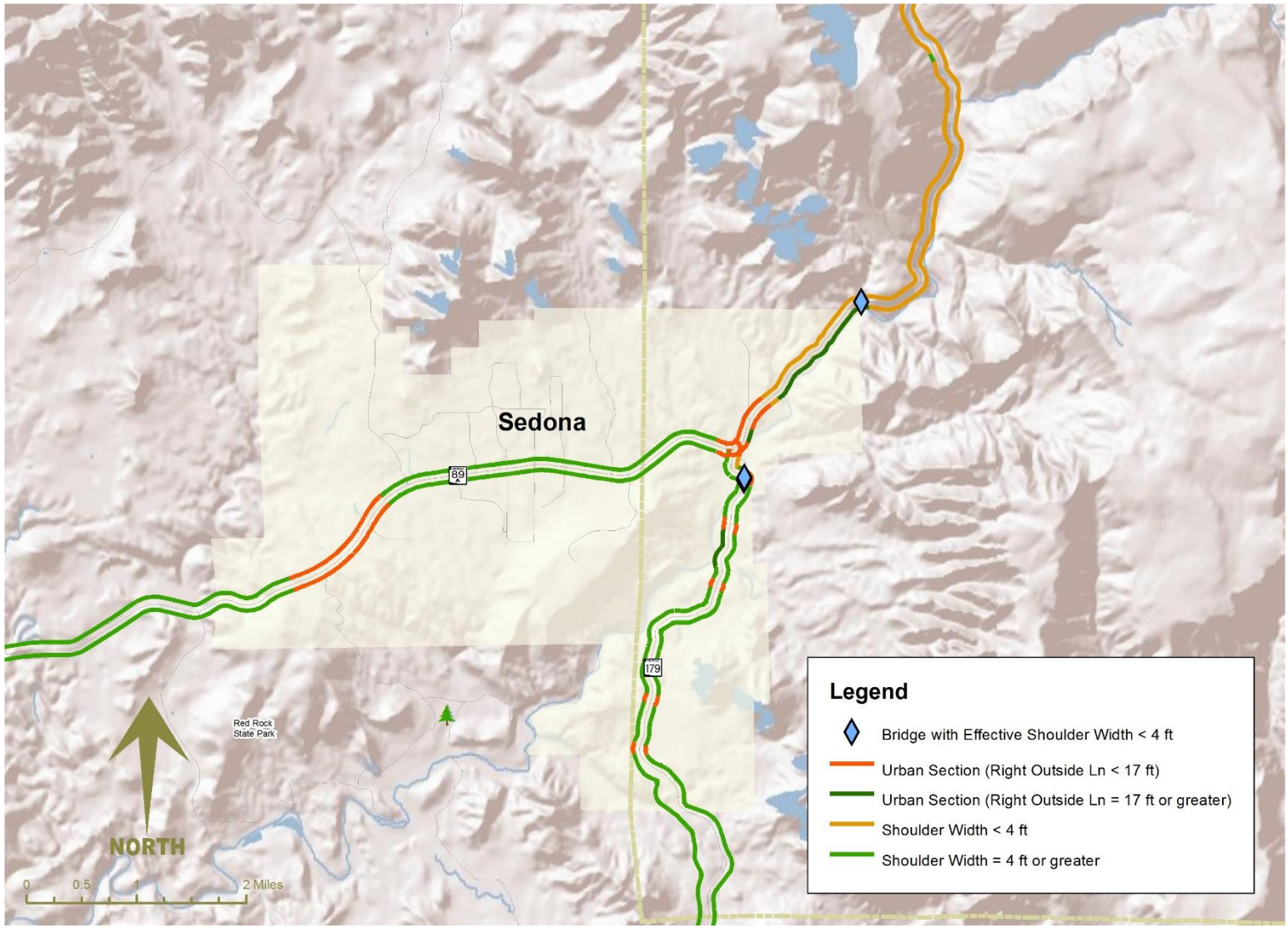
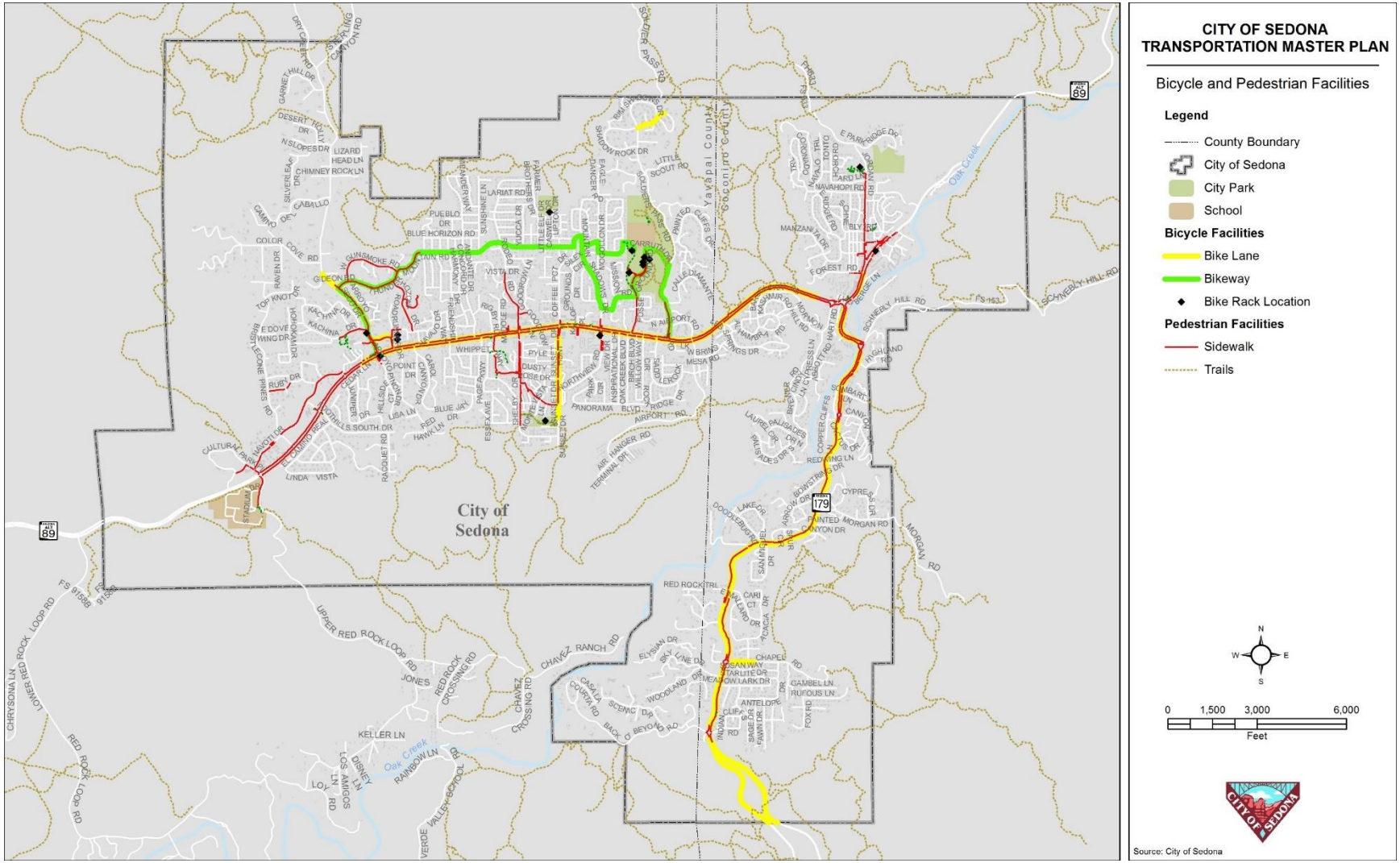


Figure 2.18: Bicycle and Pedestrian Facilities



PUBLIC TRANSPORTATION

CURRENT BUS SERVICE, WITH 45- TO 90-MINUTE FREQUENCY DOES NOT ATTRACT SUFFICIENT TOURISTS TO PROVIDE A CONGESTION BENEFIT.

INFRASTRUCTURE

Cottonwood Area Transit provides transit service in Sedona. The Verde Lynx buses run from the City of Cottonwood Library to the Sedona Municipal Parking Lot and to the Poco Diablo Resort. The Verde Lynx route is illustrated in **Figure 2.19**. The system contains 15 fixed bus stop locations, 12 of which are in Sedona, mostly on SR 89A.

Weekday bus service is provided every 45 minutes from 6AM to 9AM, and 90-minute service from 9AM to approximately 7:12PM. In addition, the Verde Lynx provides 90-minute service on weekends from 6AM to 7:12PM.

PERFORMANCE

During Fiscal Year 2017, which ended July 1, 2017, Verde Lynx carried 55,211 passengers. Ridership in FY2017 is less than in previous years (FY 2015 and FY 2016), and nearly equivalent to 2012 ridership. Ridership data is presented in **Table 2.10.**

Table 2.10. Verde Lynx Ridership

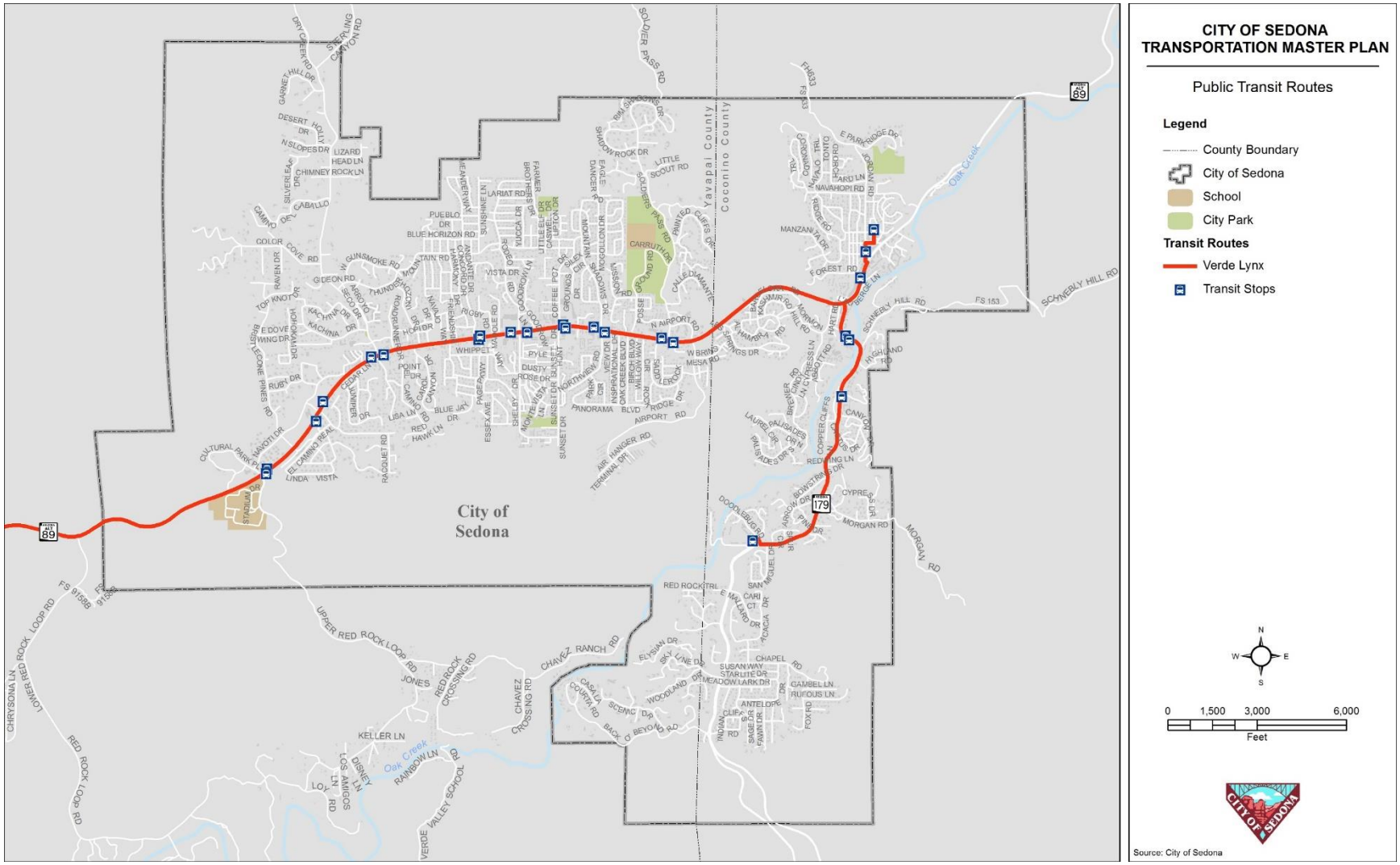
Verde Lynx Ridership Summary	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Total Ridership	54,167	58,615	54,930	63,214	60,056	55,211
Total Revenue Miles	124,400	125,646	143,476	168,832	168,970	166,999
Total Revenue Hours	3,608	3,776	4,879	5,803	5,821	5,821

NEEDS

Transit needs identified through the study include:

- Extend existing transit service to the VOC.
- Enhance transit connections to Uptown, Hillside, and West Sedona.
- Mobility data (**Figure 2.2**) shows that visitors make over 80% of trips. As such, transit service must attract a significant number of visitors to provide a congestion benefit. Visitor-focused transit needs include shuttle service from resorts to Uptown Sedona, and visitor-focused transit service to and from Oak Creek Canyon to reduce congestion in Oak Creek Canyon, and on SR 89A and SR 179.

Figure 2.19: Public Transit Routes



PARKING

Uptown Sedona has four all-day, free parking lots and four three-hour, free parking lots. A map of parking facilities is shown at right.

Blue free parking signs guide visitors and residents to the lots. Some of these lots are leased by the City from private businesses.

There is metered parking along Main Street in Uptown, which is in effect from 9AM to 6PM seven days a week. Parking at meters is free before 9AM and after 6PM.

Source: City of Sedona

PERFORMANCE

Key findings from the *2012 City of Sedona Uptown Parking Management Plan* indicate that the demand for on-street parking is very high compared to off-street parking facilities. Study data collected showed that peak occupancy in the Municipal Lot on a Saturday was 64%, while at Sinagua Plaza, peak occupancy was 89%.

The *2012 City of Sedona Uptown Parking Management Plan* recommendations focus on improving awareness of existing supply, increasing supply in opportunity areas, and providing better tools for patrons to find parking. Other focus areas include making sure all necessary improvements are well marketed and the community is educated. Improvements in the system will largely go unrecognized without proper marketing and outreach.

NEEDS

Parking needs identified are:

- Wayfinding to improve awareness of and access to the underutilized off-street public parking facilities;
- Increase the public parking supply in a cost-efficient manner and continue to implement shared parking;
- Lease a specific off-street lot and designate it for tour bus parking; TAC notes that a drop-off and turnaround area is also needed for buses, in addition to bus parking;
- Designate a specific off-street facility for employee parking and implement an employee permit program; and
- Implement a residential parking program to reduce parking spillover impacts (if needed).

Chapter 3 – Community Engagement

Two periods of community engagement were conducted during development of the Sedona TMP. Each period allowed residents to provide input on mobility challenges and potential solutions. The first community engagement effort was conducted in October 2016, to request input on transportation priorities. The second community engagement effort was conducted in June 2017 to request input on proposed strategies.

COMMUNITY ENGAGEMENT, OCTOBER 2016

For three weeks from October 26 to November 16, 2016, Sedona residents were given the opportunity to provide input on mobility priorities and strategies for consideration within the Sedona TMP using an online survey. Questions were asked through a series of screens to capture input from a wide audience on a range of topics. Nearly 3,300 individuals viewed the survey with 2,200 responding. Input for each question is summarized below.

SURVEY RESPONDENT DEMOGRAPHICS

- 81% of respondents were full-time residents, 12% part-time residents, 2% visitors, and 5% were neither a visitor nor a resident.
- 30% of respondents have lived in Sedona for less than five years, 20% between five and nine years, and 50% for over nine years.
- 15% of respondents were between the ages 35-49, 40% between 40-65, and 35% over 65. Less than 10% were between the ages of 19-35.

QUESTION NO. 1 – PRIORITIES

Question No. 1 asked for input related to transportation priorities within the City. Participants were asked to identify their top four priorities. The priorities that ranked the highest (**Table 3.1**) were:

1. New Roads
2. Wider Roads
3. Transit for Visitors

The priorities that ranked the most number of times were:

1. Transit for Visitors
2. New Roads
3. Connecting Neighborhoods

The most frequently suggested comments for new roads were:

- Pave Schnebly Hill Road
- Construct Red Rock Crossing Bridge

Table 3.1. Community Engagement - Input on Transportation Priorities

Rank	Priority Name	Average Position	Times Ranked
1	New Roads	1.94	1,028
2	Wider Roads	2.35	751
3	Transit for Visitors	2.40	1,089
4	Transit for Residents	2.46	737
5	Connecting Neighborhoods	2.50	993
6	Pedestrians and Bicycles	2.57	776
7	Safety Improvements	2.73	600
8	Technology Options	2.88	559

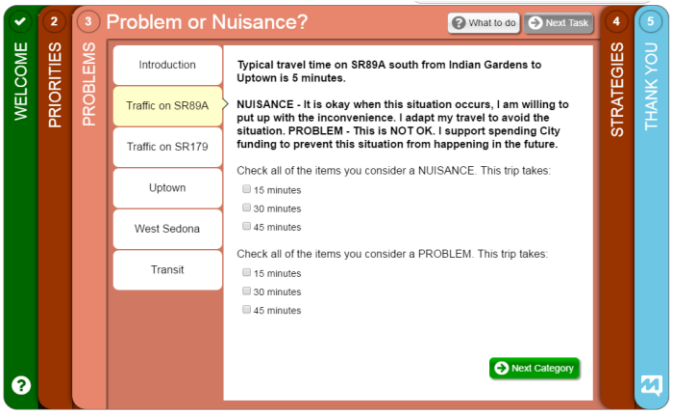
QUESTION NO. 2 – TOLERANCE FOR TRAFFIC CONGESTION ON SR 89A

Questions No. 2 through No. 6 sought input on the public's tolerance on a range of challenges to provide the team input on priorities and potential trade-off preferences for various issues including site-specific traffic congestion and infrastructure needs.

Tolerance was examined through questions related to specific definitions or thresholds for what constitutes a "nuisance" or a "problem."

A "nuisance" was explained as: "It's OK when this situation occurs, I am willing to put up with the inconvenience. I adapt my travel to avoid the problem." The less acceptable rating, or "problem" was explained as: "This is NOT OK. I support spending City funding to prevent this situation from happening in the future." In comparing each timeframe across both charts, it became clear what was most often considered a "nuisance" and what was a "problem."

Question No. 2 stated that typical travel time on SR 89A from Indian Gardens to Uptown is five minutes. Most respondents said that a delay of 15 minutes is a nuisance, but not a problem. Respondents were split between 30 minutes and 45 minutes being a problem (**Figure 3.1**).



QUESTION NO. 3 – TOLERANCE FOR TRAFFIC CONGESTION ON SR 179

Typical travel time on SR 179 from the VOC to the intersection of SR 89A and SR 179 (the "Y") is about 15 minutes. Most respondents indicated that a 30-minute travel time for this trip is considered a nuisance. Respondents were split as to when it became a problem (30 minutes or 45 minutes (**Figure 3.2**).

QUESTION NO. 4 – CONGESTION ISSUES IN UPTOWN

Question No. 4 sought input on issues in Uptown and issues that contribute to congestion. Respondents indicated that a lack of available parking, large numbers of pedestrians, vehicles stopping to make a left turn, and location of jeeps/buses are all a nuisance. Of the four issues, large numbers of pedestrians ranked highest as a problem.

Figure 3.1: Congestion Tolerance on SR 89A Survey Screen and Results

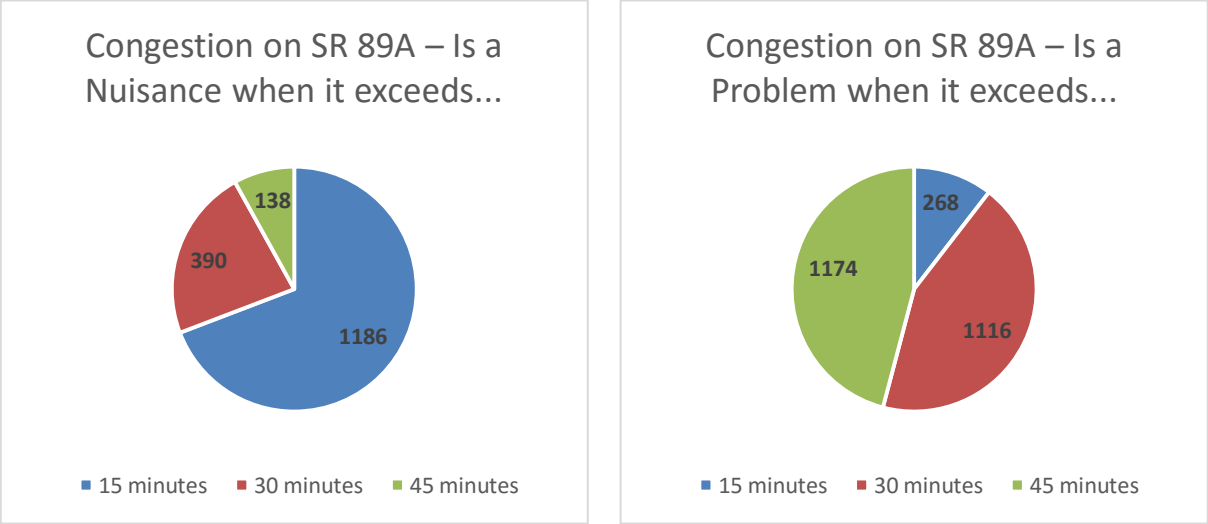
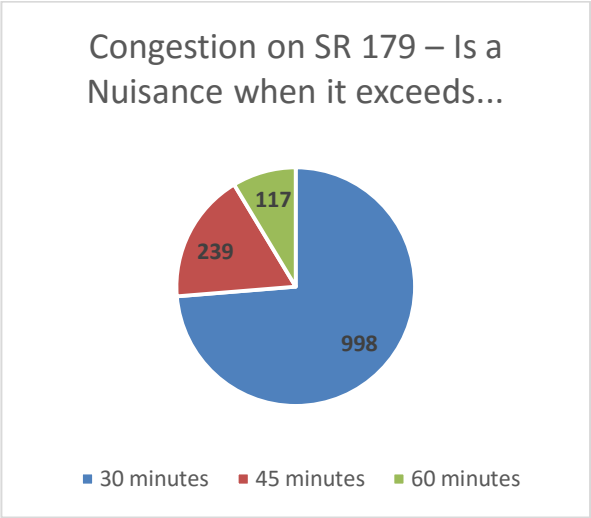


Figure 3.2: Congestion Tolerance on SR 179 Survey Screen and Results



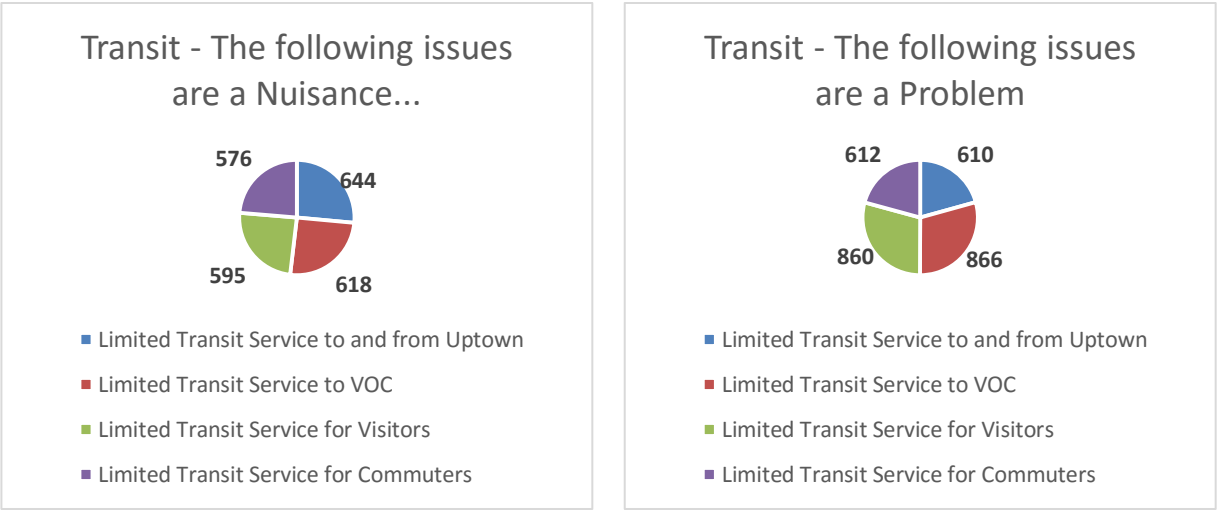
QUESTION NO. 5 – WEST SEDONA MOBILITY

Question No. 5 sought input on mobility issues in West Sedona. Respondents identified that limited sidewalks, weekday afternoon traffic, lack of neighborhood connectivity, and a lack of bicycle and pedestrian facilities are all a nuisance. More people said pedestrian and bicyclist safety in West Sedona is a problem than a nuisance. Similarly, more people said lack of neighborhood connections in West Sedona is a problem than said it was a nuisance.

QUESTION NO. 6 – TRANSIT SERVICE

Question No. 6 addressed availability of transit service. More people said that a lack of transit service to VOC, limited transit service for visitors, and limited transit service for commuters is a problem (**Figure 3.3**). Conversely, more people said that limited service to Uptown is a nuisance rather than a problem.

Figure 3.3: Transit Survey Screen and Results



QUESTION NO. 7 – TRANSPORTATION STRATEGIES

In Question No. 7, participants rated potential strategies on a scale of 1 to 5 with 5 being the most desirable and 1 being the least desirable. Input received is listed in **Table 3.2,** presented in order of highest to lowest rating within each category.

All the potential strategies received at least a 3 rating, indicating a neutral to positive response, with exception to add a median to SR 89A in West Sedona or to eliminate left turns.

Table 3.2. Community Engagement Results – Transportation Strategies Ratings

Strategy	Description	Rating (1-5)
Pedestrians and Bicyclists Enhancements		
Overpass or Underpass	For pedestrians in high traffic locations	4.26
Sidewalks and Paths	More bicycle and walking paths	3.42
Signalized Crosswalks	Add more signalized cross-walks	3.15
Enhanced Traffic Control	More hours for Traffic Officers	3.1
Wayfinding and Signage	Improved signage throughout the City	3.1
Uptown Congestion		
Bypass Uptown	Build a new road or bridge	3.98
Parking Availability	Build a parking garage	3.7
Multimodal Transportation Center	Parking, shuttle, buses, loading and information center	3.57
Widen SR 89A	Add another lane to SR 89A	3.04
Eliminate Left Turns	Add medians and roundabouts	2.94
West Sedona Improvements		
Traffic Signalization Optimization	Improve timing and coordination of traffic signals	3.95
Connect Neighborhoods	Bicycle and walking path connections	3.65
New Local Streets	Add streets as alternatives to SR 89A	3.61
Protected Bike Lanes	Add protected lanes for safety and comfort	3.22
Raised Median on SR 89A	Improve safety and traffic flow	2.74
Visitor Traffic		
Park-and-Ride Lots	Add visitors park-and-ride shuttle	4.1
Roundabout Signage	Educate travelers about roundabouts	3.81
No Parking in the Canyon	Eliminate parking on SR 89A in OCC	3.39
Travel Time Information	Signs to report travel times on SR 89A and SR 179	3.27
Transit Enhancements		
Verde Lynx Service Enhancements	Extend service to VOC	3.95
Transit Incentives	Discounted bus fares for residents	3.83
Employer Incentives	Employer paid bus passes for employees	3.8
Fixed Route Bus Service	Connection Uptown, Hillside, and West Sedona	3.77
On-Demand Shuttle	From resorts to Uptown	3.61

COMMUNITY ENGAGEMENT, JUNE 2017

The recommended transportation strategies presented in Chapter 4 were introduced to the public in June 2017. Input was received through a community meeting, and through an on-line survey. These are summarized below.

COMMUNITY MEETING

Community meetings were held on June 21, 2017 and, June 24, 2017. The meetings were held at City Hall, Council Chambers. Over 100 people attended both meetings.

Basic format: City staff provided an overview of the TMP and explained that the plan provides a decision-making tool to select projects that improve transportation mobility in Sedona. Recommended strategies were then presented at one of four stations with accompanying city staff members. Residents were invited to walk around, review each of the strategies, and ask questions. Afterwards, people were directed to a survey area with iPads and lap tops where they could respond to the online survey or take a flier with the URL to complete the survey at home.

ONLINE-SURVEY

In conjunction with the community meetings where the proposed alternatives were presented, an online survey was launched on June 21, 2017 to gauge the public's perception of the strategies. The survey remained open until July 6, 2017.

The survey presented 14 potential strategies, and asked the question, "Given the benefits, costs and tradeoffs of this strategy, how likely are you to support it?" The respondent could then choose between "very likely", "somewhat likely", "neutral", "somewhat unlikely", and "very unlikely."

There were 1,706 total responses to the survey, with 1,411 complete responses, meaning that some people did not answer every question.

SURVEY RESPONDENT DEMOGRAPHICS

- 76% of respondents were full-time residents, 12% part-time residents, 3% visitors, and 8% were commuters. This is a very similar distribution to the October 2016 survey.
- 23% of respondents identified themselves as a business owner.
- 26% of respondents have lived in Sedona for less than five years, 20% between five and nine years, and 40% over nine years.
- 12% of respondents were between the ages 35-49, 42% between 40-65, and 43% over 65. Only 3% were between the ages of 19-34.

SURVEY RESPONSES SUMMARY

A summary of the responses is in **Table 3.3**, with neutral responses omitted to demonstrate overall support or opposition to each strategy. **Table 3.4** provides a response summary to sales tax alternatives. **Table 3.5** and **Table 3.6** summarize survey responses to two additional projects that may be considered in the long -term.

Table 3.3. Community Engagement Results – Transportation Strategies Ratings

Strategy	Likely to Support	Unlikely to Support
Strategy 12. Traveler Information	66.97%	20.75%
Strategy 8. Enhanced Transit Service - Tourism Focused Shuttle Service	66.40%	20.02%
Strategy 7. Enhanced Transit Service - Commuter/Resident Focused	65.14%	18.30%
Strategy 1. Uptown Sedona Roadway Improvements	62.18%	26.20%
Strategy 5. Major Roadway Connections	**60.96%**	**26.17%**
Strategy 6. Neighborhood Vehicular Connections	60.70%	24.83%
Strategy 11. Bicycle and Pedestrian Improvements	58.51%	26.20%
Strategy 4. SR 179 Improvements, Schnebly Hill roundabout to the "Y"	57.85%	31.97%
Strategy 10. SR 89A/West Sedona Access Improvements	57.37%	27.68%
Strategy 2. Uptown Sedona Pedestrian Improvements	49.52%	37.82%
Strategy 9. Neighborhood Vehicles - Tourism Focused	45.95%	34.34%
Strategy 3. Uptown Sedona Parking Improvements	43.54%	38.68%

Table 3.4. Community Engagement Results – Sales Tax Alternatives

Strategy	Likely to Support	Unlikely to Support
½ -cent sales tax	**67.50%**	**20.16%**
¾ -cent sales tax	**53.08%**	**32.78%**
1 -cent sales tax	**50.79%**	**39.20%**

Input was also solicited whether constructing a new roadway at Red Rock Crossing, to connect VOC to West Sedona, should be considered in the short-term, long-term, or not at all (**Table 3.4)**. The final question inquired whether paving Schnebly Hill Road from Sedona to I-17, is a viable option (**Table 3.5)**.

Table 3.5. Community Engagement Results – Red Rock Crossing

Strategy	Short-Term	Long-Term	Shouldn't be Considered
Red Rock Crossing	49.86%	22.43%	27.71%

Table 3.6. Community Engagement Results – Pave Schnebly Hill Road

Strategy	Viable	Not Viable
Pave Schnebly Hill Road	43.07%	56.93%

Chapter 4 – Strategies

Chapter 4 introduces the recommended strategies and improvement projects that will incrementally reduce congestion and improve mobility within the City of Sedona.

The strategies were developed by considering analysis of traffic and mobility data, input provided through the Community Outreach survey, discussions with stakeholders at the October 2016 Toolbox Workshops, feedback from discussions and presentations to City Council, and input from members of the TAC.

These strategies were selected to improve mobility within the City, while also respecting the guiding principles of the community values. 13 strategies are recommended and grouped by area or improvement type. An additional strategy, paving Schnebly Hill Road, is presented for information purposes, but is not recommended within the TMP.

Justification for the strategies was supported by extensive analysis including development of a traffic simulation model that was closely calibrated to actual travel time data. More details about the simulation model is presented in **Appendix E.** Strategies are listed in **Table 4.1.**

Table 4.1. Summary of Recommended Strategies

STRATEGY	NEEDS ADDRESSED	COST	EFFECTIVENESS RATIO	
			Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
Strategy 1. Uptown Sedona Roadway Improvements	• Reduce congestion • Reduce turning movement conflicts • Improve pedestrian safety	$3,548,800	$54.70	$3.85
Strategy 2. Uptown Sedona Pedestrian Improvements	• Improve pedestrian safety • Reduce congestion	$7,000,000	$125.56	$8.84

STRATEGY	NEEDS ADDRESSED	COST	EFFECTIVENESS RATIO	
			Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
Strategy 3. Uptown Sedona Parking Improvements	• Increase parking supply • Reduce congestion	Construction cost: $5M - $15M depending on size of parking garage; $15,000 to $25,000 per space excluding land costs Marketing and outreach cost: $10,000 annually	N/A	N/A
Strategy 4. SR 179 Improvements, Schnebly Hill roundabout to the "Y"	• Reduce congestion between the Schnebly Hill roundabout and the "Y" • Improve pedestrian safety	Schnebly Hill Road (SHR) roundabout improvements: $ 5,397,640 SR 179 Widening (2 lanes each direction) "Y" to SHR: $108,600 Pedestrian tunnel/bridge on SR 179: $2,000,000 Separated right turn lanes at the "Y": $1,382,340 Total: $8,888,480	$112.05	$7.89
Strategy 5. Major Roadway Connections	• Improve street connectivity • Reduce congestion • Alternative to SR 89A	Portal Lane: $500,000 Forest Road Extension: $1,274,100.00	$21.04	$1.48
Strategy 6. Neighborhood Vehicular Connections	• Improve street connectivity • Reduce congestion • Provide alternate routes for residents for driving, walking, and bicycling	Various street connections: $2,800,000	N/A	N/A
Strategy 7. Enhanced Transit Service - Commuter/Resident Focused	• Improve alternative mode choices for residents and commuters	Capital cost: $140,000 Annual operating cost: $329,340	N/A	N/A
Strategy 8. Enhanced Transit Service - Tourism Focused Shuttle Service	• Reduce congestion • Provide alternative mode choices for visitors	Capital cost: $3,385,000 Annual operating cost: $324,480-$459,680	SR 89A: $169.12 SR 179: $35.59	$64.16 $13.50
Strategy 9. Neighborhood Vehicles - Tourism Focused	• Reduce parking demands	Capital cost: $204,000-$339,167 Annual operating cost: $238,042	N/A	N/A
Strategy 10. SR 89A/West Sedona Access Improvements	• Improve safety (access management) • Adaptive Traffic Signal Control (ATSC)	Access management: $3,000,000 ATSC: $376,000 to $936,000	N/A	N/A

STRATEGY	NEEDS ADDRESSED	COST	EFFECTIVENESS RATIO	
			Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
Strategy 11. Bicycle and Pedestrian Improvements	• Provide alternate mode choices • Reduce congestion	Shared use path: $100,000 to $500,000 per mile Paved shoulder: $300,000 per mile Bicycle Boulevard: $193,000 per mile Pedestrian Hybrid Beacons: $150,000 each Sidewalks: $125,000 per mile	N/A	N/A
Strategy 12. Traveler Information	Provide travel time information to help travelers avoid congested routes	SR 89A: $650,000	$23.59	$4.43
		SR 179: $100,000	$1.53	$0.29
LONG-TERM STRATEGY RECOMMENDATION				
Strategy 13. Red Rock Crossing	• Provide alternative route between Sedona and VOC	$10,192,200	$225.59	$15.88
OTHER STRATEGY PRESENTED FOR CONSIDERATION, NOT RECOMMENDED				
Strategy 14. Pave Schnebly Hill Road	N/A	32,932,500	$1,247.40	$87.82

STRATEGY 1. UPTOWN SEDONA ROADWAY IMPROVEMENTS

Traffic congestion in Uptown Sedona is a source of frustration for residents and visitors. SR 89A through Uptown functions as a major arterial for through travelers coming from Oak Creek Canyon (OCC) and as a local street providing direct access to businesses in Uptown. The inability of SR 89A to serve both regional travelers and local visitors leads to congestion and delays that extend up Oak Creek Canyon.

A typical traffic lane under ideal conditions has a capacity of approximately 1,900 vehicles per hour, per the *Highway Capacity Manual*. Traffic signals, on-street parking, pedestrian crossings, and turning vehicles all reduce roadway capacity.

The *2014 Uptown Sedona Pedestrian Crossing Study* estimated that SR 89A has about 40% of the ideal capacity or about 760 vehicles per hour. Traffic volumes collected in April 2016 (Saturday, April 16, 2016) show northbound SR 89A traffic volumes at 1,002 vehicles per hour and southbound at 970 vehicles per hour, exceeding the capacity of the roadway.

Traffic congestion in Uptown is a primary contributor to congestion in Oak Creek Canyon. As vehicles exit Oak Creek Canyon toward Uptown, they reach the queue of vehicles caused by pedestrians crossing the road, vehicles turning to and from on-street parking, etc. Vehicle speeds drop to 10 mph as they travel through Uptown.

The Uptown Sedona roadway improvements recommendations involve a multi-faceted approach to improving congestion and safety by providing additional capacity and reducing the conflicts between vehicles and pedestrians. Recommended roadway improvement projects in Uptown are:

1. Construct a raised median with decorative landscaping or decorative barrier to direct pedestrians to controlled crossings.
2. Construct an additional southbound travel lane on SR 89A through Uptown.
3. Construct a turnaround or roundabout at the north end (e.g. at Art Barn).
4. Construct a roundabout at the south end (Jordan Road) of Uptown on SR 89A.
5. Create one-way access from SR 89A to free parking via Schnebly Road.
6. Conduct a traffic signal timing analysis to coordinate mid-block and Forest Road traffic signals

These improvements are shown in **Figure 4.1**. Additional descriptions of the improvements follow.

STRATEGY DESCRIPTION

1 Construct a raised median with decorative landscaping or decorative barrier to direct pedestrians to controlled crossings.

The raised median would be continuous through Uptown between Forest Road and Art Barn Road, excluding the Jordan Road intersection. The raised median would restrict left-turn movements to and from SR 89A from local side streets and reduce pedestrian crossings outside of signed/signalized crosswalks, movements that generally impede thru-traffic flow in Uptown. Pedestrians will be directed to designated crossings.

A variety of median widths were considered. The recommended median width of 6' provides a pedestrian refuge between the northbound and southbound travel lanes, while minimizing impacts to streetscape, existing on-street parking, and right-of-way. The raised median would include desert plantings, decorative rock, or decorative fencing/barrier.

2 Construct an additional southbound travel lane on SR 89A through Uptown.

This project will also include an additional 12-foot southbound travel lane on SR 89A starting north of Art Barn Road that ties into the two existing southbound lanes north of Forest Road. The second southbound lane would occupy a portion of the existing center turn lane, and a portion of the shoulder used for parking. A second southbound travel lane would improve traffic flow and reduce conflicts caused by vehicles turning and parking since through vehicles would be able to utilize a second inside travel lane.

3 Construct a turnaround or roundabout at the north end of Uptown (e.g. at Art Barn).

A turn-around or roundabout would facilitate U-turns for motorists traveling on northbound SR 89A. Vehicles exiting hotels and parking areas on the creek-side of SR 89A would turn right (north) and then make a U-turn to go southbound on SR 89A. The initial recommendation is to construct a turnaround, with the possibility of expanding to a roundabout when determined to be necessary, or with future private development.

4 Construct a roundabout at the south end (Jordan Road) of Uptown on SR 89A.

A roundabout at Jordan Road would facilitate U-turns for southbound SR 89A traffic. Vehicles exiting hotels and parking areas on the west side of SR 89A would turn right (south) and make a U-turn at the Jordan Road roundabout to go northbound on SR 89A.

5 Create one-way access from 89A to free parking via Schnebly Road

This project would include an extension of Schnebly Road to SR 89A, to direct vehicles traveling from Oak Creek Canyon, who desire to stop in Uptown, to free off-street parking lots. This will reduce the number of vehicles on SR 89A looking for premium paid parking.

6 Conduct a traffic signal timing analysis to coordinate mid-block and Forest Road traffic signals

Analysis of the mid-block pedestrian signal and the Forest Road traffic signal should identify signal timing improvements to optimize traffic flow and reduce delay, in balance with pedestrian crossing activity.

STRATEGY COSTS

Uptown roadway improvement costs are depicted in **Table 4.2.**

Table 4.2. Estimate of Probable Cost – Uptown Sedona Roadway Improvements

STRATEGY ELEMENT	COST
Construct a raised median with decorative barrier to direct pedestrians to controlled crossings.	$916,100
Construct an additional southbound travel lane on SR 89A through Uptown.	
Construct a turnaround or roundabout at the north end (e.g. at Art Barn)	$472,700
Create one-way access from SR 89A to free parking via Schnebly Road	Cost estimate is for a turnaround, including Schnebly Road connection
Construct a roundabout at the south end (Jordan Road) of Uptown on SR 89A.	$2,160,000
Conduct a traffic signal timing analysis of the mid-block pedestrian signal and Forest Road traffic signal	Minor cost
TOTAL ESTIMATE OF PROBABLE COST[1]	**$3,548,800**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

The recommended improvements will reduce turning movement and pedestrian conflicts between through traffic and local traffic. Analysis shows that this combination of improvements would reduce travel time under peak congested conditions from 42 minutes to 15 minutes. Implementing these improvements will reduce and possibly eliminate the need for the current Uptown traffic control operations program. Quantitative benefits are listed in **Table 4.3.**

Within **Table 4.3**, Congested Travel Time (min) is derived from the Google Travel Time data collected for this study. Improved Travel Time (min) is calculated by traffic simulation modeling of the proposed improvements. Total annual vehicle hours traveled (VHT) savings is calculated considering the daily total traffic volume and the estimated improvement in travel time.

Table 4.3. Strategy Benefits – Uptown Sedona Roadway Improvements

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost/ Annual VHT Saved
42 minutes	15 minutes	-64% reduction in travel time	64,872	$3,548,800	$249,835	$54.70	$3.85

The Federal Highway Administration (FHWA) identifies the following benefits of a raised median:

Mobility: Studies estimate that raised medians improve traffic flow by 10% or more as vehicular side-friction is reduced from vehicles turning to and from the highway at unpredictable locations. A raised median and access management maximizes efficiency by increasing traffic flow and reducing stop-and-go traffic. This preserves public investment in the roadways.

Safety: Raised medians increase safety by limiting drivers' decision points. This is especially important as a large percentage of drivers are unfamiliar with the Sedona area. FHWA's Crash Modification Factor Warehouse website estimates a 39% crash reduction for all crash types and severities with the

implementation of a raised median and access management. Raised medians also provide pedestrian refuge areas, reducing the number of pedestrian crashes by 46%.

TRADEOFFS

Construction of a raised median, second southbound travel lane, and turnaround/roundabout improvements will change the character of Uptown. Widening will impact the streetscape and landscape, including the outdoor seating area at Jordan Road. New right-of-way may be required.

The widening from two to three lanes and a raised median will increase crossing distance for pedestrians, increasing the exposure of pedestrians to potential vehicular conflicts/crashes. These improvements, while improving traffic flow and reducing congestion in Uptown, will also increase vehicle speeds, making it less comfortable for pedestrians crossing SR 89A in the Uptown area.

Construction of these improvements will result in lengthy traffic disruptions during construction.

COMMUNITY PERSPECTIVES

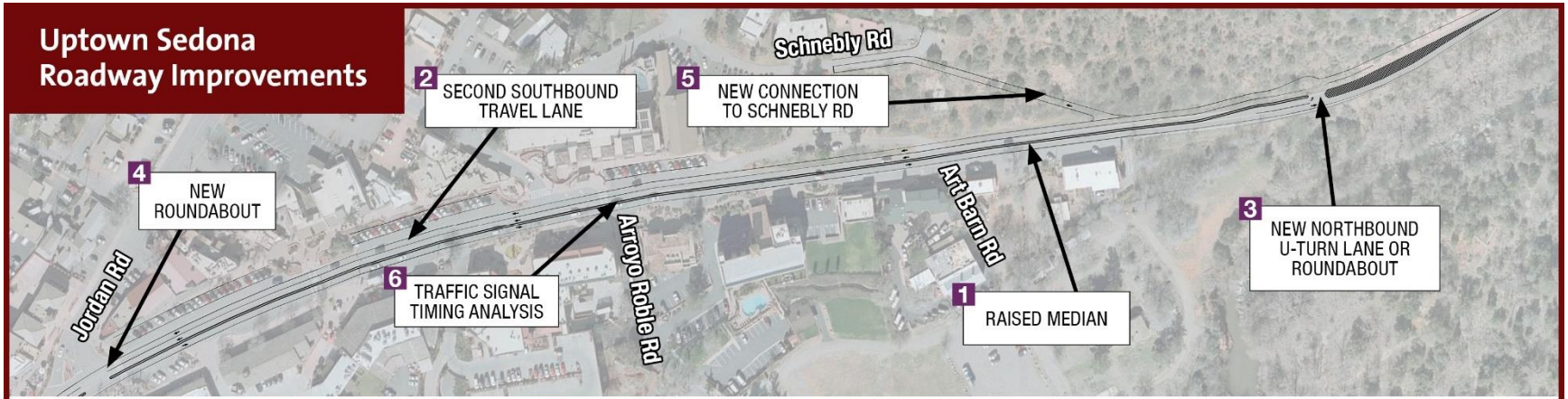
Table 4.4 shows community input on Uptown improvements, provided in the June 2017 community survey. The survey showed strong support for the Uptown improvements, with 62% either very likely or somewhat likely to support the improvements and 26% somewhat or very unlikely to support the improvements.

A review of comments indicated that many residents are concerned about additional roundabouts, as well as diminishing the pedestrian-friendly character of Uptown. Comments in favor of the raised median mentioned the increased safety and traffic flow.

Table 4.4. Community Perspectives – Uptown Improvements

Answer Choices	Responses	
Very Likely	33.46%	544
Somewhat Likely	28.72%	467
Neutral	11.62%	189
Somewhat Unlikely	11.07%	180
Very Unlikely	15.13%	246

Figure 4.1: Uptown Sedona Roadway Improvements



PROJECT DESCRIPTION:

1. Construct a raised median with decorative fence to direct pedestrians to controlled crossings.
2. Construct an additional southbound travel lane on SR 89A through Uptown.
3. Construct a turnaround or roundabout at the north end (e.g. at Art Barn).
4. Construct a roundabout at the south end (Jordan Road) of Uptown on SR 89A.
5. Create one-way access from 89A to free parking via Schnebly Road (NOT Schnebly *Hill* Road, see #5 on map above).
6. Conduct a traffic signal timing analysis to coordinate mid-block and Forest Road traffic signals

BENEFITS:

- With no traffic, it takes 7 minutes to travel from the Trout Farm to the Y. In severe congestion it takes 42 minutes. This level of severe congestion occurred on 7 days between February 1 and June 4, 2017. With this strategy, a severely congested trip would be reduced from 42 minutes, to 15 minutes.
- Raised median reduces turning movement conflicts and uncontrolled pedestrian crossings.
- Roundabouts facilitate U-turns and serve to keep vehicles consistently moving at safe speeds.

COSTS:

- Total estimated cost is $3.6M.

TRADEOFFS:

- Lengthy disruption from construction.
- Possible loss of some landscape area, seating and sidewalk at Jordan Road to expand roadway.
- Expands two lanes of traffic to three, impacting pedestrian crossings and overall character in Uptown.
- Possible added traffic near Schnebly Road.

STRATEGY 2. UPTOWN SEDONA PEDESTRIAN IMPROVEMENTS

Pedestrian crossings at Jordan Road, Arroyo Roble Road, and Wayside Chapel are uncontrolled with pedestrians crossing upon arrival at the crosswalk. This leads to frequent disruptions to through traffic on SR 89A during peak pedestrian times as pedestrians continually arrive at the crosswalk and cross SR 89A.

The stop-and-go traffic impacts travel times for vehicles arriving from Oak Creek Canyon. In addition, the mix of through traffic and pedestrian volumes can lead to safety issues.

Pedestrian crossing data collected on March 15, 2017 showed that there were 182 pedestrians that crossed SR 89A at the Mid-block pedestrian crossing in a 15-minute period. At Jordan Road, there were 115 pedestrians in 15-minute period.

The purpose of Strategy 2 is to construct pedestrian bridges over SR 89A, replacing existing at-grade crossings at Jordan Road and Wayside Chapel. The new raised median (Strategy 1) decorative landscaping or decorative barrier would direct pedestrians to the nearest bridge crossings rather than allowing them to cross SR 89A at random locations. Removing the interruptions to traffic caused by pedestrians will improve traffic flow through Uptown.

STRATEGY DESCRIPTION

Uptown Pedestrian Improvements include:

1 **Construct a pedestrian bridge over SR 89A at Wayside Chapel.**

The pedestrian bridge would be an extension of the recently constructed bridge/elevator at Wayside Chapel. The pedestrian bridge would be decorative and attractive and would be constructed to minimize obstruction of mountain views. A partnership could be considered to provide a lower 3rd level to the adjacent Best Western Hotel.

2 **Remove crosswalk at Arroyo Roble and Wayside Chapel and direct pedestrians to Wayside Chapel bridge crossing**.

Pedestrians would be directed to Wayside Chapel pedestrian bridge to cross SR 89A. An additional bridge crossing could be considered just south of Apple Avenue but is not considered in the costs below.

3 **Construct a pedestrian bridge over SR 89A at Jordan Road.**

The design should consider the possibility of eliminating elevators at this location, due to proximity of existing ADA crossings.

STRATEGY COSTS

Table 4.5 provides an estimate of probable cost for the Uptown pedestrian improvements.

Table 4.5. Estimate of Probable Cost – Uptown Sedona Pedestrian Improvements

STRATEGY ELEMENT	COST
Remove crosswalk at Arroyo Roble and direct pedestrians to Wayside bridge crossing	Minor cost
Construct a pedestrian bridge over SR 89A: assume up to three pedestrian bridges, locations could be at Jordan Road, Arroyo Roble, and the mid-block pedestrian crossing. Cost assumes **a bridge** with two **elevators at up to 3 locations**. Constructing the two of the crossings with stairs only (no elevator) would reduce the cost by approximately $500,000.	$6,000,000
Construct a pedestrian bridge over SR 89A: at Wayside Chapel and an additional elevator	$1,000,000
TOTAL ESTIMATE OF PROBABLE COST[1]	**$7,000,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Costs includes elevators on both sides of the roadway and assumes a steel truss supported by two towers. Costs are scalable; stairways could be considered instead of an elevator. Costs also include mobilization, engineering, construction administration, and a 20% contingency.

BENEFITS

Separating pedestrian crossings from moving traffic will result in a smoother traffic flow and reduce the duration and extent of traffic into Oak Creek Canyon. Analysis shows that this combination of improvements would reduce travel time under peak congested conditions from 42 minutes to 19 minutes. Pedestrian safety benefits are listed in **Table 4.6.**

Table 4.6. Strategy Benefits – Uptown Sedona Pedestrian Improvements

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
42 minutes	19 minutes	-55% reduction in travel time	55,750	$7,000,000	$492,800	$125.56	$8.84

TRADEOFFS

Pedestrians will not use an overpass that requires significant out-of-direction travel, choosing to cross SR 89A at undesignated locations. For the grade-separated pedestrian crossings to be effective, deterrents such as desert landscaping or a low decorative barrier would be required on the raised median (Strategy 1) to discourage pedestrian crossings at points other than the pedestrian bridges.

Pedestrian bridges are large structures. To provide adequate clearance for vehicles passing below the pedestrian bridge, it must have at least 16’-6”, according to ADOT. The overall height of the bridge could be 25’ or more when considering the truss/structure height and railings. The pedestrian bridge will be designed to minimize impacts to view sheds. Renderings could be developed, which could alleviate concerns of impacted views.

COMMUNITY PERSPECTIVES

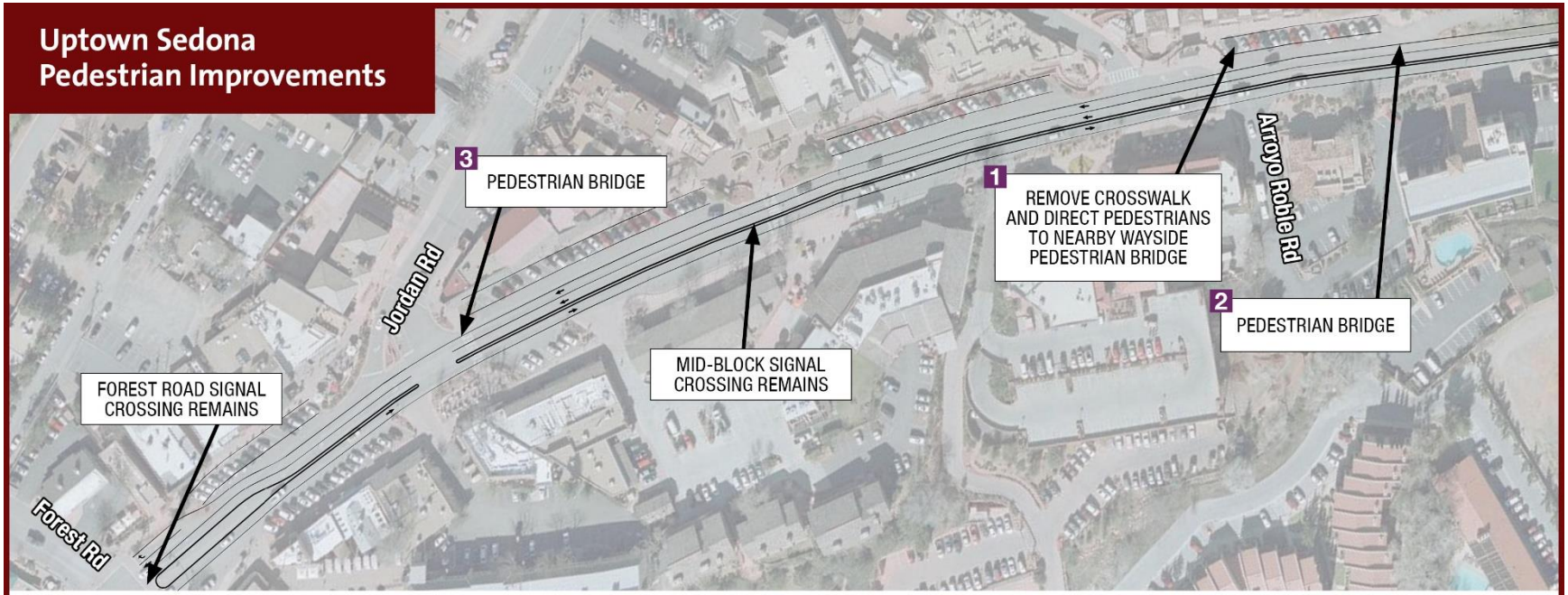
Table 4.7 shows community input provided in June 2017 for the Uptown pedestrian improvements. The survey showed that 49% of respondents are either very likely to support, or somewhat likely to support

the improvements and 39% are somewhat unlikely or very unlikely to support the improvements. Residents are concerned about impacts to views, willingness of pedestrians to utilize the bridges, and the cost. Comments in support cited reduced congestion.

Table 4.7. Community Perspectives – Uptown Pedestrian Improvements

Answer Choices	Responses	
Very Likely	26.70%	420
Somewhat Likely	22.82%	359
Neutral	12.65%	199
Somewhat Unlikely	15.51%	244
Very Unlikely	22.31%	351

Figure 4.2: Uptown Sedona Pedestrian Improvements



PROJECT DESCRIPTION:

1. Remove crosswalk at Arroyo Roble and direct pedestrians to Wayside bridge crossing.
2. Construct a pedestrian bridge over 89A at Wayside Chapel.
3. Construct a pedestrian bridge over 89A at Jordan Road.

BENEFITS:

- With no traffic, it takes 7 minutes to travel from the Trout Farm to the Y. In severe congestion it takes 42 minutes. This level of severe congestion occurred on 7 days between February 1 and June 4, 2017. With this strategy, a severely congested trip would be reduced from 42 minutes, to 19 minutes.
- Improved pedestrian safety.

COSTS:

- Total estimated cost is $6 M.

TRADEOFFS:

- Less convenient for pedestrians.
- Possible impact to views.
- Requires elevators for ADA accessibility.
- Pedestrian bridges will occupy portions of existing sidewalk and landscaped area.

STRATEGY 3. UPTOWN SEDONA PARKING IMPROVEMENTS

The Uptown Sedona area parking system is characterized by a highly visible set of on-street parking along SR 89A and fragmented off-street parking lots that provide the primary public parking supply.

Key findings from the *2012 City of Sedona Uptown Parking Management Plan* indicate that demand for on-street parking is very high compared to off-street parking facilities. The study estimates that 28% of the traffic congestion in Uptown Sedona is from arriving visitors searching for a parking spot along SR 89A. The City of Sedona has undertaken wayfinding efforts to improve this situation.

The Uptown Sedona Parking Recommendations focus on improving awareness of existing supply, increasing supply in opportunity areas, and providing better tools for patrons to find parking. The City will need to focus on making sure all necessary improvements are well marketed and the community is educated. Improvements in the system will largely go unrecognized without proper marketing and outreach.

STRATEGY DESCRIPTION

Uptown Sedona Parking Improvements include (**Figure 4.3**):

1 **Expand parking areas through additional parking lots, on-street parking, or a new parking garage.**

Focus the off-street parking around the existing Municipal Parking Lot and available surrounding areas that may be ripe for redevelopment.

Traffic from SR 89A should be directed to this area using signage and a potential new street connection to SR 89A via Schnebly Road (see Strategy 1).

Additional on-street parking could be added along Jordan Road from SR 89A to Apple Road, providing more managed supply to support the expanding retail area. Include parking meters consistent with recent additions on SR 89A.

In addition, the City may consider converting Van Deren Road, Wilson Road, or Smith Road, between Forest Road and Schnebly Road to one-way street couplets to allow one of the existing lanes to be converted to on-street parking. Striping, signing, and way-finding would be required.

Specific off-street lot locations should be designated for tour bus parking and for an employee parking permit program. From a customer service standpoint, these should be the least prioritized spaces, leaving those closer priority spaces for customer traffic, turnover, and highest opportunity for business success within Uptown.

In the long term, the City should consider constructing a new multi-level parking structure. A detailed site selection process would be required. A potential site is located at the northwest corner of Jordan Road and Schnebly Road. This parcel previously housed a bank and the site is now owned by the Sedona Chamber of Commerce. Additional sites could be considered outside of Uptown with shuttle/transit service to Uptown.

2 Enhance signs that provide directions to City parking lots.

Improve driver awareness of the existing parking supply through improved wayfinding, both static and technology based.

The improved way finding should be branded and consistent in terms of placement, visual appearance, and navigational guidance. Branding should stand out from Manual of Uniform Traffic Control Devices (MUTCD) signage and clearly indicate where and how to park, as shown in Figure 4.3. Parking branding signage should be coordinated with marketing and education materials, which should also be distributed to business owners to communicate with customers.

A parking information smart phone app will supplement the additional parking supply. The application could provide information such as parking locations and occupancy and potentially accept payments. The inclusion of occupancy will be heavily data dependent and will likely require an investment in lot-by-lot or space-by-space counting technology, including variable message sign displays for real time occupancy. The ideal app would provide wayfinding capabilities from destinations in Uptown to the most logical parking supply (with alternatives during peak conditions).

STRATEGY COSTS

An estimate of probable cost for Uptown parking improvements is shown in **Table 4.8**. A wide range of cost is shown, dependent upon whether the City chooses to pursue a new parking garage, or improves surface parking, or on-street parking.

Table 4.8. Estimate of Probable Cost – Uptown Sedona Parking Improvements

STRATEGY ELEMENT	COST
Expand parking areas through additional parking lots, on-street parking, or a new parking garage	$5M - $15M, depending upon size of parking garage; $15,000- $25,000 per space excluding land costs
Marketing and education for outreach, marketing collateral, and social media outreach	$10,000 annually
TOTAL ESTIMATE OF PROBABLE COST[1]	$5M - $15M depending upon size of parking garage

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

- Better balanced parking system with off-street utilization more closely matching on-street utilization
- Higher customer satisfaction and reduced complaints
- Reduced congestion related to searching for parking
- One-way street conversion would address existing parking issues (safety, resident complaints)

TRADEOFFS

A new parking structure could potentially impact views if it is largely an above-ground structure. Furthermore, additional parking may encourage more vehicles in Uptown. As such, consideration may be given to locating the parking garage outside of Uptown and providing high frequency shuttle service

between the parking garage and Uptown. The shuttle service could consist of Neighborhood Vehicles (See Strategy 9) or utilize the high frequency shuttle that extends to Oak Creek Canyon (See Strategy 8).

COMMUNITY PERSPECTIVES

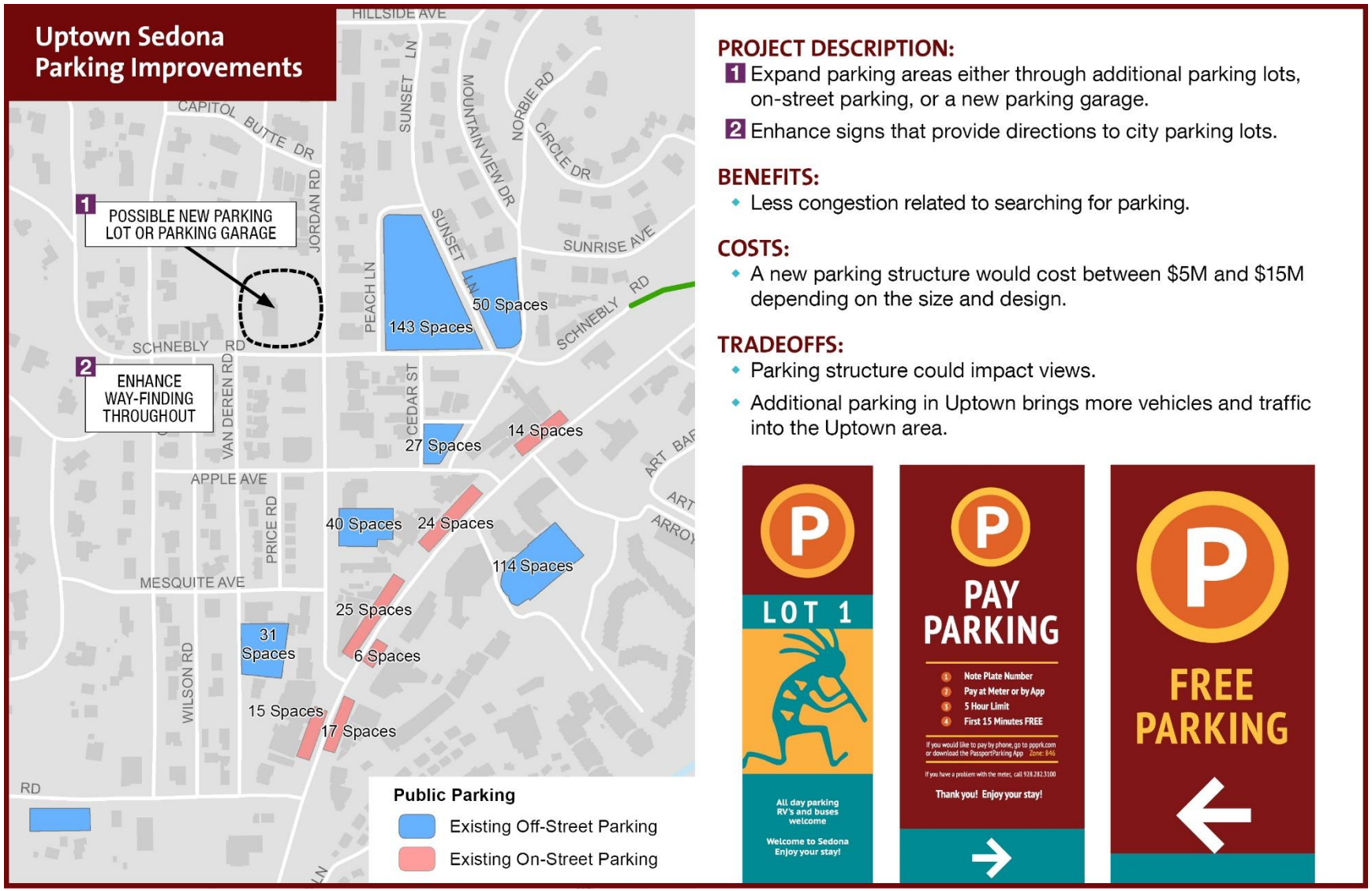
Table 4.9 shows community input provided in the June 2017 on Uptown parking improvements. The survey showed that 43% of respondents are either very likely to support or somewhat likely to support the improvements and 39% are somewhat unlikely or very unlikely to support the improvements.

A review of comments indicated that many residents are concerned about impacts to views, and the anticipated cost.

Table 4.9. Community Perspectives – Uptown Parking Improvements

Answer Choices	Responses	
Very Likely	20.05%	309
Somewhat Likely	23.49%	362
Neutral	17.78%	274
Somewhat Unlikely	17.65%	272
Very Unlikely	21.03%	324

Figure 4.3. Uptown Sedona Parking Improvements



STRATEGY 4. SR 179 IMPROVEMENTS, SCHNEBLY HILL ROUNDABOUT TO THE "Y"

Following a meandering corridor with breathtaking views of the surrounding red rock scenery, SR 179 is designated as a scenic byway and provides the most direct access to Sedona from I-17. Improved in 2009, SR 179 has a raised median, one travel lane in each direction, seven roundabouts in the City of Sedona, and another four in VOC

On an uncongested day, travel time on SR 179 from Bell Rock Blvd in the VOC to the "Y" is about 12 minutes. During peak congested periods, this trip exceeds 36 minutes. This level of serve congestion occurred on 6 days during spring 2017.

Traffic data shows that SR 179 between Schnebly Hill Road and the "Y" often carries over 19,000 vehicles per day during peak seasons and weekends[4] and operates under congested conditions. During peak hours, entering traffic volumes at the Schnebly Hill Road intersection approached 1,800 vehicles per hour.

At the SR 179/Schnebly Hill Road roundabout, the northbound and southbound approaches both perform at LOS F as does the entire intersection during peak periods. High traffic volumes, interruptions from pedestrian crossings at Tlaquepaque, and vehicles turning to and from driveways all impact the continuous traffic stream and cause delays for upstream vehicles, which leads to back-ups on SR 179 that can extend south to the City boundary. Speed profile data illustrates that the bottleneck at the Schnebly Hill Road roundabout extends southward to north of Chapel Road.

The northbound movement of the SR 179/SR 89A roundabout also performs at LOS E. During peak periods, traffic in Uptown north of the intersection impedes vehicles entering and existing the roundabout, leading to vehicle queues forming in the northbound direction south of the "Y".

This strategy recommends improvements to eliminate the bottleneck at Schnebly Hill Road and at the "Y", which will reduce congestion on the entire SR 179 corridor.

STRATEGY DESCRIPTION

Recommended improvements to SR 179 between Schnebly Hill Road and the "Y" are described below, and depicted in **Figure 4.4**.

1 Schnebly Hill Road roundabout is expanded to two lanes.

Widening of the Schnebly Hill Road roundabout to two lanes will eliminate a bottleneck on SR 179. The roundabout will be improved to include two circulating lanes, two lanes entering the roundabout, and two lanes exiting the roundabout.

Benefits

Modeling shows that a two-lane roundabout will operate at LOS A. The average delay per vehicle will decrease from 51.0 seconds to 6.6 seconds per vehicle. A benefits summary is presented in **Table 4.10.**

[4] By comparison SR 179 near Mallard Drive carried just over 16,000 vehicles per day in April 2016, see Appendix C

Figure 4.4: SR 179 Improvements, Schnebly Hill Road to the "Y"

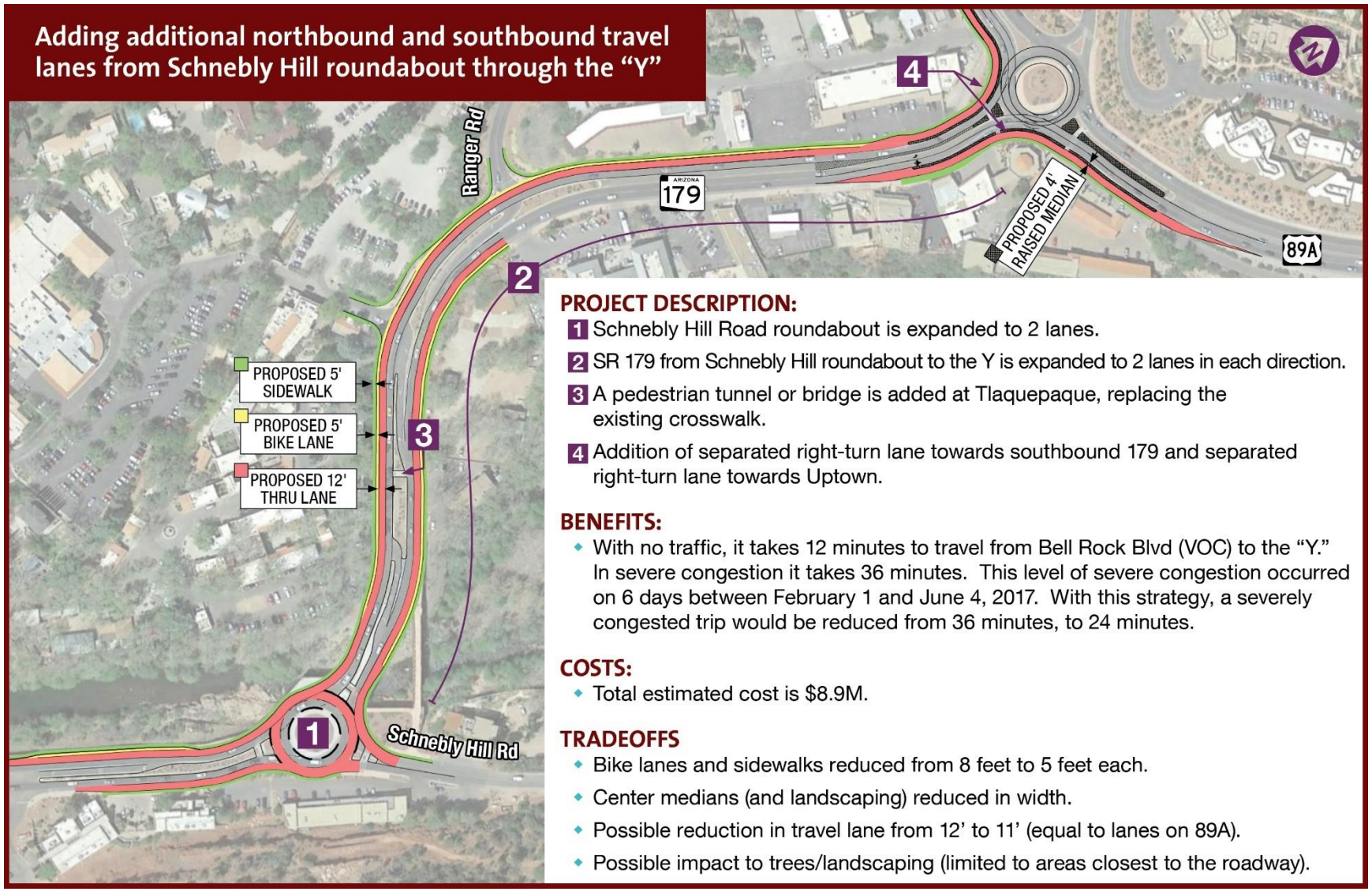


Table 4.10. Strategy Benefits – Schnebly Hill Road Roundabout Widening

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
36 minutes	28.2 minutes	-22% reduction in travel time	53,362	$5,397,640	$379,993	$100.64	$7.09

Costs

An estimate of probable cost for the roundabout improvements is listed in **Table 4.11.**

Table 4.11. Estimate of Probable Cost – Schnebly Hill Road Roundabout Widening

STRATEGY ELEMENT	COST
Schnebly Hill Road roundabout is expanded to two lanes	$5,397,640.00
TOTAL ESTIMATE OF PROBABLE COST[1]	**$5,397,640.00**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Tradeoffs

The roundabout will require widening of the SR 179 bridge over Oak Creek. To minimize bridge widening, existing 8’ to 10’ sidewalks would be reduced to 5’.

2 SR 179 from Schnebly Hill roundabout to the “Y” is expanded to two lanes in each direction.

The improvements would also expand SR 179 between Schnebly Hill Road roundabout and the “Y” to two lanes in each direction.

Benefits

Two travel lanes will improve the efficiency of both the Schnebly Hill Road roundabout and the “Y” roundabout, providing additional capacity from the expanded two-lane roundabout to the two-lane “Y” roundabout.

Costs

An estimate of probable cost for the widening improvements is listed in **Table 4.12**.

Table 4.12. Estimate of Probable Cost – SR 179 Widening

STRATEGY ELEMENT	COST
SR 179 from Schnebly Hill roundabout to the “Y” is expanded to two lanes in each direction.	$108,600.00
TOTAL ESTIMATE OF PROBABLE COST[1]	**$108,600.00**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Tradeoffs

The widening improvements may require additional right-of-way. To accommodate the widening while minimizing impacts to adjacent property and the need for additional right-of-way, bicycle lanes and sidewalks would be reduced from 8' feet to 5' feet each. The width of the center median and landscaping may also be reduced. Travel lanes could also be reduced from 12' to 11'. The improvements will likely impact trees and landscaping close to SR 179 corridor.

3 A pedestrian tunnel or bridge is added at Tlaquepaque, replacing the existing crosswalk.

The existing crosswalk at Tlaquepaque would be removed and replaced with a pedestrian tunnel or bridge over SR 179. A tunnel would likely require the profile of SR 179 to be elevated.

Benefits

A pedestrian tunnel eliminates conflicts between pedestrians and motorists, smooth traffic flow and improving pedestrian safety for those crossing the widened four-lane SR 179. The pedestrian tunnel or bridge would connect Tlaquepaque to Tlaquepaque North.

Costs

An estimate of probable cost for the pedestrian bridge or tunnel is listed in **Table 4.13**.

Table 4.13. Estimate of Probable Cost – SR 179 Pedestrian Bridge or Tunnel at Tlaquepaque

STRATEGY ELEMENT	COST
A pedestrian tunnel or bridge is added at Tlaquepaque, replacing the existing crosswalk.	$2,000,000
TOTAL ESTIMATE OF PROBABLE COST[1]	**$2,000,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Tradeoffs

The pedestrian tunnel could be constructed to take advantage of elevation differences between SR 179 and adjacent property; however, significant excavation would still be required and would impact adjacent property, utilities, and require new right-of-way.

A new pedestrian bridge could impact views. In addition, a pedestrian bridge may not be utilized if pedestrians must travel out of their way to access the bridge.

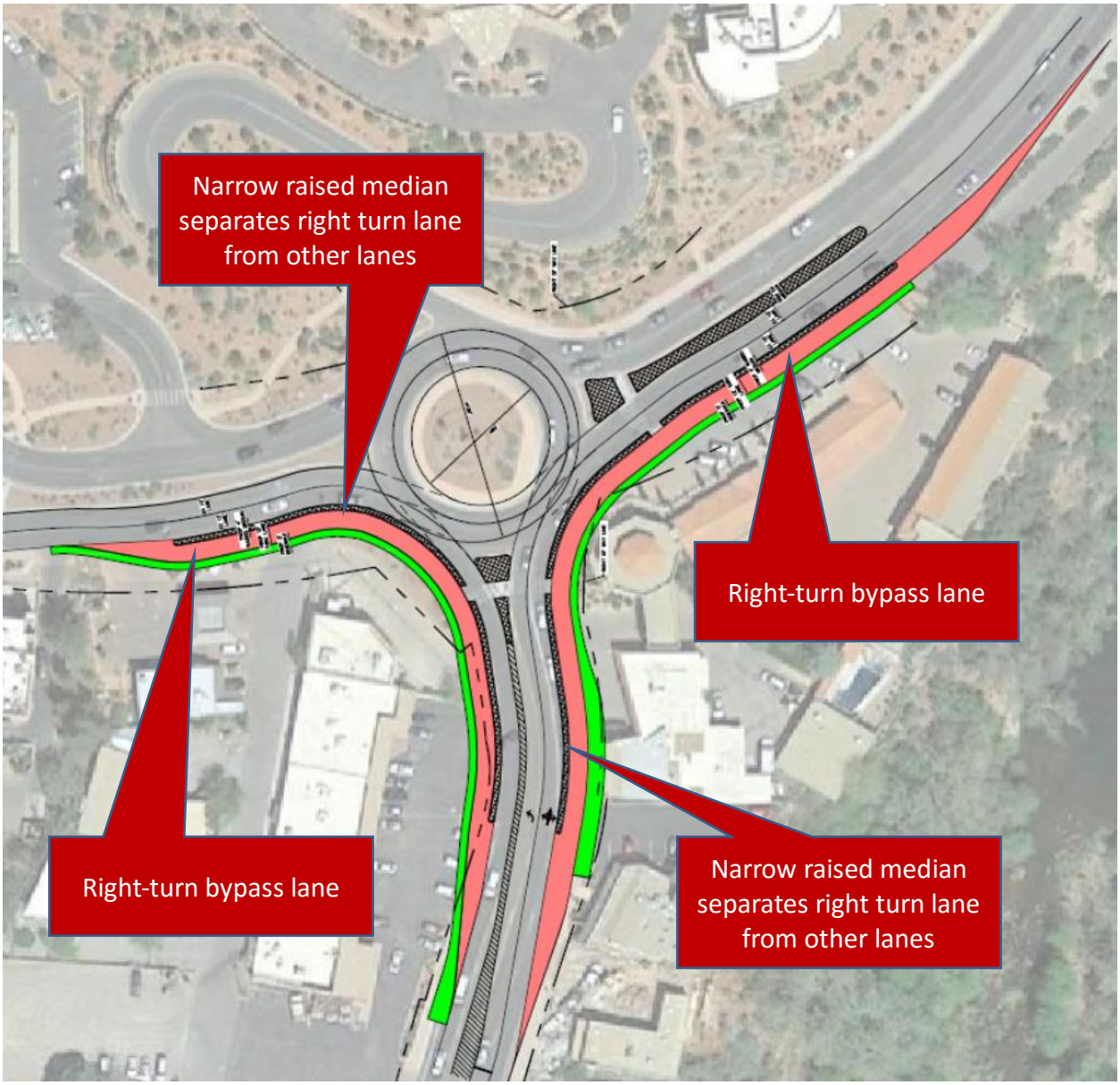
4 Add a separated right-turn lane towards southbound SR 179 and a separated right-turn lane towards Uptown at the "Y" roundabout.

A separated right turn lane for northbound SR 179 to northbound SR 89A would be added to the "Y" roundabout. The right turn lane would be separated from the other roundabout approach lanes by a narrow median forming a bypass lane, as illustrated in **Figure 4.5.**

Benefits

A right turn bypass lane removes right turning vehicles from the roundabout, enabling them to bypass the roundabout. This increases the number of vehicles that can make a right turn from northbound SR 179 to northbound SR 89A and from northbound SR 89A to southbound SR 179. These improvements will allow motorists traveling to and from West Sedona to be separated from those traveling to Uptown. These bypass lanes will improve the LOS at the "Y" roundabout from LOS D to LOS C and improve the performance of both the west and south approaches. Notably, the performance of the south approach will improve from a LOS E to LOS C.

Figure 4.5: "Y" Improvements – Right Turn Bypass Lanes



Costs

An estimate of probable cost for the SR 179 roadway improvements is listed in **Table 4.14**.

Table 4.14. Estimate of Probable Cost – SR 179 Roadway Improvements

STRATEGY ELEMENT	COST
Addition of separated right-turn lane towards southbound SR 179 and separated right-turn lane towards Uptown, at the "Y".	$1,382,240
TOTAL ESTIMATE OF PROBABLE COST	**$1,382,240**

Tradeoffs

To construct the bypass lanes, the existing sidewalk will need to be narrowed to 5'. In addition, landscaping and streetscape at the northwest corner will be impacted. Some right-of-way may also be required to accommodate the improvements.

STRATEGY COSTS

A summary of estimate of probable cost for SR 179 roadway improvements is listed in **Table 4.15**.

Table 4.15. Estimate of Probable Cost – SR 179 Roadway Improvements

STRATEGY ELEMENT	COST
Schnebly Hill Road roundabout is expanded to 2 lanes.	$5,397,640
SR 179 from Schnebly Hill roundabout to the "Y" is expanded to 2 lanes in each direction.	$108,600
A pedestrian tunnel or bridge is added at Tlaquepaque, replacing the existing crosswalk.	$2,000,000
Addition of separated right-turn lane towards southbound SR 179 and separated right-turn lane towards Uptown, at the "Y".	$1,382,240
TOTAL ESTIMATE OF PROBABLE COST	**$8,888,480**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

Benefits of the combined improvements is presented in **Table 4.16.** The benefits reflect the Schnebly Hill Roundabout widening to two lanes, SR 179 roadway widening to two lanes between Schnebly Hill Road and the "Y", the "Y" roundabout bypass lanes, and a pedestrian bridge or tunnel at Tlaquepaque. The analysis shows that the combined improvements will reduce travel time from Bell Rock Boulevard to the "Y" from 36 minutes to 24 minutes under congested conditions, a 32% improvement.

Table 4.16. Strategy Benefits – Combined SR 179 Roadway Improvements

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
36 minutes	24.6	-32%	79326	$8,888,480	$625,749	$112.05	$7.89

COMMUNITY PERSPECTIVES

Table 4.17 summarizes community input provided in June 2017 community survey. The survey showed that 58% of respondents are very likely or somewhat likely to support the improvements and 32% are somewhat or very unlikely to support the improvements. A review of comments indicated that many residents are concerned about impacts to trees and properties, as well as reduction in bike lane width. Some commenters noted that Schnebly Road roundabout is a choke point or bottleneck for traffic.

Table 4.17. Community Perspectives – SR 179 Roadway Improvements

Answer Choices	Responses	
Very Likely	32.33%	494
Somewhat Likely	25.52%	390
Neutral	10.27%	157
Somewhat Unlikely	13.09%	200
Very Unlikely	18.78%	287

STRATEGY 5. MAJOR ROADWAY CONNECTIONS

Sedona's street network was largely developed prior to the City's incorporation in 1988, as subdivisions were incrementally approved without connectivity between them. As a result, traffic is funneled to SR 89A and SR 179, even for the shortest of trips.

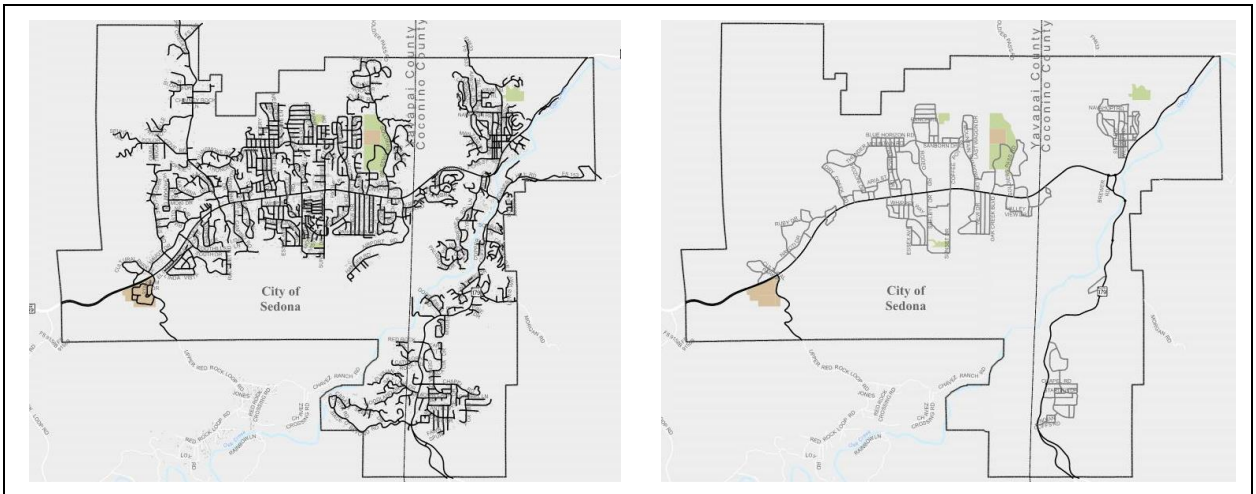
A well-connected street network has many short links, numerous intersections, and minimal dead-ends (cul-de-sacs). As connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations, creating a more accessible and resilient transportation network. A connected network reduces transportation impacts by distributing trips. A connected network encourages walking and bicycling as off-highway connected streets are more comfortable to walk and bike along.

Sedona's street network connectivity was evaluated at a high-level to get a sense of how well the street network connects origins and destinations.

Figure 4.6 shows a need to improve connectivity within Sedona. **A** (left exhibit) shows the City's entire street network (142 miles of local streets, collectors, and arterials). **B** (right exhibit) removes the streets that do not provide any connectivity to other streets (e.g., dead-end streets and cul-de-sacs were removed). The connectivity analysis demonstrates:

1. Of the 142 miles of existing roads, approximately 56 miles (39.4%) are connected streets and 19 of these miles are SR 89A and SR 179.
2. Some local street connections, such as Thunder Mountain Road, provide alternative routing options to portions of SR 89A.
3. Brewer Road/Ranger Road is the only alternative that connects SR 89A and SR 179, while there are no connecting streets between West Sedona and Uptown, nor between Uptown and SR 179. All trips that desire to travel between these areas are directed to use SR 89A or SR 179.

Figure 4.6: Sedona Roadway Network Connectivity



A. All of Sedona Streets

B. *Sedona's Connected Streets*

STRATEGY DESCRIPTION

This strategy recommends three specific improvements to help to enhance connectivity between roadway connections and neighborhoods to create a system of alternative routes to SR 179 and SR 89A.

1 Make Portal Lane one-way in to the Tlaquepaque/Los Abrigados area.

2 Connect Tlaquepaque parking lot to Ranger Road/Brewer Road for exiting vehicles. Improve the Brewer Road / Ranger Road intersection.

Portal Lane currently serves traffic coming to and from the Tlaquepaque, Los Abrigados, and El Portal districts from SR 179. Motorists desiring to leave this district are all directed to SR 179 southbound. Motorists who desire to go north on SR 179 must head south to the Schnebly Hill Road roundabout, circle the roundabout, and head north on SR 179.

Traffic count data shows approximately 100 vehicles per hour are making U-turns at the Schnebly Hill Road roundabout (Saturday afternoon data, April 2016). A high percentage of these originate from Tlaquepaque and are making a U-turn to head north. This U-turn movement requires northbound vehicles to yield, adding to the bottleneck that occurs during peak periods.

A new connection to Brewer Road from Tlaquepaque would enable vehicles to bypass the Schnebly Hill Road roundabout and use Brewer Road. Recommendations are:

Costs

An estimate of probable cost for the improvements is listed in **Table 4.18**.

Table 4.18. Estimate of Probable Cost – Portal Lane / Ranger Road / Brewer Road Improvements

STRATEGY ELEMENT	COST
Make Portal Lane one-way in to Tlaquepaque / Los Abrigados area.	$500,000
Connect Tlaquepaque parking lot to Ranger Road / Brewer Road for exiting vehicles.	
TOTAL ESTIMATE OF PROBABLE COST	**$500,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Benefits

A summary of benefits of the Portal Lane/ Ranger Road/ Brewer Road improvements is provided in **Table 4.19**.

Table 4.19. Strategy Benefits – Portal Lane / Ranger Road / Brewer

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
36 minutes	32.5 minutes	-10% reduction in travel time	24,378	$513,000	$36,115	$21.04	$1.48

Tradeoffs

Portal Lane/Ranger Road/Brewer Road improvements would likely impact parking at Tlaquepaque. Roadway improvements may require acquisition of right-of-way to establish the roadway as a public street.

3 Extend the west end of Forest Road to connect to Southbound SR 89A

The Forest Road connection would extend the existing Forest Road west and then southward to connect to SR 89A. Residents and visitors would use the Forest Road connection to bypass SR 89A in Uptown and the "Y" to get from Uptown to West Sedona. At its intersection with SR 89A, vehicles would be able to turn right onto southbound SR 89A. A raised median on SR 89A would preclude vehicles from making a left turn from Forest Road to northbound SR 89A. Vehicles on northbound SR 89A would be able to make a left turn onto Forest Road at a directional median opening at the intersection of SR 89A and Forest Road.

Costs

An estimate of probable cost for the Forest Road connection is listed in **Table 4.18**.

Table 4.20. Estimate of Probable Cost – Forest Road Connection

STRATEGY ELEMENT	COST
Extend west end of Forest Road to connect to Southbound SR 89A	$1,274,100.00
TOTAL ESTIMATE OF PROBABLE COST	**$1,274,100.00**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Benefits

The Forest Road connection is designed to provide an alternative route to and from Uptown, providing Uptown residents with alternatives to congested SR 89A and the "Y". Mobility pattern data shows approximately 650 daily trips between the neighborhoods north and west of Uptown and West Sedona. Currently these vehicles utilize SR 89A and the "Y" to make this trip. The Forest Road connection would serve a portion of these trips and enable residents and visitors to use Forest Road to access SR 89A. This improvement would be consistent with the Sedona Community Plan, Circulation Policy #5, which states, "Provide street connections as low-speed alternatives to the highways that will maintain neighborhood safety and integrity."

Tradeoffs

The Forest Road connection to SR 89A will require new roadway construction in an area of steep terrain. Like the roadway serving the Hilton from the "Y", the Forest Road connection may require a set of switchbacks or s-curves to navigate the terrain and avoid US Forest Service property. This will likely have a visual and aesthetic impact as the roadway is constructed in the mountain side.

The Forest Road connection will require right-of-way acquisition of private property. There are currently undeveloped/vacant lots at the end of Forest Road that could be considered for acquisition for this improvement project.

COMMUNITY PERSPECTIVES

Table 4.21 shows community input provided in the June 2017 community survey. The survey showed that 58% of respondents are either very likely, or somewhat likely to support the improvements and 32% are somewhat or very unlikely to support the improvements.

A review of comments indicated that many residents are concerned about possible impacts to US Forest Service land for the road extension. There was generally positive support for the Ranger Road connection. Uptown residents tended to support the Forest Road connection.

Table 4.21. Community Perspectives – Major Roadway Connections

Answer Choices	Responses	
Very Likely	36.92%	556
Somewhat Likely	24.04%	362
Neutral	12.88%	194
Somewhat Unlikely	10.96%	165
Very Unlikely	15.21%	229

Figure 4.7: Major Roadway Connections

PROJECT DESCRIPTION:

1. Make Portal Lane one-way in to Tlaquepaque / Los Abrigados area.
2. Connect Tlaquepaque parking lot to Ranger Road / Brewer Road for exiting vehicles.
3. Extend west end of Forest Road to connect to Southbound SR 89A.

BENEFITS:

- Brewer/Ranger connection diverts vehicles that would be making a U-turn movement at the Schnebly Hill roundabout, reducing SR 179 congestion.
- With no traffic, it takes 12 minutes to travel from Bell Rock Blvd (VOC) to the "Y." In severe congestion it takes 36 minutes. This level of severe congestion occurred on 6 days between February 1 and June 4, 2017. With this strategy, a severely congested trip would be reduced from 36 minutes, to 33 minutes.
- Brewer/Ranger connection is a relatively low cost improvement
- Brewer/Ranger connection creates a more convenient route for northbound and westbound SR179 travelers, with minimal impact to southbound SR179 travelers.
- Forest Road connection allows Uptown residents and emergency responders to avoid congestion in Uptown and at the "Y".

COSTS:

- Total estimated cost for Brewer/Ranger connection is $500K.
- Total estimated cost for Forest connection is $1.3M.

TRADEOFFS:

- Forest Road connection requires property acquisition.
- Potential for increased traffic in Forest Road neighborhoods.
- Impacts to private property.
- Visual and aesthetic impacts.

STRATEGY 6. NEIGHBORHOOD STREET CONNECTIONS

This strategy is similar to Strategy 5 (Major Roadway Connections). It establishes small roadway connections between neighborhoods to create a system of alternative routes to SR 89A. The routes would primarily be used by residents who are familiar with Sedona's neighborhoods and streets. The connections would improve the resident convenience and allow them to walk, bicycle, or drive to destinations in West Sedona without using SR 89A.

STRATEGY DESCRIPTION

Create a set of new neighborhood vehicular connections meant to accommodate local residents, keeping short trips off SR 89A.

The recommended connections (**Table 4.22**) are not an exhaustive list of new roadway connections that should be implemented; those shown are opportunities to establish connectivity while minimizing impacts to existing structures. The route would not be signed as an alternate route or thoroughfare, and would primarily serve short trips by locals and residents with a modest increase in traffic. New connections would be implemented with redevelopment opportunities.

Table 4.22. Strategy Description – Neighborhood Street Connections

ID	Connection Name	Anticipated Benefit
West Sedona, south of SR 89A A parallel route south of SR 89A will establish connectivity between subdivisions south of SR 89A		
1	Connect El Camino Road to Carroll Canyon Drive.	Develops an alternative route south of SR 89A.
2	Table Top Road to Golden Eagle Drive	Develops an alternative route south of SR 89A.
3	Roadrunner Drive to Shelby Drive, near Columbine Court	Develops an alternative route south of SR 89A.
4	Connect Northview Road to Sunset Drive	Develops an alternative route south of SR 89A.
5	Panorama Boulevard to Rockridge Drive Connection	Develops an alternative route south of SR 89A and interconnects subdivisions. At a minimum, this connection could consist of a pedestrian/bike connection. The connection should also provide legal/designated access to the trail system to the south.
6	Connect Willow Way to Rockridge Drive	Develops an alternative route south of SR 89A.
West Sedona, north of SR 89A While Thunder Mountain Road provides a limited alternative to SR 89A, additional connections will further enhance connectivity. Mobility pattern data shows 1,200 daily internal trips in West Sedona north of SR 89A. Connectivity will enable them to use routes other than SR 89A.		
7	Connect White Bear to Calle del Sol to Navoti	Continues parallel route development north of SR 89A. Provides a connection to Dry Creek Road. Connects through Sedona Public Library.

STRATEGY COSTS

An estimate of probable cost for the neighborhood street connection improvements is listed in **Table 4.23**.

Table 4.23. Estimate of Probable Cost – Neighborhood Vehicular Connections

	STRATEGY ELEMENT	COST
1	El Camino Road to Carroll Canyon Drive	$200,000
2	Table Top Road to Golden Eagle Drive	$400,000
3	Roadrunner Drive to Shelby Drive, near Columbine Court	$400,000
4	Northview Road to Sunset Drive	$400,000
5	Panorama Boulevard to Rockridge Drive Connection	$200,000
6	Willow Way to Rockridge Drive	$500,000
7	White Bear to Calle del Sol to Navoti	$700,000
TOTAL ESTIMATE OF PROBABLE COST		**$2,800,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

New neighborhood connecting streets will provide residents with alternatives to travel in and around Sedona. Instead of relying on SR 89A, to travel between neighborhoods, residents will be able to use local streets to move around West Sedona. As connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations, creating a more accessible and resilient transportation network. A connected network reduces transportation impacts by distributing trips. A connected network encourages walking and bicycling as connected streets are generally not as large and are more comfortable to walk and bike along.

TRADEOFFS

Residents will be concerned about impacts to their individual property. Most of the neighborhood connections will require acquisition of new right of way.

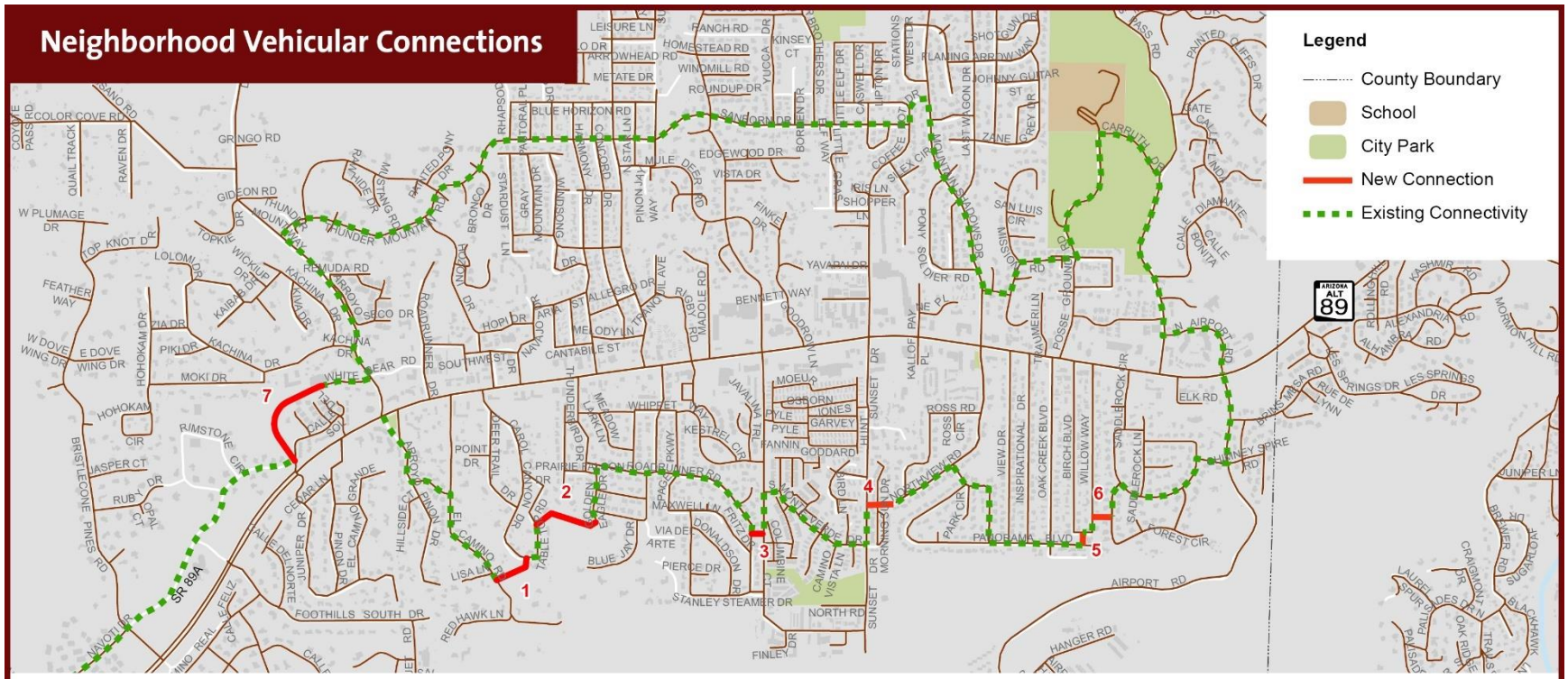
COMMUNITY PERSPECTIVES

Table 4.24 shows community input provided in the June 2017. The survey showed that 60% of respondents are either very or somewhat likely to support the improvements and 25% somewhat or very unlikely to support the improvements. A review of comments indicated that many residents are concerned about how this strategy will affect neighborhoods. Some commenters supported the need for more walking and biking paths.

Table 4.24. Community Perspectives – Neighborhood Vehicular Connections

Answer Choices	Responses	
Very Likely	39.97%	594
Somewhat Likely	20.73%	308
Neutral	14.47%	215
Somewhat Unlikely	8.68%	129
Very Unlikely	16.15%	240

Figure 4.8: Neighborhood Vehicular Connections



PROJECT DESCRIPTION:

- Set of new neighborhood vehicular connections meant to accommodate local residents, keeping short trips off SR 89A.
- Examples are shown on the map (other connections could be identified).

BENEFITS:

- Gives residents alternatives.
- Reduces number of trips on SR 89A.
- Promotes safety.

COSTS:

- Estimated cost for the 7 connections shown is $2.8M.

TRADEOFFS:

- Potential for minor increased traffic through neighborhood segments.
- Potentially requires property acquisition.

STRATEGY 7. ENHANCED TRANSIT SERVICE - COMMUTER/RESIDENT FOCUSED

Transit is most efficient when a series of high demand activity centers are linked via linear corridors. This allows for high visibility of available transit routes as well as a clear understanding of where the transit goes and how to access the service.

Sedona's two major thoroughfares, SR 89A and SR 179, are ideal opportunities for transit service "trunk" lines. These two main routes throughout the City serve employment centers, schools, visitor attractions, and civic spaces. This allows destinations to be served with a minimum of out-of-direction travel for passengers, creating a more efficient system and a more desirable customer experience.

The Verde Lynx service, operated by Cottonwood Area Transit (CAT), currently provides fixed route service between Cottonwood, West Sedona, Uptown Sedona, and a portion of Sedona along the northern part of SR 179, down to the Poco Diablo Resort. It does not extend south to VOC.

Previous studies have looked at the opportunity to expand the fixed-route service in the City of Sedona and surrounding area. Studies dating back several years have called for service along SR 179 with connections between Sedona and visitor destinations along the highway (e.g., Cathedral Rock).

STRATEGY DESCRIPTION

1 **Extend Verde Lynx bus service to VOC. Bus would run hours similar to current Verde Lynx: Monday –Saturday, 6AM - 7:15PM with the potential to expand**.

Extend Verde Lynx Fixed Route transit service south along SR 179 to VOC, the Sedona Red Rock Visitor Center, and Ranger Stations. VOC has a large hospitality sector, creating a need for both workers to get to their jobs and visitors looking to visit destinations along SR 179 and Uptown Sedona.

Initially, service frequency would be consistent with that provided on the current Verde Lynx routes (serve frequency throughout the day varies from 30 minutes to 2 hours). As the route gains ridership and is proven successful, service frequency would increase.

STRATEGY COSTS

An estimate of probable cost for the enhanced transit service (commuter and resident focused) is listed in **Table 4.25**.

Table 4.25. Estimate of Probable Cost – Enhanced Transit Service / Commuter and Resident Focused

STRATEGY ELEMENT	COST
Capital Costs (1 new bus)	$140,000
Annual operating costs	$329,340

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

The extended Verde Lynx transit service will primarily serve residents and commuters to Sedona. Residents and commuters who become familiar with the service and can plan their work schedules accordingly are more likely to utilize the service to get to and from work and shopping destinations.

TRADEOFFS

Does not reduce congestion on SR 179

Verde Lynx bus service currently operates at a frequency of 45 to 2-hours. Bus service at this frequency is not convenient or sufficiently consistent to encourage typical motorists to leave their vehicles behind. This route would serve commuters and riders with predictable schedules.

To attract a significant number of motorists from their vehicles, and thereby reduce congestion, bus service must be more frequent (e.g. every 10 to 15 minutes).

For comparison purposes, ridership on the previous Road Runner bus service (discontinued in 2012), was approximately 27 passengers per hour at 20-minute frequency. During peak periods, ridership increased to 50 to 60 passengers.

Requires on-going operations and maintenance costs

Transit service requires on-going expenses. Transit service costs are typically calculated based on the number of service hours provided (one bus operating for an hour is one service hour). Providing additional buses to increase service frequency, extending the route length, or extending service hours all result in increased operating costs.

Requires multi-jurisdictional cooperation

Transit service to VOC will require cooperation between the City, Coconino County, Yavapai County, and ADOT. Funding for transit service is provided through ADOT and Federal Transit Administration (FTA) grants. These grants typically cover 58% of operating costs. The remaining 42% of operating costs would be split between Yavapai County, Coconino County, and the City.

COMMUNITY PERSPECTIVES

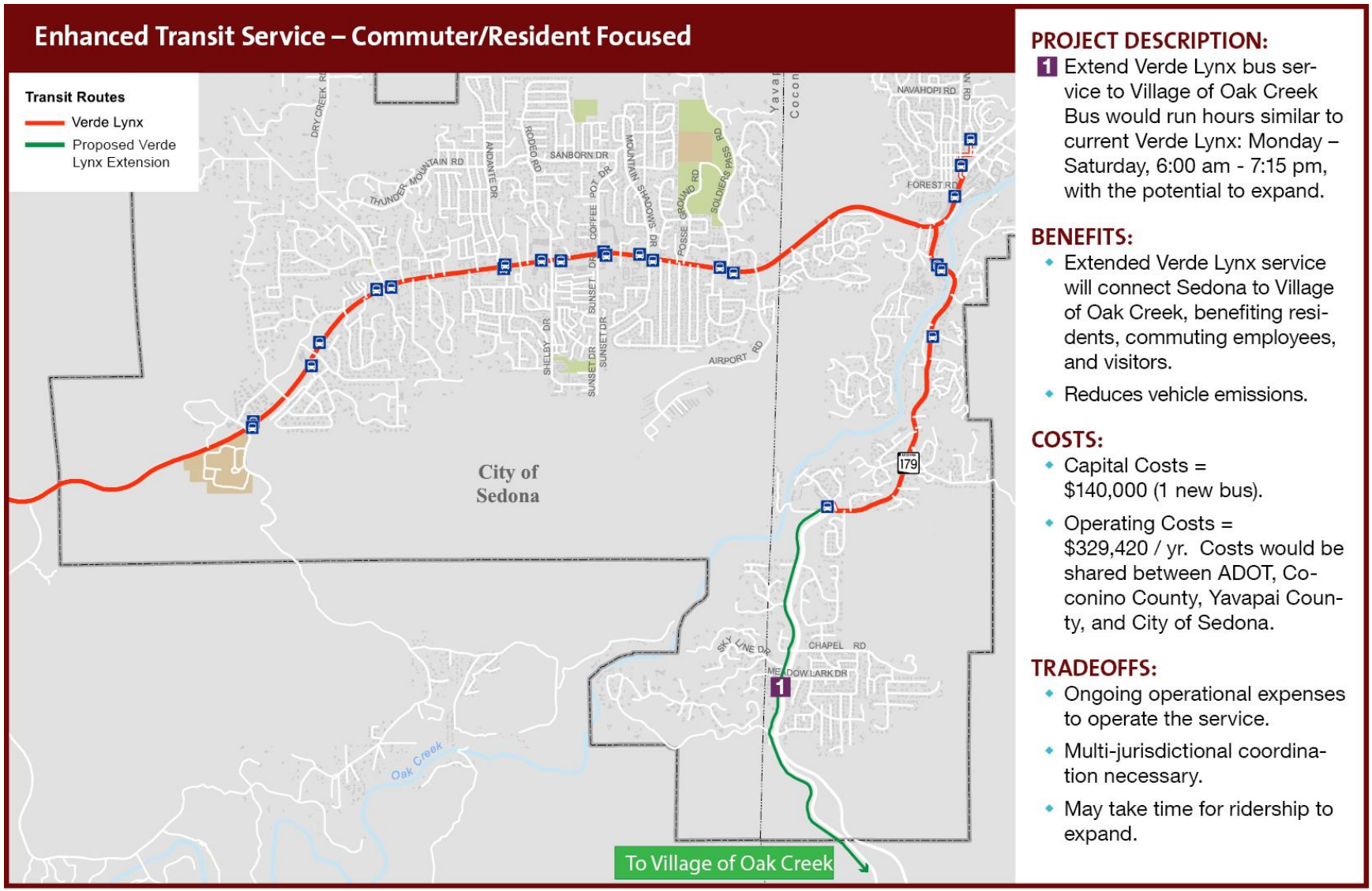
Table 4.26 summarizes community input provided in the June 2017 survey. The showed that 65% of respondents are either very or somewhat likely to support the improvements and 18% are somewhat or very unlikely to support the improvements.

A review of comments indicated general support with some skepticism about how utilized the service will be.

Table 4.26. Community Perspectives – Enhanced Transit Service – Commuter/Resident Focused

Answer Choices	Responses	
Very Likely	47.04%	699
Somewhat Likely	18.10%	269
Neutral	16.55%	246
Somewhat Unlikely	8.14%	121
Very Unlikely	10.16%	151

Figure 4.9: Enhanced Transit Service (Commuter/Resident Focused)



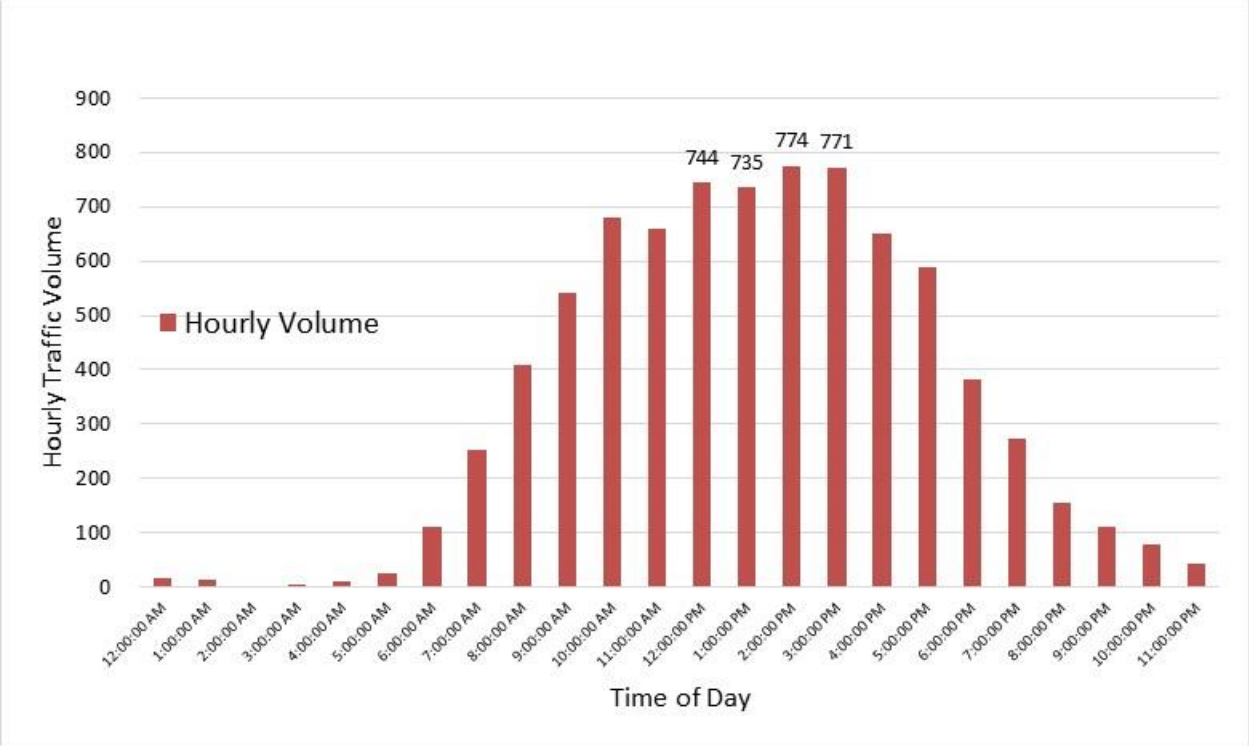
STRATEGY 8. ENHANCED TRANSIT SERVICE - TOURISM FOCUSED SHUTTLE SERVICE

Traffic congestion in Sedona cannot be solved without addressing traffic congestion in Oak Creek Canyon (OCC). While OCC is outside of City incorporated boundaries, traffic in Sedona is inextricably connected to traffic in there since SR 89A through Uptown is the only route to and from OCC

OCC traffic volume data (**Figure 4.10[5]**) shows that nearly 40% of traffic occurs during the four-hour period from 12PM – 4PM. The concentration of traffic during this period overwhelms SR 89A. Managing visitor travel better during this peak period will reduce congestion not only in OCC, but also through Uptown and along the SR 179 corridor.

This strategy recommends a tourist-focused shuttle system to transport visitors to and from destinations along the SR 179 corridor and SR 89A in OCC. A strategy overview is presented in **Figure 4.11.**

Figure 4.10: Oak Creek Canyon Hourly Traffic Volumes



STRATEGY DESCRIPTION

1 **Implement a tourist-focused bus shuttle system from VOC to Slide Rock State Park**.

A shuttle system to OCC would connect visitor destinations along SR 179 to Uptown Sedona and Slide Rock State Park, switching visitors from their personal vehicles to shuttles and reducing the number of vehicles in the OCC at any one time. This would reduce both road volumes and the demand to park along the highway and at trailheads.

[5] SR 89A at Art Barn Road, April 16, 2016

2 Construct a Park-and-Ride lot near the Red Rock Ranger Station or at other locations in VOC.

A Travel Information Center on SR 179 could serve as a Park-and-Ride lot for shuttle services to Sedona and OCC. The center would be staffed by travel advisors to assist visitors with transit routing, encourage them to avoid peak-period travel, and educate them about travel alternatives in Sedona. The center would encourage visitors to "park once". The information center could serve as a gathering place for the community and include arts and crafts tents, food carts, or special events for both the community and visitors to the area and county. The concierge service could also provide visitors registration opportunities for pre-planned tours and other local activities.

STRATEGY COSTS

An estimate of probable cost for a visitor-focused Oak Creek Canyon shuttle is listed in **Table 4.27**.

Table 4.27. Estimate of Probable Cost – Tourism Focused Oak Creek Canyon Shuttle

STRATEGY ELEMENT	COST
Capital Costs for 6 to 8 new buses, bus stop improvements	$840,000 to $1,120,000
Bus stop improvements	$480,000
Park and Ride lot	$785,500
Travel Information Center	$1,000,000
TOTAL ESTIMATE OF PROBABLE COST	**$3,385,000**
Total Annual Operating Costs	**324,480 / yr. - $459,680 / yr.**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

A visitor-focused shuttle system is estimated to divert between approximately 400 to 900 vehicles per day from Oak Creek Canyon. This will result in a decrease in congested travel time under sever conditions on SR 89A from 42 minutes to 36 minutes, as illustrated in **Table 4.28.**

Table 4.28. Strategy Benefits – Tourism Focused Shuttle Service

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
42 minutes - SR 89A	36 minutes	-14%	14,191	$2,400,000	$910,480.00	$169.12	$64.16
36 minutes - SR 179	24 minutes	-32%	67,444	$2,400,000	$910,480.00	$35.59	$13.50

TRADEOFFS

Buses would also experience congestion

Unless congestion is eliminated from Oak Creek Canyon, either by limiting the number of vehicles in Oak Creek Canyon (through a reservation system or other means), buses will be impacted by congestion in

Oak Creek Canyon and through Uptown. Buses would also be impacted by server congestion on SR 179 between VOC and the "Y".

Requires on-going operations and maintenance costs

Transit service requires on-going expenses. Transit service costs are typically calculated based on the number of service hours provided (one bus operating for an hour is one service hour). Providing additional buses to increase service frequency, extending the route length, or extending service hours all result in increased operating costs.

Seasonality of demand

Demand for the shuttle system will be seasonable (spring through fall). The variability makes operating the system more complex. Integrating the system with Verde Lynx could reduce the complexity, allowing drivers from other routes to be assigned during peak season as needed, then assigned to other routes in off-peak periods.

Requires multi-jurisdictional cooperation

Coordination with ADOT will be necessary for construction of bus stops and shelters along SR 89A.

Coordination will be required with the US Forest Service and Coconino County. A shuttle system could be provided in partnership with Verde Lynx or with the Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA).

Incentives for Utilization

To make the shuttle system effective and successful, other canyon management efforts will be required to encourage tourists to utilize the shuttle such as:

- Permit program to limit the number of visitors to Slide Rock State Park and Oak Creek Canyon recreation sites. The number of permits issued would be determined by the US Forest Service and be based on available parking at Slide Rock State Park and other recreations site in Oak Creek Canyon. Permits would be required during peak season (March 1 through October 31).
- Parking would only be allowed within designated parking lots at designated recreation sites (trailheads, pullouts, etc.) with a parking permit. Those without a permit would be required to utilize the shuttle service.
- Enforcement resources including partnerships with Coconino County Sheriff's Office, Arizona Department of Public Safety, and US Forest Service would be required.

COMMUNITY PERSPECTIVES

Table 4.29 summarizes community input provided in the June 2017 survey. The survey showed that 66% of respondents are either very or somewhat likely to support the improvements and 20% are somewhat or very unlikely to support the improvements.

A review of comments indicated skepticism about how utilized the service will be, emphasized the need for Park-and-Ride lots, and differing views as to whether the service should be free. There was support for managed parking in the area, and the need to connect the shuttles to parking areas.

Table 4.29. Community Perspectives – Enhanced Transit Service – Tourism Focused Shuttle Service

Answer Choices	Responses	
Very Likely	43.25%	637
Somewhat Likely	23.15%	341
Neutral	13.58%	200
Somewhat Unlikely	7.94%	117
Very Unlikely	12.08%	178

Figure 4.11: Enhanced Transit Service (Tourism Focused Shuttle Service)

Enhanced Transit Service – Tourism Focused

PROJECT DESCRIPTION:

1. Implement a tourist-focused bus shuttle system from Village of Oak Creek to Slide Rock State Park. Buses would run every 15 to 20 minutes, 8 am to 8 pm, between March and October.
2. Park-and-Ride lot near Red Rock Ranger Station; additional stops and pick-up points along SR 179 and SR 89A.

BENEFITS:

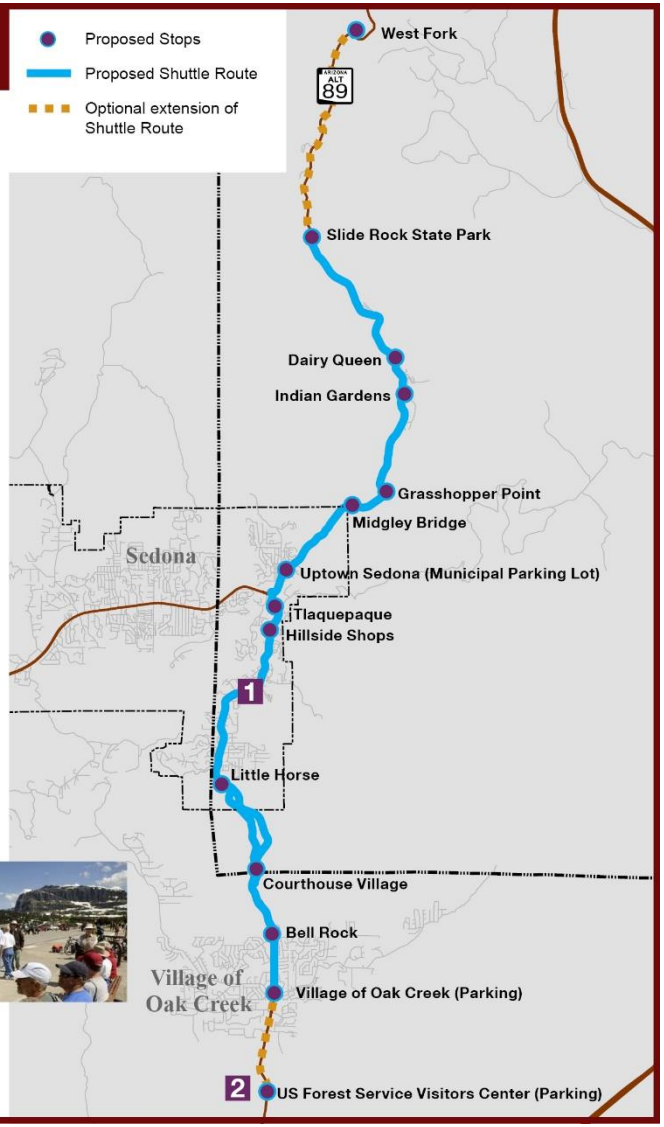
- Reduced vehicles entering Oak Creek Canyon from Sedona, reducing congestion. A visitor-focused shuttle system is estimated to divert between approximately 400 to 900 vehicles per day from Oak Creek Canyon. A mandatory shuttle system could divert 2,000 to 3,000 vehicles per day from Oak Creek Canyon.
- With no traffic, it takes 7 minutes to travel from the Trout Farm to the "Y". In severe congestion it takes 42 minutes. This level of severe congestion occurred on 7 days between February 1 and June 4, 2017. With the this strategy, a severely congested trip would be reduced from 42 minutes, to 36 minutes.
- Also, with no traffic, it takes 12 minutes to travel from Bell Rock Blvd (VOC) to the "Y." In severe congestion it takes 36 minutes. This level of severe congestion occurred on 6 days between February 1 and June 4, 2017. With this strategy, a severely congested trip would be reduced from 36 minutes, to 24 minutes.
- Reduced Vehicle Emissions.

COSTS:

- Capital Costs = $2.4 M (8 new buses and park-and-ride lot improvements).
- Operating Costs = $460,000 / yr. Costs may be shared between ADOT, Coconino County, Yavapai County, and City of Sedona.

TRADEOFFS:

- Ongoing operational expenses to operate the service.
- Multi-jurisdictional coordination necessary.
- Need to create strong incentives for utilization.
- Seasonality of operations/ demand periods.



STRATEGY 9. NEIGHBORHOOD VEHICLES - TOURISM FOCUSED

Fixed route service can be more successful when gaps in service (schedule or route) are filled in by flexible services. This is often seen in cities where ride-hail services such as Uber or Lyft are used by commuters to provide access between home or work and a transit station. In downtown environments, several cities have had success in using subsidized or ad-sponsored electric vehicle services to circulate people from parking lots or transit on the periphery of the district to the main activity centers.

Example of the City of Aspen's demand-responsive ride program vehicle.

STRATEGY DESCRIPTION

Implement neighborhood vehicle flexible service to supplement the Verde Lynx or Oak Creek Canyon Shuttle. Rides would be provided "on-demand" and are requested utilizing a smartphone application. Vehicles could be electric, gas, or alternative fuel.

As a supplement to the fixed route service (Strategy 7 and 8), a flexible, demand-based service is recommended to serve Uptown and connect to West Sedona, SR 179, and Hillside destinations. The flexible service would utilize Neighborhood Vehicles (NVs) like the vehicle shown above and those shown in **Figure 4.12.**

Demand-responsive flexible service extends the reach and viability of Verde Lynx transit to more customers by removing obstacles between the transit stop and the ultimate destination. Demand-responsive service should be focused on weekends (Friday-Sunday) and peak-season (March/April/May, September/October).

Other cities that operate similar services contract to private operators. Companies including The Free Ride (http://thefreeride.com/) and Downtowner (http://www.ridedowntowner.com/#home-video) operate these services in other cities through advertising revenues and city funding.

The demand-responsive flexible service makes it more convenient for visitors and residents to move around Sedona using transit without being discouraged by the longer headways of the Verde Lynx service. Rides are initiated by the patron through a smart phone application or vehicles can be flagged. The prevalence of smartphone-based ride-hail services creates a level of comfort that fewer visitors have with traditional fixed-route transit service. The service would be paid for through City funding, passenger fees, advertising, and support from other business or non-profit organizations.

The *City of Sedona Demand Response Electric Transit Service in Uptown Feasibility Study (2010)*[6] explored the feasibility of a NV-based service and found that such a service could be implemented in a cost-effective manner. The feasibility study estimated up to 137,000 passengers per year; however, with today's prevalence of smart phones and increased tourism in Sedona, ridership would likely be higher than the 2010 study estimated.

The 2010 feasibility study defined a service area consisting of the Municipal Parking Lot, Uptown Sedona, Tlaquepaque, and Hillside. The service area could also include trailheads in neighborhood locations and/or trailheads with limited parking. It is recommended that the City begin with a modest fleet (5 to 10 vehicles) and enhance it as demand is proven and increases.

STRATEGY COSTS

An estimate of probable cost for the neighborhood vehicles listed in **Table 4.30**. A sample start-up cost budget is provided in **Table 4.31**. **Table 4.32** provides sample operational costs.

Table 4.30. Estimate of Probable Cost – Neighborhood Vehicles

STRATEGY ELEMENT	COST
Ridership Estimates	The City of Sedona Demand Response Electric Transit Service in Uptown Feasibility Study estimated ridership of 137,000 passengers per year
Capital Costs	City of Sedona Feasibility Study (2010) estimated capital costs of **$204,000** for a fleet of 10 NVs. Capital costs for the San Diego system was **$339,167 (See Table 4.31)** for a fleet of 10 NVs.
Operating Costs	Aspen Colorado, which has a fleet of 5 NVs pays a private contractor **$290,000** per year to operate the service. Service operates daily, 8AM – 11PM. The San Diego system, with a fleet of **10 NVs, pays $79,845** (see **Table 4.31**) per month to operate the system. City of Sedona Feasibility Study (2010) projected annual operating costs, for a fleet of 10 NVs of **$238,042** per year. The service would operate 362 days per year, 9 hours per day. Service would be run through a combination of volunteer and paid staff. The cost model assumes revenue of $94,573 per year (50-cent fare).

Table 4.31. Example Neighborhood Vehicle Demand-Responsive Transit Start-up Costs

Startup Costs	Cost/Vehicle	# of Vehicles	Total
Vehicle Acquisition	$ 20,000	10	$ 200,000
Vehicle Branding	$ 1,500	10	$ 15,000
After Market Modifications	$ 2,500	10	$ 25,000
Charging Stations	$ 3,500	10	$ 35,000
Startup Marketing	$ 1,167	10	$ 11,167
Branding	$ 1,000	10	$ 10,000
App Development	$ 4,000	10	$ 40,000
Driver Smart Phones	$ 300	10	$ 3,000
Total	**$ 33,967**	**10**	**$ 339,167**

[6] http://www.sedonaaz.gov/Home/ShowDocument?id=8979

Table 4.32. Example Neighborhood Vehicle Monthly Operational Costs

Monthly Operating Costs	Cost/Vehicle	Total
Insurance	$ 850	$ 8,500
Driver Payroll	$ 2,700	$27,000
Management Benefits	$ 350	$ 3,500
Management Payroll	$ 1,200	$12,000
Storage and Maintenance	$ 503	$ 5,025
Electricity	$ 100	$ 1,000
Marketing	$ 350	$ 3,500
Web	$ 250	$ 2,500
Employee Phones	$ 250	$ 2,500
Payroll Tax	$ 432	$ 4,320
Misc.	$ 1,000	$10,000
Total (14 hours per day)	**$ 7,985**	**$79,845**

BENEFITS

The City of Aspen, CO runs a similar program in their downtown area. Managers of the Aspen, CO system indicated the following benefits:

- Visitors and residents enjoy the convenience of the system. Its flexibility allows residents and visitors to be transported directly to their destination when they need it. Aspen has set a goal of no more than a five-minute wait for a ride. Rides can be hailed through a smartphone (via app or website) or can be flagged on the street.
- The system has contributed to lower parking occupancy rates, reducing vehicles "wandering" finding a parking spot. The program was paired with a doubling of parking prices and an expansion of a bikeshare service to increase the service's effectiveness and desirability.
- There has been an increased utilization of Park-and-Ride lots located at the perimeter of downtown. Visitors park in the lots and use the NV to access downtown. This reduces congestion in downtown.

Implementation of a demand-responsive NV service will help the City to transition to a "park once" model. Visitors will be more inclined to leave their vehicles in hotel parking lots or at Park-and-Ride locations, thereby reducing congestion on Sedona's roadways.

TRADEOFFS

Seasonal demand

The demand for the system will be seasonal. Demand will be high during the spring and lower during other times of the year. This introduces operating complexity as staffing levels and number of vehicles utilized will change.

Requires on-going operations and maintenance costs

The system requires continued annual investment (operating contract) with a private vendor. While some costs will be offset from advertising revenues, additional funding will be required. Funding could be solicited from local businesses or business groups.

Vehicle technology

Other cities that have implemented the system have utilized electric vehicles. Electric vehicles with zero emissions provide environmental benefits; however, in a hilly environment such as Sedona, the capacity and geographic reach of an electric vehicle fleet may be limited. As such, gasoline vehicles may be considered, which would reduce the environmental benefits.

COMMUNITY PERSPECTIVES

Table 4.33 shows community input provided in the June 2017 survey. The survey showed that 46% of respondents are either very likely, or somewhat likely to support the improvements and 34% are somewhat or very unlikely to support the improvements.

A review of comments indicated that they like the forward-thinking, but are concerned about the amusement park atmosphere it could bring.

Table 4.33. Community Perspectives – Neighborhood Vehicles - Tourism Focused

Answer Choices	Responses	
Very Likely	27.20%	396
Somewhat Likely	18.75%	273
Neutral	19.71%	287
Somewhat Unlikely	13.60%	198
Very Unlikely	20.74%	302

Figure 4.12: Neighborhood Vehicles - Tourism Focused

Neighborhood Vehicles – Tourism Focused

PROJECT DESCRIPTION:

- Neighborhood vehicle flexible service supplements the Verde Lynx or Oak Creek Canyon Shuttle.
- Rides are provided "on-demand" and are requested utilizing a smart-phone application.
- Vehicles could be electric, gas, or alternative fuel.

BENEFITS:

- Reduces parking demands, including at busy and crowded trail-heads.
- On-demand service is flexible, able to transport passengers to wherever they desire to go.
- Promotes a "park once" strategy for shopping, dining, recreating and sightseeing.
- Reduced vehicle emissions.

COSTS:

- Capital Costs = $340,000 (10 vehicles).
- Operating Costs = $300,000 - $600,000 / yr., depending upon number of vehicles, hours of service, and months per year.
- Costs could be reduced if volunteer drivers can be utilized.
- Costs could also be reduced by advertising revenue.

TRADEOFFS:

- Ongoing operational expenses.
- Seasonality of operations/demand periods.
- Service area of electric vehicles would be limited; gas engine vehicle would have a larger service area.

STRATEGY 10. SR 89A/WEST SEDONA ACCESS IMPROVEMENTS AND ADAPTIVE TRAFFIC SIGNAL CONTROL

Driveway access points are essential elements of any street network as they represent the start and end points of vehicle trips. However, each driveway also represents a potential conflict point between vehicles, pedestrians, and bicyclists.

The number and complexity of these conflict points directly relates to the safety performance of the roadway. A crash analysis of SR 89A and SR 179 (previously presented in **Figure 2.12)** illustrates the correlation between safety and access management. SR 179 with well-managed access has significantly fewer crashes than SR 89A with its numerous and closely spaced driveways.

The crash data shows that 60% of total crashes within the City occurred on SR 89A or at SR 89A intersections while 22% of total crashes within the City occurred on SR 179 or within SR 179 intersections.

Property with two closely spaced driveway openings

Well-managed access introduces opportunities to improve corridor aesthetics and pedestrian comfort

Managing access and raised medians are the most effective means to regulate access and reduce crashes. Median openings with dedicated left-turn lanes will be located to facilitate circulation and access at safe locations.

This strategy (**Figure 4.13)** recommends eliminating and consolidating driveway access points and installing a raised median on SR 89A.

In addition, this strategy recommends implementing adaptive traffic signal control technology to reduce congestion.

STRATEGY DESCRIPTION

1 **Eliminate or consolidate redundant driveway access points.**

Managing the placement, spacing, and design of driveway and street connections improves mobility and safety. Driveway access should be managed by considering street context, function, and location. Good

access management begins at the planning level and proceeds through design, construction, and on-going maintenance. Well executed access management balances safety and operating efficiency of the roadway with effective ingress and egress to adjacent properties.

2 Construct a raised median to control certain left turn movements to and from SR 89A

The *2010 SR 89A Crash Analysis and Safety Evaluation* recommended a raised median in areas of highest pedestrian activity from Andante Drive to Rodeo Drive and from Mountain Shadows Drive to Soldiers Pass Road. The study showed the entire two-mile section (Dry Creek Road to Airport Road) would benefit from median installation.

Benefits

The Federal Highway Administration (FHWA) identifies corridor access management as one of its nine proven safety countermeasures. Access management provides the following benefits:

- **Mobility:** Studies estimate that raised medians improve traffic flow by 10% or more as vehicular side-friction is reduced from vehicles turning to and from the highway at unpredictable locations. A raised median and access management maximizes efficiency by increasing traffic flow and reducing stop-and-go traffic. This preserves public investment in the roadways.
- **Safety**: Raised medians and access management Increase safety by limiting drivers' decision points. This is especially important as a large percentage of drivers are unfamiliar with the Sedona area. FHWA's Crash Modification Factor Warehouse website estimates a 39% crash reduction for all crash types and severities with the implementation of a raised median and access management. Raised medians also provide pedestrian refuge areas, reducing the number of pedestrian crashes by 46%.
- **Sidewalks and landscaping**: Reducing the number of access points results in fewer driveways across sidewalks, improving the comfort and safety of people walking along SR 89A and corridor aesthetics.
- **Redevelopment**: A well-developed and adopted access management plan will enable access improvements to be incorporated into the parcel redevelopment plans.

Costs

Estimated costs for an SR 89A access management program is listed in **Table 4.34**. The program would be implemented incrementally as redevelopment of parcels occurs, or phased into larger segments as part of a City Capital Improvement Project.

Table 4.34. Estimate of Probable Cost – SR 89A / West Sedona Access Management

STRATEGY ELEMENT	COST
Raised median between Airport Road and Dry Creek Road.	$2,000,000
Driveway consolidation; further study required to determine number of and location of driveways $5,000 per driveway location, assume 200 driveways.	$1,000,000
TOTAL ESTIMATE OF PROBABLE COST	**$3,000,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

Tradeoffs

Raised medians and access management will make it less convenient to make turns to/from SR 89A at some locations.

The access management strategy and plan will require City and ADOT partnership. A robust public outreach process with business and property owners will be required to address business concerns about limiting access.

3 Implement adaptive traffic signal control system and communications between traffic signals (Airport Road to Upper Red Rock Loop Road)

Poor traffic signal timing contributes to traffic congestion and delay. Conventional traffic signal systems use pre-programmed, daily signal timing schedules. Adaptive traffic signal control (ATSC) technology adjusts the timing of red, yellow and green lights to accommodate changing traffic patterns and ease traffic congestion.

Benefits

FHWA[7] estimates that adaptive signal control improves average performance metrics (travel time, control delay, emissions, and fuel consumption) by 10 percent or more. In systems with extremely outdated signal timing, and under saturated conditions, the improvement can be 50 percent or more. Improvement might not be as dramatic in areas where traffic demand is stable and predictable during typical time-of-day periods, performance is regularly monitored, and signal timing is well maintained.

Costs

An estimate of probable cost for the adaptive traffic control system is listed in **Table 4.35**.

Table 4.35. Estimate of Probable Cost – Adaptive Traffic Signal Control

STRATEGY ELEMENT	COST
Adaptive traffic signal control (ATSC) system, SR 89A, Airport Road to Upper Red Rock Loop Road. Cost assumes ATSC at 8 intersections at $35,000 per intersection (controller upgrade, advance detection, software configuration); fiber communication ($200,000 per mile, 2-3" conduit, pull boxes infrastructure, and 96 fiber cable) to allow for video streaming; cameras ($7,000 per intersection). Radios ($5,000 per intersection are a less expense alternative to fiber.	$936,000 (fiber communication) $376,000 (radio communication)
TOTAL ESTIMATE OF PROBABLE COST	**Variable; see above**

Tradeoffs

An Adaptive Traffic Signal Control system will require additional equipment (sensors, cameras, controllers, communications) to be installed at each traffic signal on SR 89A. Operations and maintenance of the system would be by the ADOT.

[7] https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/asct.cfm

COMMUNITY PERSPECTIVES

Table 4.36 summarizes community input provided in the June 2017 survey. The survey showed that 57% of respondents are either very likely or somewhat likely to support the improvements and 28% are somewhat or very unlikely to support the improvements.

Note that the question was focused on access management improvements. The question did not make inquiry about adaptive traffic signal control technology.

A review of comments indicated that they are supportive of improved safety, but concerned about the negative impact to businesses.

Table 4.36. Community Perspectives – SR 89A/West Sedona Access Management

Answer Choices	Responses	
Very Likely	34.33%	496
Somewhat Likely	23.04%	333
Neutral	14.95%	216
Somewhat Unlikely	10.66%	154
Very Unlikely	17.02%	246

Figure 4.13: West Sedona Access Improvements

SR 89 A/West Sedona Access Improvements

PROJECT DESCRIPTION:

1. Eliminate or consolidate redundant driveway access points.
2. Construct a raised median to control certain left turn movements to and from SR 89A.
3. Implement adaptive traffic signal control system and communications between traffic signals (Airport Road to Upper Red Rock Loop Road)

BENEFITS:

- Raised median: Improves traffic flow and efficiency by 10%, and reduces crashes by 50%.
- May prevent the need for widening at a later date.
- Improves pedestrian and bicyclist safety and aesthetics.

COSTS:

- Raised median: 2 miles from Airport Road to Dry Creek Road would cost $1.5M to $2M.
- Driveway: $3,000 - $5,000 per driveway location as part of a larger city project

TRADEOFFS:

- A raised median may be less convenient to make turns to and from SR 89A at some locations.
- Interruption from construction.

STRATEGY 11. BICYCLE AND PEDESTRIAN IMPROVEMENTS

With its world-renowned hiking and bicycling trails, its favorable climate during most of the year, and millions of visitors who come to Sedona for an 'active' vacation, Sedona can become an Arizona and national leader in creating a great environment for walking and bicycling. There are multiple reasons why this is important to Sedona.

1. **Bicycling can help relieve congestion in Sedona**. A bicycle lane takes up 1/3 the space of a vehicle lane, but can accommodate nearly as many people. With Sedona's relatively compact geography, more people walking and bicycling means a more efficient use of City roads.
2. **Bicycle and pedestrian facilities are inexpensive**. A shared-use path costs a fraction of a new roadway.
3. More people walking and bicycling **reduces the need for roads and parking.**
4. Walking and bicycling **helps the environment and improves air quality.**
5. Bicycling and walking can help **residents to stay healthy.**
6. **Walking and bicycling can provide economic benefits.** Tourism in Sedona will be constrained by congestion. More tourists who walk and bike means more visitors in hotels, shops, and businesses and fewer impacts to the roads.

This strategy recommends several improvements to make walking and bicycling safer, more convenient, and more comfortable. The improvements listed are not comprehensive; dozens of other connections could be implemented to improve walking and bicycling in Sedona. The improvements, presented in **Figure 4.14**, and discussed below begin the path toward a more bike-friendly and walkable Sedona.

Why Focus on Bicycling and Walking?

Four types of bicyclists.

Strong and Fearless

Enthused and Confident

Interested but Concerned

No Way, No How

Strong and Fearless (<1%) are happy to have roads they are allowed to travel on – will ride under any condition.

Enthused and Confident (5% - 9%) want bike lanes that *define a space for bicycle travel*.

Interested but Concerned (60%) will *only ride* when there is little or no interaction with motor vehicles; want separated shared-use paths, etc.

No Way, No How (30%) will not be riding a bicycle no matter what is provided.

STRATEGY DESCRIPTION

1 Shared-use path from Uptown to West Sedona.

A paved or stabilized surface shared-use path that connects Uptown to West Sedona would pass through the scenic Soldiers Wash and Adobe Jack area. The path could roughly follow alignments of existing trails or more closely parallel SR 89A.

Benefits: The path could become a recreational tourist draw for visitors, as well as a convenient option for residents to travel between West Sedona and Uptown.

Tradeoffs: Construction of this pathway would require coordination with the US Forest Service. As an alternative to a paved surface, the pathway could be constructed of stable, decomposed granite to provide a smooth yet natural surface.

Costs: Estimate of probable cost for a shared-use path across Soldiers Wash is shown in **Table 4.37**.

A shared-use path is physically separated from motorized vehicular traffic by an open space or barrier with a preferred width of 10 feet to 14 feet, suitable for bi-directional travel of bicyclists and pedestrians.

Table 4.37. Estimate of Probable Cost – Shared-Use Path

STRATEGY ELEMENT	COST
Per mile unit cost of shared-use path	Variable; costs can range from $100,000 to $500,000 per mile.
TOTAL ESTIMATE OF PROBABLE COST	**$500,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

2 Wide paved shoulders on Dry Creek Road.

Dry Creek Road is a popular bicycling route. Paved shoulders for bicyclists are provided on lower Dry Creek Road. Five-foot paved shoulders are recommended north of Color Cove Road.

Benefits: Improving the shoulders will remove the bicyclists from the travel lane, improving their safety and that of the motorists traveling on Dry Creek Road. Paved shoulders will provide a turn-off area for tourists enjoying the natural beauty of the area.

Tradeoffs: Coordination and participation with Yavapai County will be required for portions of Dry Creek Road outside of the City boundary. Installation of paved shoulders may impact drainage, roadway ditches, and culverts. Paved shoulders will need to be maintained (sweeping) on a regular basis.

Costs: Estimate of probable cost for paved shoulders on Dry Creek Road is shown in **Table 4.38.**

Table 4.38. Estimate of Probable Cost – Paved Shoulders on Dry Creek Road

STRATEGY ELEMENT	COST
Per mile unit cost of paved shoulder	$300,000 per mile
TOTAL ESTIMATE OF PROBABLE COST[1], paved shoulder on Dry Creek Road (2 miles)	**$600,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

3 Bicycle boulevard parallel both north and south of 89A using existing streets and some new connecting pathways.

A bicycle boulevard is a shared local or residential street that has been modified with traffic calming, safer intersection crossings, signs, pavement markings, and other amenities to prioritize the safety, comfort, and convenience of people biking and walking. A typical bike boulevard is routed along an existing residential street with low vehicle speeds and low volumes of motorized traffic and provides direct access to a variety of destinations. Bike boulevards, by design, discourage cut-through motor vehicle traffic, preserve the neighborhood aesthetic of residential streets, and provide an alternative travel route to busy streets for people walking and biking.[8]

Benefits: Bicycle boulevards are a low-cost way to create a connected network of streets with high bicyclist comfort and safety. They appeal to a broad spectrum of cyclists and encourage new bicycle ridership. A bicycle boulevard network can serve as the backbone for walking and biking in Sedona.

Tradeoffs: Some residents may not want an increase of bicycle traffic in their neighborhoods.

Costs: Estimate of probable cost for bicycle boulevard is shown in **Table 4.39**.

Table 4.39. Estimate of Probable Cost – Bicycle Boulevard

STRATEGY ELEMENT	COST
Per mile unit cost of bicycle boulevard	$193,000 per mile
TOTAL ESTIMATE OF PROBABLE COST	**$1,200,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

[8] City of Tucson Bicycle Boulevard Master Plan

4 Various sidewalk connections

The City will continue to allocate Capital Improvement Program (CIP) budget for sidewalk improvements.

Benefits: Sidewalks improve the safety and comfort of pedestrians. Roadways without sidewalks are more than twice as likely to have pedestrian crashes as sites with sidewalks on both sides of the street[9]. Research indicates that people will walk for recreational purposes if a facility is provided. Recreational walking is one of the easiest ways for people to get the recommended allotment of physical exercise each day.

Tradeoffs: New right-of-way may be required for some sidewalk segments. Further investigation is required on a case by case basis. Any new pedestrian signals on SR 89A would require an engineering analysis consistent with Arizona Department of Transportation policies and procedures.

Costs: Estimate of probable cost for various sidewalk connections is shown in **Table 4.40**.

Table 4.40. Estimate of Probable Cost – Various Sidewalk Connections

STRATEGY ELEMENT	COST
Unit cost for sidewalks, 5-foot, 1-side	$ 125,000 / mile
TOTAL ESTIMATE OF PROBABLE COST, various sidewalk connections	**To be determined**

5 Signalized pedestrian crossings on SR 89A

SR 89A in West Sedona is lined with hotels, restaurants, shopping, and other destinations – desirable destinations for pedestrians. While sidewalks line both sides of SR 89A from Upper Red Rock Loop Road to the east, through certain segments, accessing destinations located on opposite sides of the roadway introduces a significant barrier due to limited crossing opportunities. While traffic signals are located approximately every 1,500 feet, providing crossing opportunities for pedestrians, there are several segments that are separated by nearly ½ mile between signalized crossings.

The lack of pedestrian crossing opportunities, coupled with the higher speeds and higher traffic volumes, is manifest in the higher numbers of pedestrian and bicycle crashes on SR 89A. **Table 4.41** shows that 78% of bicycle and pedestrian crashes with motor vehicles occurred on SR 89A.

Table 4.41. Bicycle and Pedestrian Crashes with Motor Vehicles (2011-2015)

	CITY OF SEDONA TOTAL	SR 89A (WEST SEDONA) TOTAL
Pedestrian crashes	19	14
Bicycle crashes	25	20

Signalized crossing opportunities at locations, as identified in **Figure 4.14**, will improve safety and

[9] https://safety.fhwa.dot.gov/ped_bike/tools_solve/walkways_trifold/

convenience for pedestrians. Two options are provided for signalized pedestrian crossings: Pedestrian Hybrid Beacon, or a Two-Stage Pedestrian Signal. An example location of a Pedestrian Hybrid Beacon is illustrated in **Figure 4.15.** An example of a Two-Stage Pedestrian Signal is illustrated in **Figure 4.16**.

The pedestrian hybrid beacon (PHB) is helps pedestrians cross busy or higher-speed roadways at midblock crossings or uncontrolled intersections. The beacon head consists of two red lenses above a single yellow lens. The lenses remain "dark" until a pedestrian desiring to cross the street pushes the call button to activate the beacon. The signal then initiates a yellow to red lighting sequence consisting of steady and flashing lights that directs motorists to slow and come to a stop. The pedestrian signal then flashes a WALK display to the pedestrian. Once the pedestrian has safely crossed, the hybrid beacon again goes dark.[10]

A Two-Stage Pedestrian Signal uses a standard Red-Yellow-Green signal for motorists and remains green unless activated by a pedestrian. The Two-Stage signal incorporates the median island refuge between the two stages. The signal is placed at a mid-block location. A pedestrian presses a call button to activate the first signal. When the light turns red, a “WALK” signal prompts them to proceed to the median. The pedestrian then walks a short distance along the median to activate the second signal. A second “WALK” indication appears when the traffic signal turns red.

Benefits: Pedestrian Hybrid Beacons have been shown to reduce pedestrian crashes by 69%, and total crashes by 29%.

Tradeoffs: Signalized pedestrian crossings may would require coordination with the adjacent traffic signals so as not to introduce additional congestion and delay.

Costs: Estimate of probable cost for a pedestrian hybrid beacon and a two-stage signalized crossing is shown in **Table 4.42**.

Table 4.42. Estimate of Probable Cost – Pedestrian Hybrid Beacons on SR 89A

STRATEGY ELEMENT	COST
Pedestrian Hybrid Beacon (each)	$150,000
Two-Stage Signalized Pedestrian Crossing (each)	$250,000
TOTAL ESTIMATE OF PROBABLE COST, assume 3 new locations	**$450,000 to $750,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

[10] https://safety.fhwa.dot.gov/provencountermeasures/ped_hybrid_beacon/

COMMUNITY PERSPECTIVES

Table 4.43 shows community input provided in the June 2017 survey. The survey showed that 59% of respondents are either very likely, or somewhat likely to support the improvements and 26% are somewhat or very unlikely to support the improvements.

A review of comments indicated that they are supportive of the improvement, but don't feel it will have an impact on congestion reduction. Residents expressed support for bike lanes on Dry Creek Road.

Table 4.43. Community Perspectives – Bicycle and Pedestrian Improvements

Answer Choices	Responses	
Very Likely	40.93%	589
Somewhat Likely	17.58%	253
Neutral	15.29%	220
Somewhat Unlikely	8.48%	122
Very Unlikely	17.72%	255

Figure 4.14: Potential Pedestrian Crossing Locations

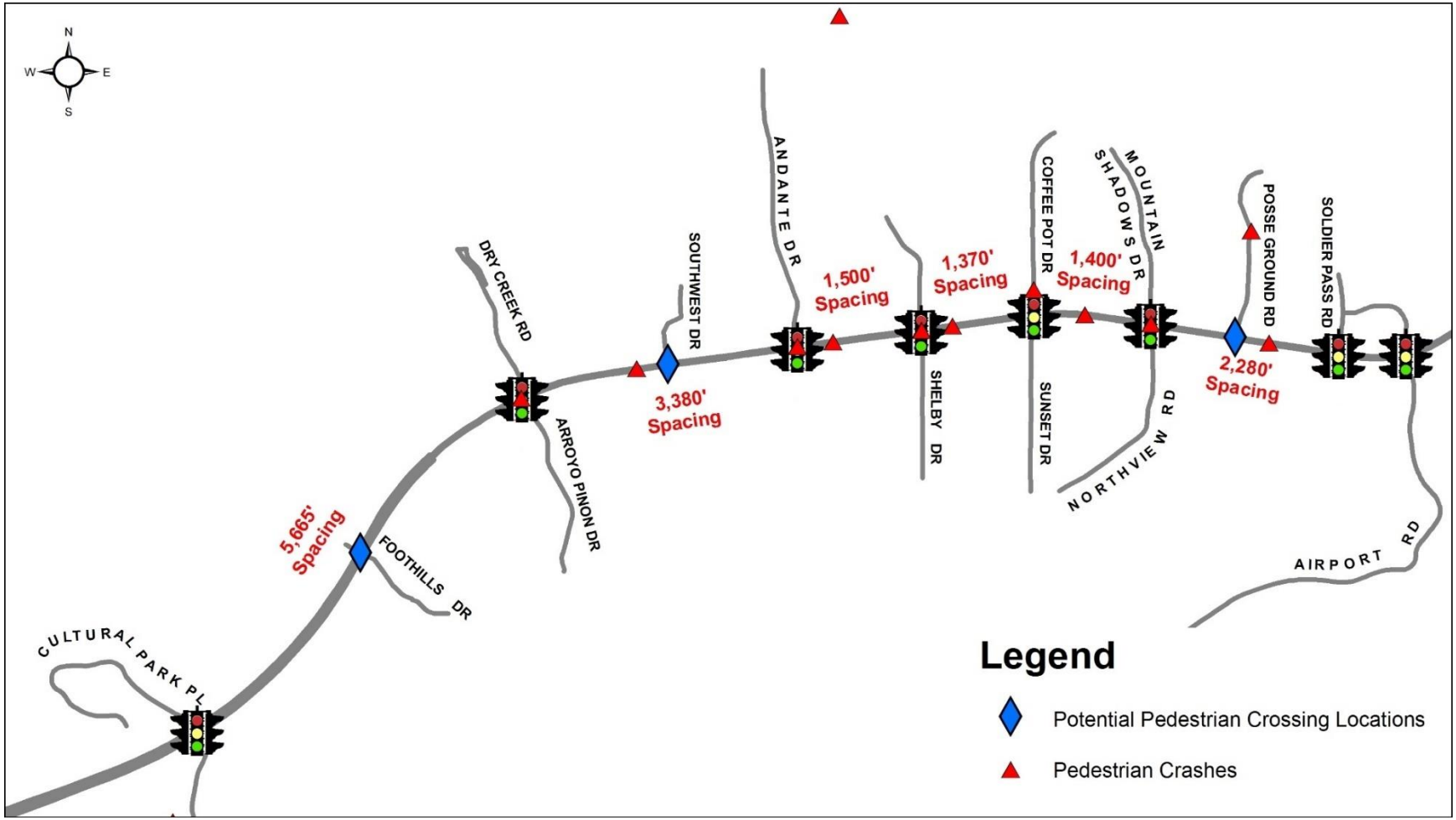


Figure 4.15: Example of a Pedestrian Hybrid Beacon (PHB)

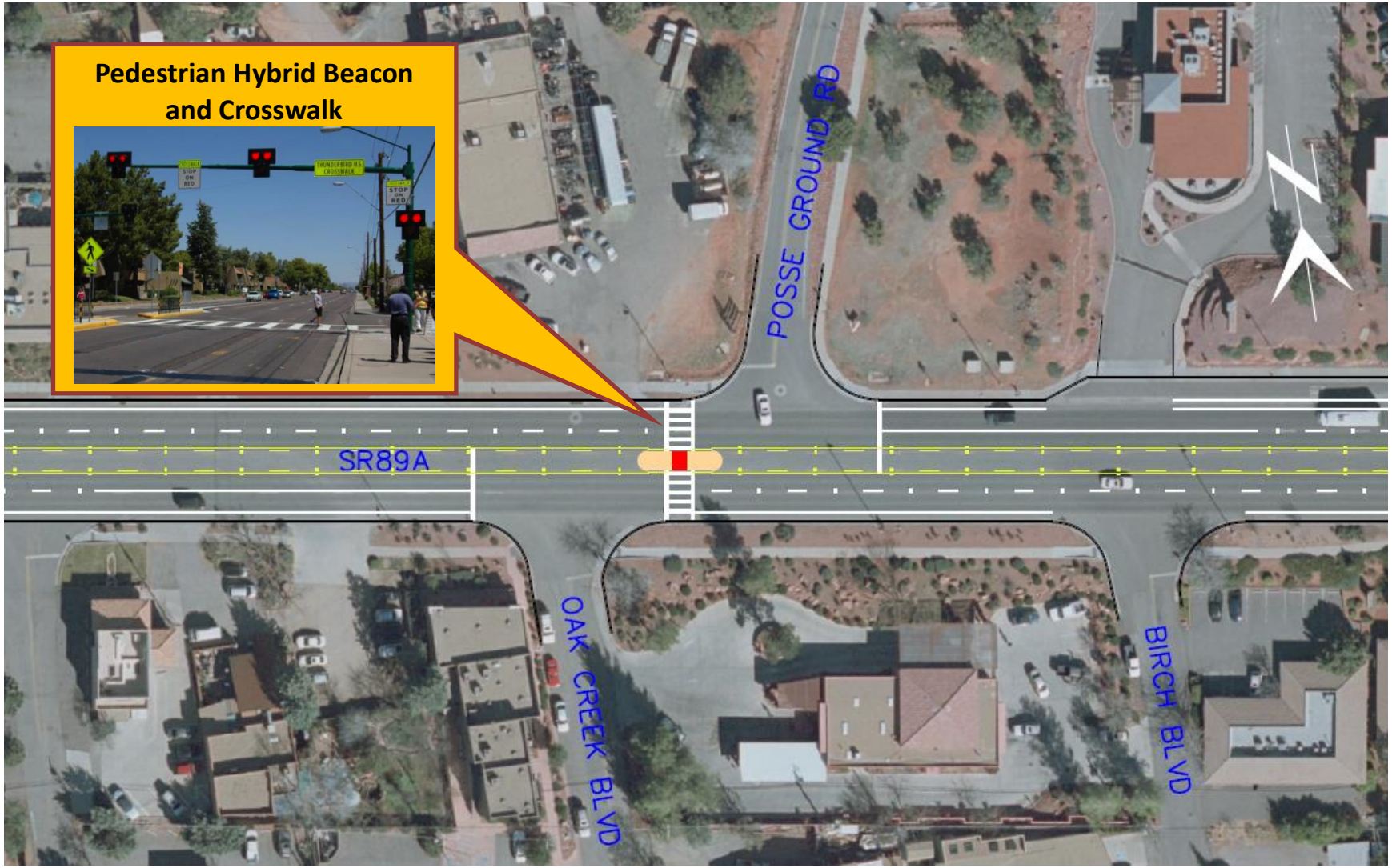


Figure 4.16: Example of a Two-Stage Pedestrian Cross-walk

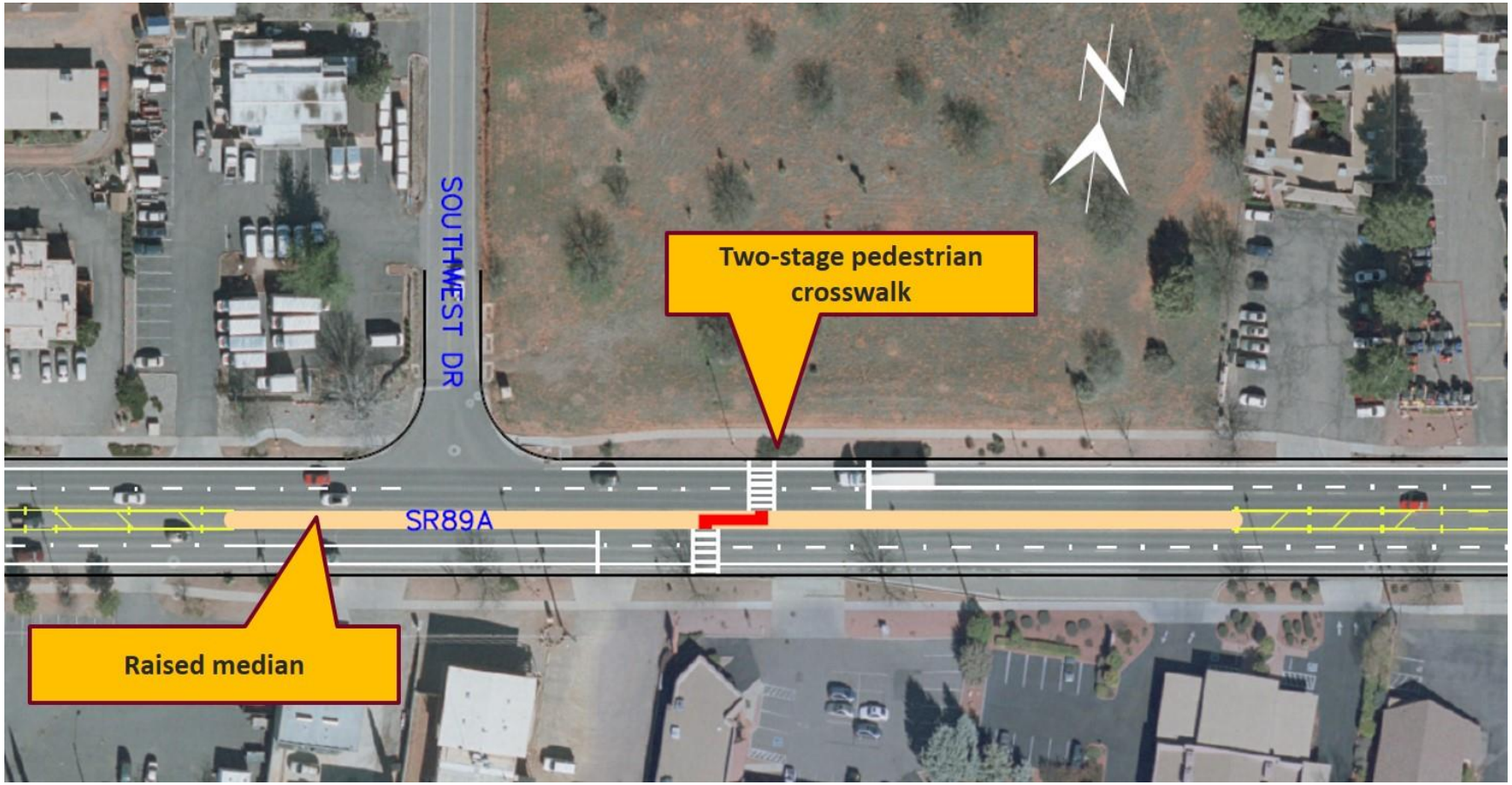
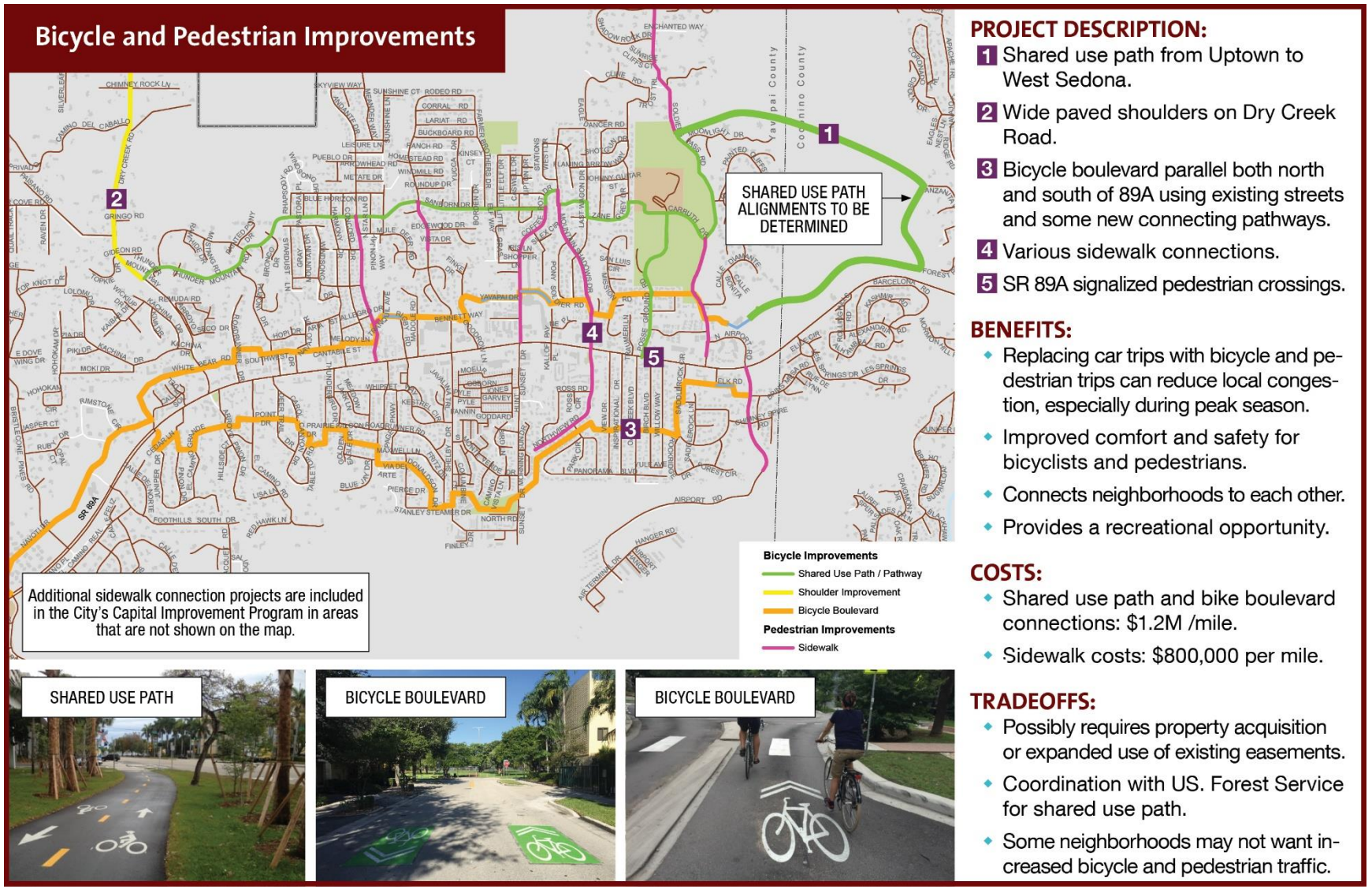


Figure 4.17: Bicycle and Pedestrian Improvements



STRATEGY 12. TRAVELER INFORMATION

Travel time data shows that during the morning and evening, SR 179 is a faster route to Sedona than SR 260; however, during the afternoons of the most congested days in March and April 2017, SR 260 was a faster way to reach the "Y".

Mobility pattern data for the month of March 2016 showed that 90% of visitors to Sedona who came from the south (e.g. Phoenix) used SR 179, while 10% used SR 260. Providing real-time information to motorists, as illustrated in **Figure 4.18**, about congestion levels on SR 179 and SR 260 will enable them to select their preferred route. Diverting a portion of SR 179 travelers will improve congestion on SR 179.

A significant portion of traffic in Oak Creek Canyon is pass-through traffic traveling to and from Flagstaff. A portion of this traffic would also be diverted if given advance information regarding congestion and delay in Oak Creek Canyon.

STRATEGY DESCRIPTION

1 Electronic message signs on I-17 at Camp Verde and at SR 89A south of Flagstaff display travel time information to Sedona.

ADOT maintains a network of electronic Dynamic Message Signs (DMS) that provide information about incidents, closures, restrictions, hazardous weather, and in urban areas signs display travel times. The signs are strategically located on state highways across Arizona in advance of key decisions points for travelers.

It is recommended that the City of Sedona collaborate with ADOT to install electronic DMS travel information signs on I-17 south of Camp Verde and on I-17/SR 89A in Flagstaff. The DMS will provide real-time travel information to motorists regarding conditions on SR 179 and on SR 89A.

ADOT conducted a study[11] to prepare a preliminary concept and cost estimate for a traveler information system in Oak Creek Canyon. The system includes two new arterial-sized dynamic message signs (side of the road and pole mounted) at the northern and southern limits of Oak Creek Canyon, 2 hybrid message signs at Oak Creek Canyon Vista and Slide Rock State Park, wireless communications between each of the signs, and anonymous re-identification devices to collect travel time data from traveling vehicles.

STRATEGY COSTS

An estimate of probable cost for the travel information system is listed in **Table 4.44**.

[11] SR 89A Oak Creek Canyon Pullout Closures and SR 89A Real-Time Travel Information Study, October 2017

Table 4.44. Estimate of Probable Cost – Travel Information System

STRATEGY ELEMENT	COST
Travel Information Sign, south of SR 260 / I-17 interchange (hybrid sign), includes equipment, communication, power, design and construction	$100,000
Travel Information System in Oak Creek Canyon includes 2 dynamic message signs, 2 hybrid signs, equipment, communication, power, design and construction	$650,000
TOTAL ESTIMATE OF PROBABLE COST	**$750,000**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

Real-time traveler information will maximize the efficiency and capacity of SR 179 and SR 260. Providing real-time information on travel times and traffic conditions would enable travelers to make an informed route choice. Travelers who choose to use SR 260 would arrive in Sedona quicker and on less-congested routes. This could help alleviate the congestion on SR 179 and improve overall reliability on routes leading to Sedona. **Table 4.45** summarizes performance benefits of the traveler information system.

Table 4.45. Strategy Benefits – Traveler Information

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
36 minutes (SR 179)	26 minutes	-26% reduction in travel time	65,309	$100,000	$18,770.00	$1.53	$0.29
42 minutes (SR 89A)	35 minutes	-16% reduction in travel time	27,549	$650,000	$122,005	$23.59	$4.43

TRADEOFFS

Local Business Concerns

Providing travel information to allow motorists to make informed decisions is an economical and effective congestion management strategy. Local businesses in VOC will be concerned about the potential loss of traffic from motorists who choose to use SR 260 instead of SR 179. Conversely, City of Cottonwood may be concerned about an increase in traffic through their community.

Travel Time Reliability

As motorists choose to use SR 260, congestion on SR 89A in Sedona will increase; route conditions on SR 179 and on SR 260 will change throughout the day. Once travel time information has been communicated to a motorist and they have decided to choose a route, it is possible that conditions will have changed on SR 179 or on SR 260 by the time the motorist arrives in Sedona. This could frustrate motorists who anticipated a congestion-free route.

Coordination with ADOT

As the DMS will be located on state highway right-of-way, the City must coordinate with ADOT to develop and implement the project. During the Transportation Master Plan development, ADOT has indicated a willingness to participate in the project.

COMMUNITY PERSPECTIVES

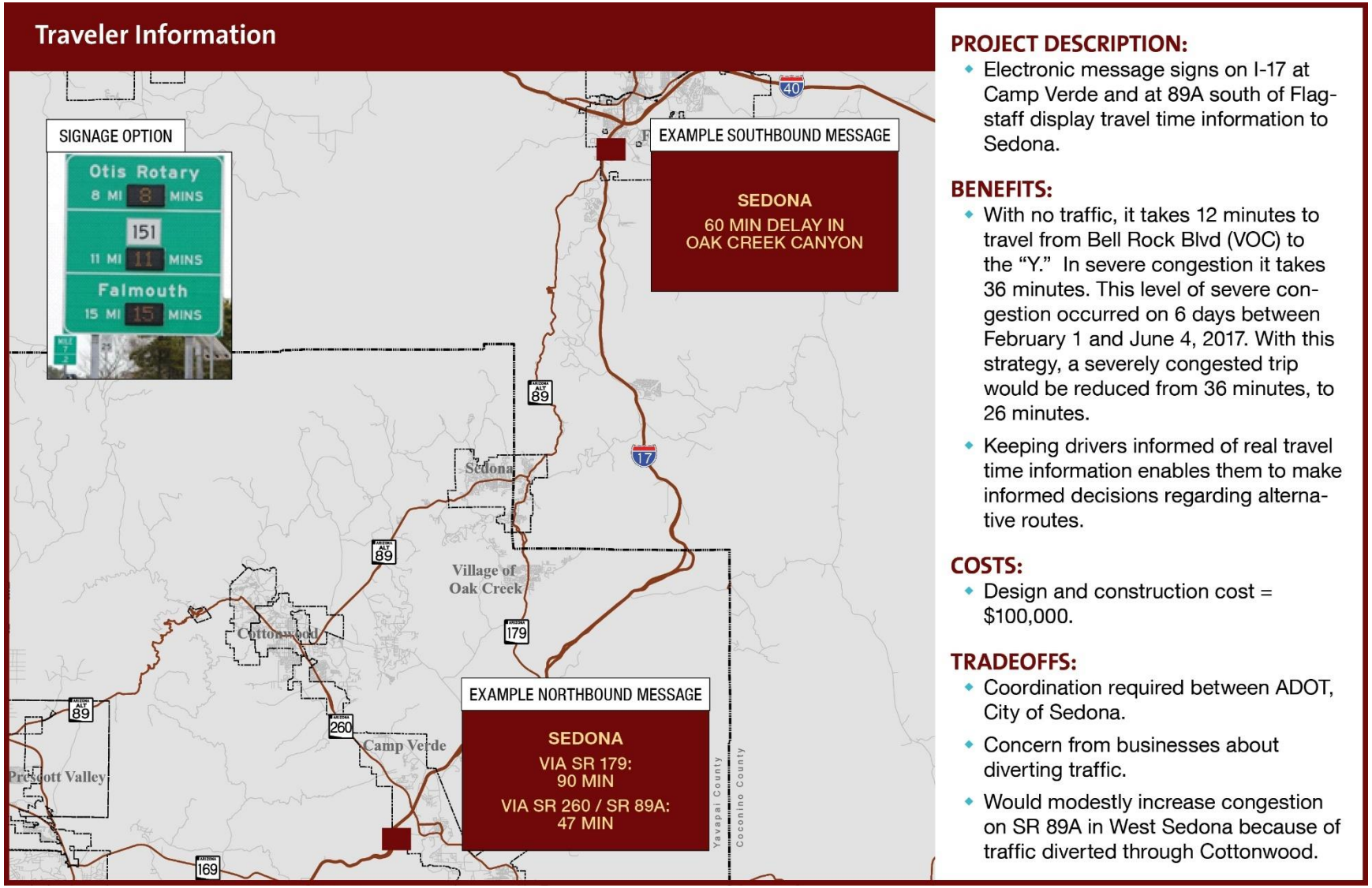
Table 4.46 shows community input provided in the June 2017 survey. The survey showed that 67% of respondents are either very likely or somewhat likely to support the improvements and 21% are somewhat or very unlikely to support the improvements.

A review of comments indicated that respondents are concerned about more traffic in West Sedona and suggested that smart phones already have this information. Other commenters mentioned that the information could be valuable if it is accurate. and to use it on busy weekends.

Table 4.46. Community Perspectives – Traveler Information

Answer Choices	Responses	
Very Likely	50.31%	725
Somewhat Likely	16.66%	240
Neutral	12.28%	177
Somewhat Unlikely	6.11%	88
Very Unlikely	14.64%	211

Figure 4.18: Travel Information



STRATEGY 13. RED ROCK CROSSING

A source of frustration to residents and travelers is a lack of alternatives to SR 179 and SR 89A when traveling between West Sedona and VOC. During times of peak congestion, the only alternative to SR 179 is Beaver Head Flat Road to the south of VOC. The route adds 20 miles, and 20 to 30 minutes to the trip. Many residents have expressed a desire for a more convenient alternative route.

Several previous studies have assessed the feasibility of constructing a new bridge over Oak Creek to connect VOC to West Sedona. The studies identified several potential locations, one of which is at Red Rock Crossing at the end of Verde Valley School Road. The Red Rock Crossing alternative is illustrated in **Figure 4.19**. A crossing at this location was washed out in a flood in 1978.

Because of the high cost of this improvement in relation to the anticipated benefits, and given that the project is completely outside of City limits, this strategy may be considered in the long-term, but is not feasible to implement in the near-term.

STRATEGY DESCRIPTION

1 **Construct new bridge or crossing of Oak Creek and roadway improvements; a possible location is at end of Verde Valley School Road to connect to Red Rock Crossing Road.**

This new bridge connection would connect Red Rock Crossing Road to Verde Valley School Road, establishing a two-lane corridor connecting SR 179 to Upper Red Rock Loop Road. Yavapai County currently owns right-of-way across Oak Creek at this location, as illustrated in **Figure 4.20.**

STRATEGY COSTS

An estimate of probable cost for the Red Rock Crossing Bridge is listed in **Table 4.47**.

Table 4.47. Estimate of Probable Cost – Red Rock Crossing Bridge Over Oak Creek

STRATEGY ELEMENT	COST
Roadway Improvements / Bridge over Oak Creek	$6,090,200
Utility relocations	$250,000
Design and environmental studies	$1,219,000
Mobilization / Environmental Control Measures	$1,164,000
Right-of-Way	$250,000
Contingency	$1,219,000
TOTAL ESTIMATE OF PROBABLE COST	**$10,192,200**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

Red Rock Crossing bridge would provide an alternative route between VOC and West Sedona. The new route and bridge could divert approximately 200 vehicles from SR 179 during peak congestion periods, improving travel time on SR 179 by seven minutes during the congested peak hour. During uncongested times, the new route would provide only a modest travel time savings for those accessing the western end of West Sedona. **Table 4.48** summarizes anticipated performance benefits of the Red Rock Crossing.

Table 4.48. Strategy Benefits – Red Rock Crossing

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
36 minutes	29 minutes	-18% reduction in travel time	45214	$10,192,200	$718,080	$225.59	$15.88

TRADEOFFS

Low usage by tourists and visitors

While the route would provide an alternative for daily commuters and residents, the route would not be well-utilized by unfamiliar tourists and visitors, as their intended destinations are along SR 179, Uptown, and Oak Creek Canyon.

Benefit limited to those traveling from VOC to the western portions of West Sedona

The distance from VOC at the intersection of SR 179/Verde Valley School Road utilizing Verde Valley School Road, a new Red Rock Crossing bridge, and Upper Red Rock Loop Road to the intersection of SR 89A and Dry Creek Road would be 8.75 miles. The same trip using SR 179 and SR 89A is 10 miles. The Red Rock Crossing route would be faster for those accessing the western-most areas of West Sedona. For those traveling to eastern portions of West Sedona, the Red Rock Crossing bridge would not provide any travel time benefits.

Environmental Studies

The proposed crossing is located adjacent to Crescent Moon Ranch Day Use Area, one of the most picturesque sites in Sedona. Lengthy and costly environmental studies would need to be completed to assess the environmental impacts, which include impacts to US Forest Service's Crescent Moon Ranch Day User Area, Oak Creek, riparian habitat, and nearby residential neighborhoods.

Improvements to Verde Valley School Road and Upper Red Rock Loop Road

Roads leading to the Red Rock Crossing bridge would require improvements. The last 1.3 miles of Verde Valley School Road is currently unpaved as it approaches Red Rock Crossing. Further south, Verde Valley School road passes through residential neighborhoods.

Interjurisdictional Coordination

Red Rock crossing is located outside of the City. These improvements would require collaboration and participation from the US Forest Service, and Yavapai County who would need to manage the project and provide majority of funding.

Due to the magnitude of the project, additional funding sources including federal, would likely need to be identified.

Low Performance Benefits

In relation to other potential projects and strategies to improve congestion in Sedona, the Red Rock Crossing strategy provides a low benefit in relation to the potential cost of the project. With an effectiveness ratio of $225 per vehicle hour saved, it is the second highest-cost project.

COMMUNITY PERSPECTIVES

Table 4.49 summarizes community input provided in the June 2017 survey. The survey showed that 50% of respondents feel this project is important in the short-term. 27% said that the project should not be considered.

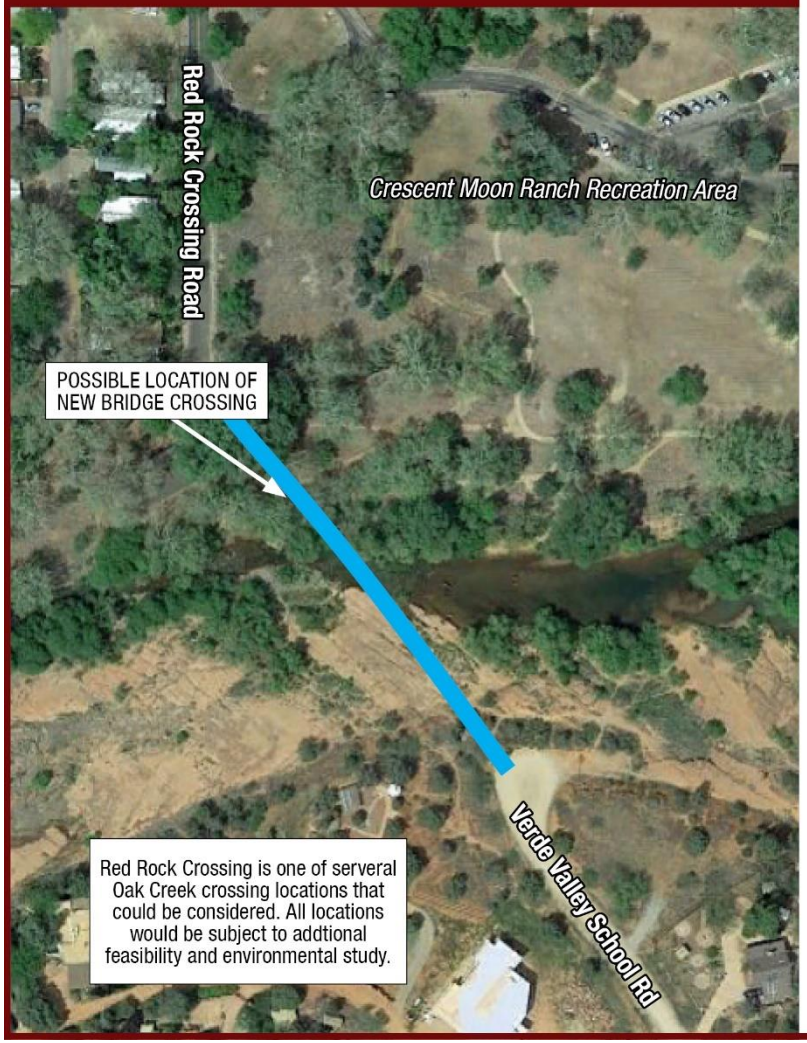
A review of comments indicated that they are concerned about environmental impacts, but many feel that it would be a benefit to the local community.

Table 4.49. Community Perspectives – Red Rock Crossing

Answer Choices	Responses	
Long term strategy	22.43%	323
Short term strategy	49.86%	718
Should not be considered	27.71%	399

Figure 4.19: Red Rock Crossing

Other Jurisdiction Project: Red Rock Crossing



PROJECT DESCRIPTION:

- Construct new bridge or crossing of Oak Creek and roadway improvements; possible location is at end of Verde Valley School Road to connect to Red Rock Crossing Road.
- Provides alternative route between Village of Oak Creek and West Sedona.

BENEFITS:

- Primary benefit of Red Rock Crossing is to connect Village of Oak Creek to Sedona, during peak hour when SR 179 is congested.
- With no traffic, it takes 12 minutes to travel from Bell Rock Blvd (VOC) to the "Y." In severe congestion it takes 36 minutes. This level of severe congestion occurred on 6 days between February 1 and June 4, 2017. With this improvement, a severely congested trip would be reduced from 36 minutes, to 29 minutes.
- Provides alternative route for emergency response between Village of Oak Creek and Sedona.

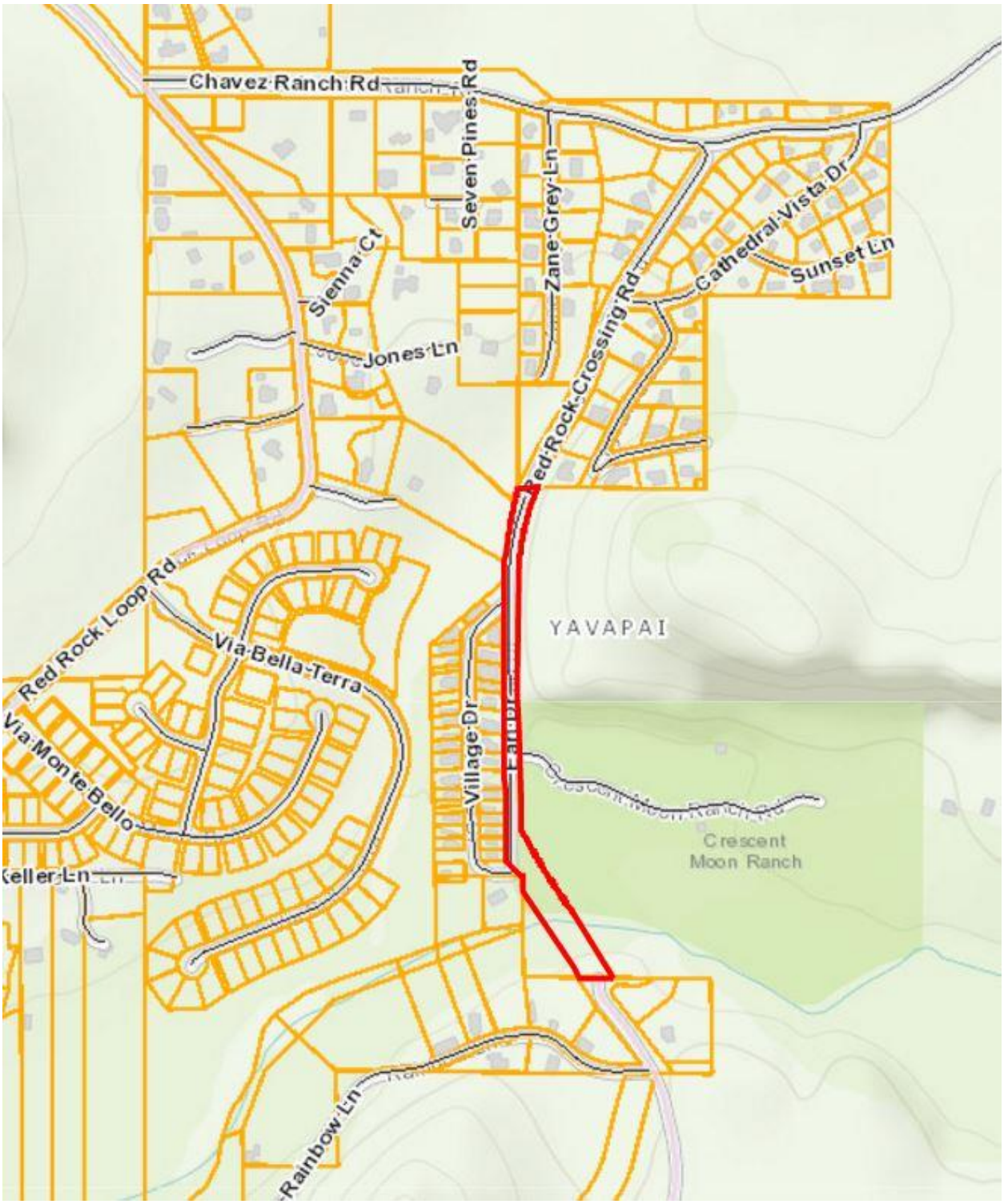
COSTS:

- Design and construction cost = $10M.

TRADEOFFS:

- Environmental and aesthetic impacts.
- Project is located outside city limits and requires Yavapai County to manage the project and be the primary funding agency.
- Given previous failed attempts to complete a crossing, it will be difficult to garner support.
- Coordination required between City of Sedona, Yavapai County and US Forest Service.
- Much higher cost with much less benefit compared to other projects.

Figure 4.20: Red Rock Crossing Right-of-Way**.**



Yavapai County Public Works owns the right-of-way for a potential Red Rock Crossing bridge. Source: Yavapai County Assessor's Office

STRATEGY 14. PAVE SCHNEBLY HILL ROAD

SR 89A through Oak Creek Canyon is the most direct route between Sedona and Flagstaff. SR 89A through Oak Creek Canyon serves tourists, residents of Oak Creek Canyon, and commuters between Flagstaff and Sedona. During peak season and weekends, users of SR 89A experience 45 – 60 minute delays.

Strategy 14 proposes to pave Schnebly Hill Road between I-17 and Sedona, providing a route alternative to SR 89A through Oak Creek Canyon. Strategy 14 is presented for information purposes. Considering the costs, environmental impacts, and the anticipated performance effectiveness of this strategy, it is not recommended for implementation within the context of the TMP.

Benefits and tradeoffs to paving Schnebly Hill Road are summarized in **Figure 4.21**.

STRATEGY DESCRIPTION

Pave Schnebly Hill Road from Sedona to I-17.

Schnebly Hill Road, also designated as Forest Service Road 153, is currently an unpaved 11-mile roadway between the Schnebly Hill Road/SR 179 roundabout and the Schnebly Hill Road/I-17 Interchange. The road has been described as one of the premier scenic drives in Arizona with its twisting climb of more than 2,000 feet from Sedona to the top of the Mogollon Rim. The roadway is owned and maintained by the US Forest Service. While the roadway is open to all highway-legal vehicles, it is only recommended to be utilized by high clearance vehicles.

Paving this roadway to establish a traversable alternative route to SR 89A through Oak Creek Canyon has been suggested by stakeholders and members of the public. Construction of a two-lane roadway would require significant drainage, slope stabilization, retaining walls, and construction blasting.

STRATEGY COSTS

An estimate of probable cost to improve Schnebly Hill Road is listed in **Table 4.50**.

Table 4.50. Estimate of Probable Cost – Pave Schnebly Hill Road

STRATEGY ELEMENT	COST
Removal / Excavation	$ 6,125,600
Roadway Improvements	$ 13,890,900
Design, Environmental Studies, Utility Relocation	$ 8,792,000
Contingency	$ 4,024,000
TOTAL ESTIMATE OF PROBABLE COST	**$ 32,932,500**

1. Estimate of probable cost includes all project costs related to design, right of way/easement, and construction.

BENEFITS

Paving of Schnebly Hill Road would improve travel time on SR 89A through Oak Creek Canyon from a congested 42 minutes to 32 minutes. It is estimated that approximately 2,125 vehicles per day would

utilize Schnebly Hill Road, as illustrated in **Table 4.51.** A performance benefits summary is provided in **Table 4.52.**

Table 4.51. Estimate of Vehicles Use of Schnebly Hill Road

	Trips
Daily weekday person trips between Flagstaff and Sedona	7,230
Visitor trips	6,169
Commuter trips	589
Other trips	473
50% of visitors would utilize the route (others use Oak Creek Canyon for its scenic qualities and destinations; assume 2.9 persons per vehicle	1,063 vehicles per day
Total Estimated vehicles on Schnebly Hill Road (commuters + other + 50% of visitors)	**2,125 vehicles per day**

Table 4.52. Strategy Benefits – Pave Schnebly Hill Road

Congested Conditions Travel Time (min)	Improved Total Travel Time (min)	Performance Effectiveness % Change	Total Annual (VHT) Savings	Estimated Project Cost	Annualized Project Cost	Project Cost / Annual VHT Saved	Annualized Project Cost / Annual VHT Saved
42 minutes	32 minutes	-23%	26401	$33,000,000	$2,318,440	$1,247.40	$87.82

TRADEOFFS

Forest Service Plan

Paving Schnebly Hill Road is inconsistent with the Forest Service Plan for this road and this area. Forest Road 153 is maintained as access to scenic backcountry areas. Paving this road would take away from the desired backcountry experience.

Increases congestion at Schnebly Hill Road Roundabout

Improving Schnebly Hill Road would add traffic volumes and congestion on SR 179, particularly at the Schnebly Hill Road/SR 179 roundabout, which is already one of the most congested locations in the City. Improvements would be required at this intersection.

Improving this route would not reduce traffic volume and congestion on SR 179. This route would only divert traffic that would normally use SR 89A through Oak Creek Canyon. Congestion benefits are limited to SR 89A in Oak Creek Canyon and through Uptown.

High Cost

The construction costs, which exceed $32 million, represent the highest cost strategy considered in the TMP. The anticipated performance effectiveness ($1247.40 per vehicle hour saved) considering the cost of $33 million, represents an ineffective project.

COMMUNITY PERSPECTIVES

Community input provided in the June 2017 survey showed that 43% of respondents feel this project is viable and 57% say it is not viable.

A review of comments indicated there is some support to at least maintain the dirt road so that it is passable.

Table 4.53. Community Perspectives – Pave Schnebly Hill Road

Answer Choices	Responses	
Yes, It IS a viable plan	43.07%	606
No, it is NOT a viable plan	56.93%	801

Figure 4.21: Pave Schnebly Hill Road

Pave Schnebly Hill Road

PROJECT DESCRIPTION:

- Pave Schnebly Hill Road from Sedona to I-17.
- Will require drainage, slope stabilization, retaining walls, and construction blasting.

BENEFITS:

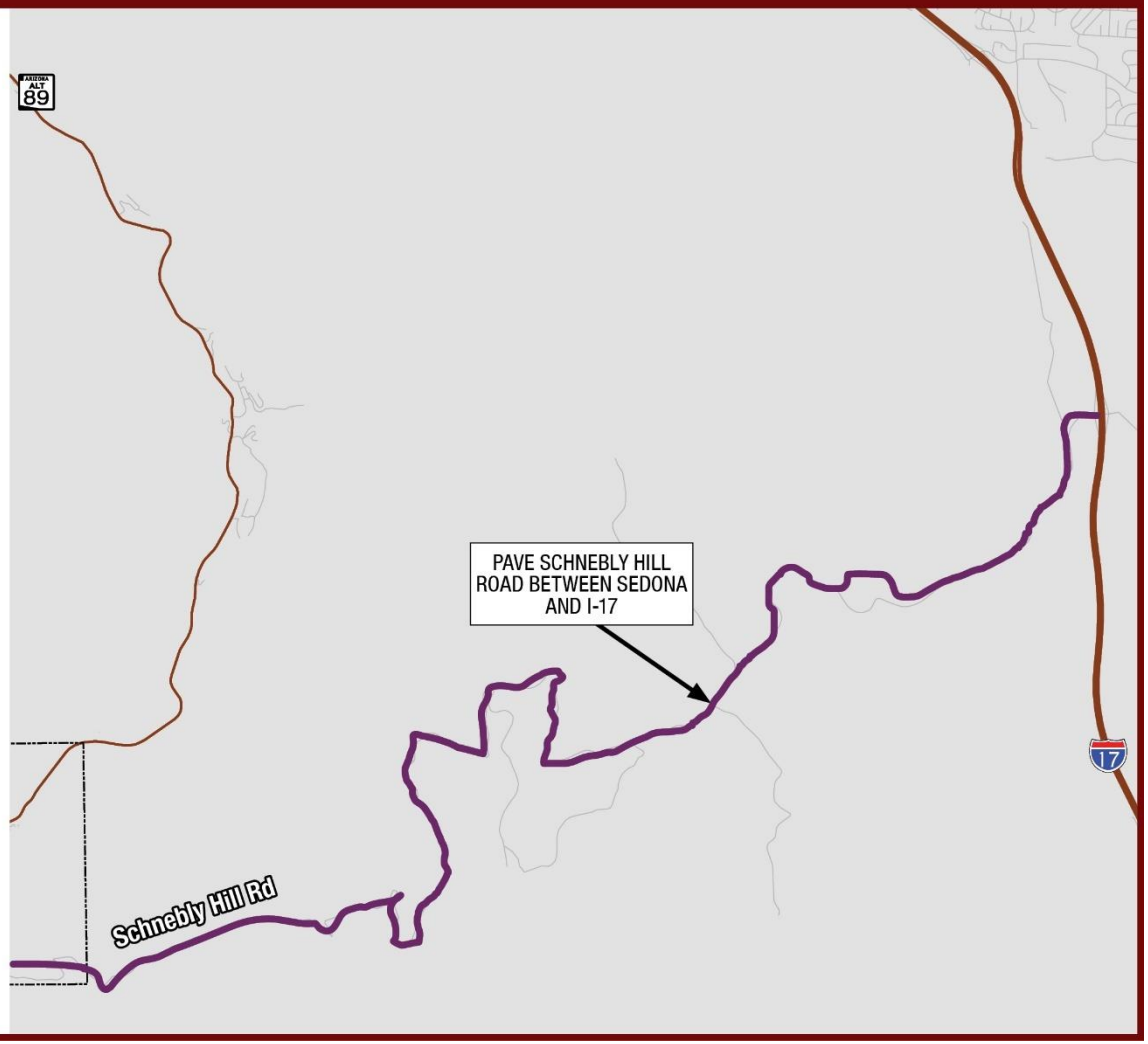
- Primary benefit of Schnebly Hill Road improvements is congestion relief of SR 89A in Oak Creek Canyon, during week-end and holiday afternoons.
- Would divert up to 2,125 vehicles per day from Oak Creek Canyon.

COSTS:

- Design and construction cost = $33M.

TRADEOFFS:

- Would add traffic volumes and increase congestion on SR 179 at Schnebly Hill Road Roundabout.
- Would require improvements to Schnebly Hill/SR 179 intersection.
- Environmental and aesthetic impacts.
- Coordination required between City of Sedona, Coconino County and US Forest Service.
- Much higher cost with much less benefit compared to other projects.



Chapter 5 – Next Steps

The TMP identified transportation improvement strategies through a process that considered input from City staff, regional stakeholders, TAC members, and the public, coupled with a review of existing studies, traffic analysis, and development of projects costs, benefits, and challenges. This chapter discusses next steps for project implementation including:

- Action plan
- Partnerships
- Funding strategies

ACTION PLAN FOR IMPLEMENTATION

An action plan was developed by partnering with City staff. Ultimately, the level of implementation of this action plan will be dependent on identification of revenues to fund the projects. Short-, mid-, and long-term implementation actions are provided in **Table 5.1.**

Table 5.1. Short-, Mid-, and Long-Term Implementation Actions

STRATEGY	Short-Term Actions (1-5 years)	Mid-Term Actions (6-10 years)	Long-Term Actions (beyond 10-years)
Strategy 1. Uptown Sedona Roadway Improvements	• Prepare a Project Assessment and 15% design plan to further identify design features, costs, impacts, and construction phasing. • Determine funding sources for design and construction. • Prepare design plans and construct project.	N/A	N/A
Strategy 2. Uptown Sedona Pedestrian Improvements	• Perform a view-shed analysis to analyze the impacts of pedestrian bridges. • Evaluate the performance of the Uptown roadway improvements, pedestrian crossing signals, and traffic control support prior to considering pedestrian bridges.	Design and construct pedestrian bridges if supported by the analysis.	N/A
Strategy 3. Uptown Sedona Parking Improvements	• Design and install wayfinding signs to Uptown parking areas. • Conduct study to determine the impact of transit on parking needs.	Conduct a parking structure need and site selection/feasibility study	Implement recommendations of the parking structure need and site selection/feasibility study
Strategy 4. SR 179 Improvements, Schnebly Hill roundabout to the "Y"	• Conduct a feasibility study of pedestrian tunnel or bridge at Tlaquepaque, replacing the existing crosswalk. • Design and construct pedestrian tunnel or bridge. • Design and construct northbound “Y” right turn lane. • Evaluate the performance of implemented strategies prior to considering the southbound “Y” right turn lane.	• Based on performance analysis, design and reconstruct Schnebly Hill Road roundabout. • Based on performance analysis, design and construct southbound “Y” right turn lane. • Based on performance analysis, design and construct additional northbound and southbound lane segments.	N/A
Strategy 5. Major Roadway Connections	• Define property and right of way impacts.	Monitor effect of improvement on traffic flow.	N/A

STRATEGY	Short-Term Actions (1-5 years)	Mid-Term Actions (6-10 years)	Long-Term Actions (beyond 10-years)
	• Identify/acquire property for new Forest Road connection and Ranger/Brewer connection. • Design and construct project.		
Strategy 6. Neighborhood Vehicular Connections	• Define property and right of way impacts. • Identify priority connections where property and right of way impacts can be addressed. • Initiate a process to consider any other beneficial neighborhood connections not already identified. • Identify relevant development opportunities through CFA's and commercial re-development	Identify priority connections where property and right of way impacts can be addressed.	Identify priority connections where property and right of way impacts can be addressed.
Strategy 7. Enhanced Transit Service - Commuter/Resident Focused	• Develop partnerships and cost sharing agreements. Develop Memorandum of Understanding (MOU)'s with Yavapai County and Verde Lynx for transit service. • Implement transit service.	Evaluate MOU and service periodically as improvement is implemented.	Evaluate MOU and service periodically as improvement is implemented.
Strategy 8. Enhanced Transit Service - Tourism Focused Shuttle Service	• Perform planning study to further identify transit service capital and operating needs and revenues, including partnerships and cost sharing agreements. • Ongoing coordination with potential partners including AZ State Parks, US Forest Service, and Oak Creek Canyon Traffic Matters Group. • Develop MOU's with partnering agencies to identify roles and potential for funding obligations.	Evaluate MOU and service periodically as improvement is implemented.	Evaluate service periodically as improvement is implemented.

STRATEGY	Short-Term Actions (1-5 years)	Mid-Term Actions (6-10 years)	Long-Term Actions (beyond 10-years)
Strategy 9. Neighborhood Vehicles - Tourism Focused	• Identify interested partners, funding sources, and potential revenues through advertising. • Evaluate value-added services such as the feasibility of providing transit to select trailheads. • This project is dependent on partner support and revenue sources.	Implement when partner support and revenue sources are quantified.	Evaluate service periodically as improvement is implemented.
Strategy 10. SR 89A/West Sedona Access Improvements	• Develop plans and coordinate with property owners regarding driveway consolidation. Consider providing incentives. • Consider driveway consolidation when evaluating redevelopment applications and CFA's. • Consider medians or additional striping in select areas where safety is a concern. • Defer continuous raised median until needed.	• Continue to pursue opportunities for driveway consolidation. • Coordinate with ADOT on implementation of raised median.	• Continue to pursue opportunities for driveway consolidation. • Coordinate with ADOT on implementation of raised median.
Strategy 11. Bicycle and Pedestrian Improvements	• Prioritize projects identified in this plan and the CIP. • Begin identifying easement/acquisition opportunities for bicycle boulevards and shared-use paths. • Obtain right of way and easements. • Design and construct projects. • Begin process to consider any other beneficial bicycle and pedestrian improvements not already identified.	• Continue to identify easement/acquisition opportunities for bicycle boulevards and shared-use paths. • Obtain right of way and easements. • Design and construct projects.	• Continue to identify easement/acquisition opportunities for bicycle boulevards and shared-use paths. • Obtain right of way and easements. • Design and construct projects.
Strategy 12. Traveler Information	• Pursue implementation with ADOT. • Coordinate with ADOT through the design and construction process as a stakeholder.	Continue to implement traffic signal monitoring and operations, incident and event monitoring and management and other ITS opportunities.	Continue to implement traffic signal monitoring and operations, incident and event monitoring and management and other ITS opportunities.

STRATEGY	Short-Term Actions (1-5 years)	Mid-Term Actions (6-10 years)	Long-Term Actions (beyond 10-years)
Strategy 13. Red Rock Crossing	• Coordinate with Yavapai County and US Forest service on future development of this project, which is a long-term project.	• Coordinate with Yavapai County and US Forest Service on future development of this project, which is a long-term project. • Identify potential funding for this project.	Coordinate with Yavapai County and US Forest Service on future development of this project.

PARTNERING

Partnering is vital for several of the recommended transportation improvements**. Table 5.2** summarizes partnering opportunities and identifies the lead agency, responsible party, and other agencies or stakeholders that would be involved in the projects.

Table 5.2. Partnering Opportunities

Strategy	Lead agency	Responsible Party	Other Agencies, Stakeholders
Strategy 1. Uptown Sedona Roadway Improvements	City of Sedona	City of Sedona	Property owners Business owners ADOT
Strategy 2. Uptown Sedona Pedestrian Improvements	City of Sedona	City of Sedona	Property owners Business owners
Strategy 3. Uptown Sedona Parking Improvements	City of Sedona	City of Sedona	Property owners Business owners
Strategy 4. SR 179 Improvements, Schnebly Hill roundabout to the "Y"	ADOT	ADOT	City of Sedona
Strategy 5. Major Roadway Connections	City of Sedona	City of Sedona	Property owners ADOT
Strategy 6. Neighborhood Vehicular Connections	City of Sedona	City of Sedona	Property owners
Strategy 7. Enhanced Transit Service - Commuter/Resident Focused	City of Sedona	Verde Lynx	City of Sedona Yavapai County Coconino County
Strategy 8. Enhanced Transit Service - Tourism Focused Shuttle Service	City of Sedona	To be determined	U.S Forest Service Arizona State Parks Coconino County ADOT
Strategy 9. Neighborhood Vehicles - Tourism Focused	City of Sedona	To be determined	Verde Lynx Business owners
Strategy 10. SR 89A/West Sedona Access Improvements	City of Sedona/ADOT	City of Sedona/ADOT	Business owners Property owners
Strategy 11. Bicycle and Pedestrian Improvements	City of Sedona	City of Sedona	Property owners ADOT
Strategy 12. Traveler Information	ADOT/City of Sedona	ADOT/ City of Sedona	City of Sedona
Strategy 13. Red Rock Crossing	Yavapai County	Yavapai County	City of Sedona

FUNDING STRATEGIES

Current sources for transportation funding in the City include the Streets Fund, the Capital Projects Fund, and the General Fund. According to the *Sedona Tentative Budget for Fiscal Year 2017/2018*, the Streets Fund is for maintaining, repairing, and upgrading streets and is comprised of money primarily from the Highway User Revenue Fund (HURF). Major street improvements and construction are paid from the Capital Improvement Fund. All other Sedona streets-related costs are paid from the City General Fund. Transportation improvements on SR 89A and SR 179 are typically funded through the state share of HURF funds or federal Surface Transportation Block Grant funds (formerly called Surface Transportation funds).

This section provides an overview of potential funding sources for the transportation improvement strategies discussed in this report. The funding sources are organized into three categories:

- Roadway improvement funding sources
- Bicycle and pedestrian funding sources
- Transit funding sources

A summary table (**Table 5.3**) identifies which funding sources are applicable to each improvement strategy. This is followed by a discussion of a potential future sales tax to fund transportation improvements. A sales tax would be subject to voter approval.

ROADWAY IMPROVEMENT FUNDING SOURCES

Highway User Revenue Fund — The state of Arizona taxes motor fuels and collects a variety of fees and charges relating to the registration and operation of motor vehicles on state public highways. These collections include gasoline and use-fuel taxes, motor-carrier taxes, vehicle-license taxes, motor vehicle registration fees, and other miscellaneous fees. Revenues are deposited in the HURF and are distributed to cities, towns, counties, and the State Highway Fund. These taxes represent a primary source of revenues available for highway construction, road improvements, road maintenance, and other related expenses. In Sedona, as mentioned above, these are primarily used for road maintenance. Should HURF monies be available for road improvements, they could be used for road improvement projects in Strategies 1, 2,4,5,7,10,11,12 and 13.

Reference: https://www.azdot.gov/about/FinancialManagementServices/transportation-funding/highway-user-revenue-fund

Federal Surface Transportation Block Grant Program (STBG) — This program provides flexible funding that may be used by states and localities for projects to preserve and improve conditions and performance on any Federal-aid highway; bridge and tunnel projects on any public road; pedestrian and bicycle infrastructure; and transit capital projects, including intercity bus terminals. The Fixing America's Surface Transportation Act (FAST Act) converted the former Surface Transportation Program into the STBG. In general, STBG projects may not be on local roads or rural minor collectors. There are several exceptions to this requirement, such as the ability to use up to 15% of a state's rural suballocation on minor collectors. Other exceptions include bridge and tunnel projects, safety projects, fringe and

corridor parking facilities/programs, recreational trails, pedestrian and bicycle projects, safe routes to school projects, boulevard/roadway projects largely in the right-of-way of divided highways, inspection/evaluation of bridges, tunnels and other highway assets, port terminal modifications, and projects within the pre-FAST Act definition of "transportation alternatives." Funds could potentially be used for improvement projects contained in Strategies 1, 2,3,10,11,12, and 13.

Reference: https://www.fhwa.dot.gov/specialfunding/stp/

Federal Highway Safety Improvement Program (HSIP) — This program is focused on funding improvements to reduce traffic fatalities and serious injuries. Funding is awarded through a competitive application-based process administered by ADOT. Highway safety improvement projects should be identified on the basis of crash experience, crash potential, crash rate, or other safety data supported means and should be consistent with ADOT's Strategic Highway Safety Plan. There is a local match requirement (5.7%), except that the federal share payable may amount to 100% of the construction of any project for:

- Traffic control signalization (including HAWK),
- Maintaining minimum levels of retro-reflectivity of highway signs or pavement markings,
- Traffic circles/roundabouts,
- Safety rest areas,
- Pavement marking,
- Shoulder and centerline rumble strips and stripes,
- Commuter carpooling and vanpooling,
- Rail-highway crossing closure,
- Installation of traffic signs, traffic lights, guardrails, impact attenuators, concrete barrier end treatments, breakaway utility poles, or
- Priority control systems for emergency vehicles or transit vehicles at signalized intersections.

Projects that improve safety, particularly the uptown Sedona roadway improvements (Strategy 1), SR 89A/West Sedona access improvements (Strategy 10), and pedestrian and bicycle improvements (Strategies 2 and 11) may potentially qualify for this funding source.

Reference: https://www.azdot.gov/docs/default-source/traffic-library/hsip-2015-manual.pdf?sfvrsn=6

Private Partnerships – A funding opportunity suggested in conjunction with improving neighborhood vehicular connections (Strategy 6) involves exploring the feasibility of private partnership contributions with surrounding property owners. The new road connections will provide travel alternatives for residents and reduce trips on SR 89A.

Federal Lands Access Program — The Federal Lands Access Program (Access Program) was established to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands. The Access Program supplements state and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. Projects are selected by a Programming Decision Committee (PDC) established in each state. This program could potentially apply to projects such as the tourism shuttle service and the Park-and-Ride lot

proposed near the Red Rock Ranger Station (Strategy 8), a shared-use path through the US Forest Service land (Strategy 11), and the Red Rock Crossing (Strategy 12). The next call for projects is not anticipated until early 2020.

Reference: https://flh.fhwa.dot.gov/programs/flap/

ADOT Planning Assistance for Rural Areas (PARA) Program – This ADOT-administered program currently funds two types of studies. A Planning Study refers to a broad range of local and regional planning issues related to roadway, transit, and non-motorized transportation modes. The geographic focus of studies can vary and include neighborhoods, incorporated communities, or entire counties. Studies may also center on specific roadway corridors, transit feasibility, or recreational trails systems. A PARA grant could help further plan the transit-related projects such as those in Strategies 7, 8, and 9.

The other type of study is a Pre-Scoping study in which ADOT will assist a Local Public Agency or Tribal Government to develop a realistic scope of work, schedule, and budget for a simple transportation project. Pre-Scoping helps to reduce scope changes and rework during the design phase and improves overall project success. PARA funding could assist in scoping transportation funding projects contained in Strategies 1,2,4,5,6,10,11and 13. An application is required for both types of studies and is awarded competitively.

Reference: https://www.azdot.gov/planning/transportation-programs/planning-assistance-for-rural-areas-(para)-program/para-pre-scoping

BICYCLE AND PEDESTRIAN FACILITY IMPROVEMENT FUNDING SOURCES

Federal STBG – As noted in the previous section, this program provides flexible funding that may be used by states and localities for projects which include pedestrian and bicycle improvements, recreational trails, and projects within the pre-FAST Act definition of "transportation alternatives."

It should be noted that funding for the Recreational Trails Program, which is a set-aside of the STBG, is administered through the Arizona State Parks Board and could potentially fund trails crossing US Forest Service Land, such as part of the shared-use path from Uptown to West Sedona (Strategy 11).

Reference: https://www.fhwa.dot.gov/specialfunding/stp/

https://azstateparks.com/grants/

Federal HSIP – As noted in the previous section, this program is focused on funding improvements to reduce traffic fatalities and serious injuries. This grant program can fund pedestrian and bicycle safety improvements on any public road or publicly owned pedestrian or bicycle pathway, including funding for bike lanes, separated bike lanes, shared-use paths, paved shoulders, road diets, bridges/tunnels for bicyclists and/or pedestrians, sidewalks, crosswalks, curb ramps, signs, counting equipment, data collection for pedestrians and bicyclists, maps, training, and road safety assessments (RSAs). This may be a potential funding source for safety-related bicycle and pedestrian improvements (Strategy 11).

Reference: https://safety.fhwa.dot.gov/hsip/hsip.cfm

HURF - Arizona jurisdictions have utilized HURF to provide landscaping and to construct bicycle lanes, paved shoulders, sidewalk facilities, and shared-use paths that are within the right-of-way. These funds, if available, could be used to fund bicycle and pedestrian improvements as part of Uptown Sedona pedestrian improvements (Strategy 2) and bicycle and pedestrian improvements (Strategy 11).

Transportation Investment Generating Economic Recovery (TIGER) program. In September 2017, the U.S. Department of Transportation announced the opportunity for state and local stakeholders to apply for $500 million in discretionary grant funding through the TIGER program. As with previous rounds of TIGER, funds for the fiscal year (FY) 2017 TIGER grants program are to be awarded on a competitive basis for projects that will have a significant impact on the Nation, a metropolitan area, or a region. TIGER Discretionary Grants may not be less than $5 million and not greater than $25 million, except that for projects located in rural areas the minimum TIGER Discretionary Grant size is $1 million.

The FY 2017 TIGER program will give special consideration to projects which emphasize improved access to reliable, safe, and affordable transportation for communities in rural areas, such as projects that improve infrastructure condition, address public health and safety, promote regional connectivity, or facilitate economic growth or competitiveness.

TRANSIT FUNDING SOURCES

Federal Transit Administration (FTA) Section 5311: Rural Public Transportation Program — The Section 5311 grant program's goals are to address the mobility needs of Arizona's rural population. The FTA allocates federal funds for this program annually, which are apportioned to states on a formula basis, providing funding to support the administrative, operating, and capital costs of public transit services in rural areas. The state distributes funds to qualified applicants annually through a competitive application process. The application process is kicked off with a series of workshops and webinars that provide guidance on the process in September/October. Applications are submitted in December and awards are generally made in July. The program renews every federal fiscal year (October 1). This funding program could potentially help support the enhanced commuter/resident-focused transit service (Strategy 7) and the tourism-focused transit service (Strategy 8).

Reference: https://www.azdot.gov/planning/TransitProgramsandGrants/5311-rural-public-transportation-program/overview

Advertising Revenues on Neighborhood Vehicles or Tourism-Focused Shuttles — An option for providing partial funding for the tourism-focused shuttle service (Strategy 8) and/or NV services (Strategy 9) is advertising revenues on the vehicles themselves.

FUTURE FUNDING SOURCES

TRANSPORTATION SALES TAX

A transportation sales tax is used in several Arizona jurisdictions to fund transportation improvements. Some examples in Arizona are:

- **Gila County Transportation Tax** – a half-cent excise tax was reapproved by votes in 2014 for a 20-year period. The excise tax began in 1994.
- **Pinal Transportation Tax** — a half-cent sales tax for transportation is currently in effect. A new half-cent sales tax for road construction will come before voters in a special November 2017 election.
- **City of Flagstaff** — a 1.051% sales tax on general sales is in effect; however, the tax is restricted for use on certain transportation projects. The previous rate was 0.721% but voters approved a 0.33% increase in November 2014. A majority of the transportation tax components expire in 2020. As the expiration date for this tax nears, the City will reevaluate the transportation needs of the community.
- **Coconino County Transportation Excise Tax**— a 0.3% sales tax for road maintenance began in January 2015.
- **City of Yuma Road Tax** – A half-cent sales tax was approved by voters in 1994 for maintenance and construction of roadways.

Table 5.3. Strategies and Funding Sources

Funding Sources	1. Uptown Sedona Roadway Improvements	2. Uptown Sedona Pedestrian Improvements	3. Uptown Sedona Parking Improvements	4. SR 179 Improvements, Schnebly Hill Roundabout to the "Y"	5. Major Roadway Connections	6. Neighborhood Vehicular Connections	7. Enhanced Transit Service - Commuter/Resident Focused	8. Enhanced Transit Service - Tourism Focused Shuttle Service	9. Neighborhood Vehicles - Tourism Focused	10. SR 89A/West Sedona Access Improvements	11. Bicycle and Pedestrian Improvements	12. Traveler Information	13. Red Rock Crossing
Highway User Revenue Fund	✓	✓		✓	✓	✓				✓	✓	✓	✓
Federal Surface Transportation Block Grant Program	✓	✓		✓						✓	✓	✓	✓
Federal Highway Safety Improvement Program	✓	✓								✓	✓		
Private Partnerships						✓		✓					
Federal Lands Access Program								✓			✓	✓	
ADOT Planning Assistance for Rural Areas) Program	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓
Federal Transit Administration Section 5311: Rural Public Transportation Program							✓	✓					
Transit Advertising Revenues								✓	✓				

SUPPORT FOR SALES TAX TO FUND TRANSPORTATION IMPROVEMENTS

During the June 2017 community outreach period, community members were asked to express their willingness to support a sales tax to fund improvements. Options were provided for a half-cent sales tax, a three-quarter-cent sales tax, and a one-cent sales tax.

The results indicated 68% support for a half-cent sales, tax, 53% support for a three-quarter-cent sales tax, and 50% support for a one-cent sales tax, as summarized in **Table 5.4.**

Table 5.4. Community Perspectives – Sales Tax Options

Answer Choices	Responses	
Half-Cent Sales Tax		
Very Likely	43.55%	540
Somewhat Likely	23.95%	297
Neutral	12.34%	153
Somewhat Unlikely	5.16%	64
Very Unlikely	15.00%	186
Three-Quarter-Cent Sales Tax		
Very Likely	29.83%	363
Somewhat Likely	23.25%	283
Neutral	14.13%	172
Somewhat Unlikely	10.76%	131
Very Unlikely	22.02%	268
One-Cent Sales Tax		
Very Likely	38.37%	513
Somewhat Likely	12.42%	166
Neutral	10.02%	134
Somewhat Unlikely	10.70%	143
Very Unlikely	28.50%	381

Appendix A – Previous Plans and Studies

Table A.1. Previous Plans and Studies

#	STUDY NAME	YEAR	AUTHOR / ORGANIZATION	KEY RECOMMENDATIONS / CONSIDERATIONS APPLCIABLE TO THE TMP	TECHNICAL ADVISORY COMMITTEE COMMENT / INPUT
1	Sedona Area Transportation Study	1991	Parsons Brinckerhoff	• Consider an Uptown Circulator connecting commercial areas along SR 179 • Establish connections between subdivisions: extend Ranger Road to SR89A providing a by-pass of the "Y". Ranger Road would extend past Brewer Road and connect to SR 89A approximately 1,100 feet west of the Y. The road could align with a potential future Forest Road extension, providing a connection to an Uptown by-pass.	• Connect neighborhoods in the area south of 89A and west of Shelby. Possibilities are El Camino to Carol Canyon Drive and Blue Jay Drive and Vista Serrena Way. • Establish legal access to the following areas: Northview to Sunset (to provide access to Sunset Park) or Kallof Place to Sunset; Panorama to Rock Ridge or Saddlerock; Birch to Panorama
2	Sedona Highway Corridor Assessment and Sedona Traffic Model and Origin Destination Study	1996	CH2MHill	• Construct a raised median with pedestrian refugee areas along 89A, between Jordan Road and Apple Avenue. • Construct a traffic signal at the intersection of 89A and Art Barn Road/Cliffs Drive	• Consider a roundabout instead of a traffic signal at the intersection of SR 89A and Art Barn Road/Cliffs Drive.
3	Trails and Urban Pathways Plan	1996	Sedona Parks and Recreation Dept.	• Provide a pedestrian/bicycle connection between West Sedona and Uptown by developing sections of Soldier Pass Road along the park boundaries for pedestrian and bicycle use.	• Establish a connection between Posse Ground Park and Soldiers Pass Road to the Adobe Jack trail system/trailhead. • Consider a separated path on north side of 89 from Soldiers Pass to east Adobe Jack trailhead or to Mariposa. • A sidewalk is needed on Sanborn.
4	West Sedona North/South Off-Highway Circulation Study	1997	CH2MHill	• Connect Navoti Drive to Dry Creek Road (via Kachina Drive) • Connect Panorama Blvd. to Sunset Drive • Connect Oak Creek to Birch Boulevard • Connect Willow Way to Rockridge Drive. • Connect Panorama Blvd. to Birch Boulevard.	• Explore a connection at the end of White Bear Road, rather than Kachina Drive. • Some of these connections could be bicycle/pedestrian-only connections
5	Ensuring a Livable Future: Transportation and a Strategic Vision	1998	Community Transportation	Implement a shuttle system. Four potential routes are proposed:	-

#	STUDY NAME	YEAR	AUTHOR / ORGANIZATION	KEY RECOMMENDATIONS / CONSIDERATIONS APPLCIABLE TO THE TMP	TECHNICAL ADVISORY COMMITTEE COMMENT / INPUT
	for the Greater Sedona Area		Association of America	• Village of Oak Creek to Uptown, beginning at the Gateway Center and the Uptown Creek with stops at shopping centers, motels, and restaurants. • SR 89A, from Uptown area to central West Sedona. • Uptown to north end of Oak Creek Canyon with stops at major picnic areas, campgrounds, Slide Rock State Park, and other scenic and commercial sites. • Neighborhood loop route from Gateway Center and travel along various collector and local roads, making stops at residential, commercial, recreational, and activity centers.	
6	Verde Valley Regional Transportation Study Update	1999	Lima and Associates/BRW	Study analyzed current and future conditions along regionally significant roads including Interstate 17, State Routes, and county roads.	Key recommendations from this study applicable to Sedona TMP have been implemented. No additional recommendations require consideration with the Sedona TMP.
7	Verde Valley Transit Study	2000	Lima and Associates/Transit Plus	The study recommended transit service be provided in peak periods between Cottonwood and Sedona, Camp Verde and Sedona, and Camp Verde and Cottonwood.	Key recommendations from this study have been implemented. No additional recommendations require consideration with the Sedona TMP
8	Sedona Shuttle Feasibility Study	2003	Nelson/Nygaard	Bus shuttle service is feasible if incentives are in place to encourage drivers to use transit for a portion of their weekly trips. Proposed routes are: • Three buses operating every 30 minutes on a fixed-route between the Village and Uptown. • One bus circulating every hour in West Sedona and connecting to an Uptown transfer point. • West Sedona Fixed-Route and Flex-Route Service operating every 30 minutes.	A low stop frequency (less than 20 minutes) could be ineffective.

#	STUDY NAME	YEAR	AUTHOR / ORGANIZATION	KEY RECOMMENDATIONS / CONSIDERATIONS APPLCIABLE TO THE TMP	TECHNICAL ADVISORY COMMITTEE COMMENT / INPUT
9	Sedona Transit Project	2004	Coconino Co. Transp. Services	Recommended a three-phase incremental transit service implementation: Phase 1: Circulator route is a 15-minute roundtrip route with two buses that provide approximately eight-minute frequency. Phase 2: Includes three additional buses in operation (a total of five) and extending an additional route into the Uptown area as far north as Jordan Avenue. Phase 3: Includes two additional 30-foot low floor buses for Oak Creek Canyon Service, increasing stop frequency for the Oak Creek Canyon Service to 30 minutes, and implementing a Canyon service route from Uptown Sedona to West Fork Trail.	Phase one was implemented in 2006 and included service from downtown Sedona to the Hillside shops on SR 179, in addition to offering express service to Cottonwood. However, the service was suspended in 2011. Refer to 2013 Red Rock Ranger District Study as an updated recommendation.
10	Sedona Parking Management Study	2005	Parking Research and Solutions	The study recommended that the City create and maintain a management program for the public parking supply, integrate parking and transit, and establish a more comprehensive network of parking maps and signs.	The study was updated and replaced by the 2012 Uptown Parking Management Plan.
11	Soldier Pass Road Area Traffic Study	2007	DMJM Harris	Assessed SR 89A from Posse Ground Road to Airport Road to improve future traffic operations, reduce delays on the cross roads, and maintain reasonable access along the road.	Consider a raised median and bike lane along SR 89A within Sedona city limits. Extend Soldier Pass Road south of SR 89A to provide access to SR 89A from Airport Mesa, Les Springs Drive, and Saddlerock Circle.
12	Sedona Transportation Feasibility Study	2008	EDAW/AECOM	Evaluated the feasibility of a road connection between the City of Sedona and the Village of Oak Creek. Five alternatives were evaluated. Red Rock Crossing Road to Verde Valley School Road alternative was selected as the preferred alternative.	Consider Red Rock Crossing Road at end of Verde Valley School Road.
13	Verde Valley Multi-Modal Transportation Study	2009	Lima and Associates	The study proposed a bypass of the SR 89A and SR 179 intersection.	

#	STUDY NAME	YEAR	AUTHOR / ORGANIZATION	KEY RECOMMENDATIONS / CONSIDERATIONS APPLCIABLE TO THE TMP	TECHNICAL ADVISORY COMMITTEE COMMENT / INPUT
14	SR 89A Crash Analysis and Safety Evaluation	2010	CivTech	Evaluated various alternatives to reduce crashes and improve safety along SR 89A between Dry Creek Road and Airport Road.	Consider a continuous raised median with quarter-mile median breaks. Construct a pedestrian barrier throughout the length of the median to preclude random pedestrian crossings. Direct pedestrians to protected crossings.
15	City of Sedona Uptown Parking Management Plan	2012	Nelson/Nygaard	Study recommended that the City develop and enforce a parking management program that should be visitor friendly, embrace new technologies, focus on making the most efficient use of the existing parking supply, minimize the impacts of parking spillover, and continue to be proactive in engaging the community.	• Improve awareness of and access to the underutilized off-street public parking facilities through wayfinding. • Expand the public parking supply in a cost-efficient manner and continue to implement shared parking. • Lease a specific off-street lot and designate it for tour bus parking; TAC notes that a drop-off and turnaround area is also needed for buses, in addition to bus parking. • Designate a specific off-street facility for employee parking, provide shuttle from out-lots; implement an employee permit program. • Implement a residential parking program to reduce parking spillover impacts. City has explored converting Wilson and Smith to a one-way with striped parking.
16	Red Rock Ranger District Alternative Transportation Plan	2013	Nelson/Nygaard	The study found that there was largely an absence of policies that supported public transportation or that provided incentive for travelers to use public transportation with no clear project champion with the ability to implement a shuttle program. Three alternative options to address these issues were proposed.	• Alternative 1: A high-frequency, limited-stop service that operates along SR 179 and SR 89A from Vista Point to The Village of Oak Creek parking lot south of Verde Valley School Road. • Alternative 2: Service to high-activity recreational sites within close proximity to the City and along SR 89A and SR 179 from the Courthouse Vista to the Encinosa Picnic Area. • Alternative 3: On-demand service within City limits; Uber-like service would connect

#	STUDY NAME	YEAR	AUTHOR / ORGANIZATION	KEY RECOMMENDATIONS / CONSIDERATIONS APPLCIABLE TO THE TMP	TECHNICAL ADVISORY COMMITTEE COMMENT / INPUT
					trailheads, lodging, and shopping destinations using a centralized on-demand website or smart phone app.
17	Uptown Sedona Pedestrian Crossing EvAaluation	2014	Stanley Consultants	Study evaluated crash data, vehicular and pedestrian traffic volumes, visual obstructions, signage and pavement markings, lighting, and availability of advanced technologies. It recommended to: • Install Rectangular Rapid Flashing Beacon (RRFB) at Jordan Road intersection. • Remove existing traffic signal at Uptown mid-block crosswalk and replace with a Pedestrian Hybrid Beacon (PHB) or RRFB. • Install a RRFB at the Arroyo Roble Road.	• Maintain existing traffic signal operation with revised time-of-day signal timing plans at the Forest Road intersection. • Consider removing on-street parking along SR 89A at Uptown. • Consider addition of another travel lane in both directions. • Consider installation of grade separated pedestrian crossings to keep traffic flow moving.
18	Verde Valley Master Transportation Plan	2016	Jacobs	• Upgrade Brewer Road and Ranger Road segments to one lane minor collector roadway. Install signage to direct SR 89A eastbound and to SR 179 northbound traffic to use connection to avoid SR 89A/SR 179 intersection. • Improve Dry Creek Road shoulders to five feet from Thunder Mountain Road to Long Canyon Road. • Conduct a transit feasibility study to determine demand for a Sedona Circulator route and shuttle service between Village of Oak Creek and Sedona. • Evaluate upgrading Schnebly Hill Road to a paved, two-lane roadway. • Install variable message signs and wayfinding signage to disseminate parking availability and parking rate information. • Construct pedestrian bridges over SR 89A. • Wayfinding signage directing pedestrians to utilize the bridges should also be installed.	

#	STUDY NAME	YEAR	AUTHOR / ORGANIZATION	KEY RECOMMENDATIONS / CONSIDERATIONS APPLCIABLE TO THE TMP	TECHNICAL ADVISORY COMMITTEE COMMENT / INPUT
				• Construct sidewalk barriers that prevent pedestrians from crossing SR 89A; funnel pedestrians to bridges or crosswalks. • Install pedestrian call button at mid-block crosswalks (Forest Road, Jordan Road, Arroyo Roble) with an LED display. • Install variable message signs on I-17 northbound before Camp Verde and on I-17 southbound south of Flagstaff to provide travel time estimates to motorists. • Evaluate the impact of constructing a parking lot south of Sedona that ties into a shuttle service that transports travelers to/from Sedona activity centers.	

Appendix B – Stakeholder Interviews

STAKEHOLDERS INTERVIEWED

1. Judy Adams – USFS – Red Rock RD
2. Laura Aronson – Red Rock Magic Trolley
3. Marc Balocco – Adventure Jeep Tours/Sedona Hummer Tours
4. Jeff Beard – Sedona Trolley
5. Sarah Beard – Sedona Trolley
6. John Bradshaw – A Day in the West/Earth Wisdom Tours LLC
7. Doug Coop – Sedona Bicycle Coordinator
8. Holly Epright – Sedona Main Street
9. Tom Gilomen – Uptown Parking Advisory Group
10. Mark Goshorn – USFS – Red Rock RD
11. Bob Larsen – Red Rock News
12. Max Licher – Design Group Architects
13. Walter (Kent) Link – ADOT Northcentral Traffic Engineer
14. Audra Merrick – ADOT Northcentral District Engineer
15. Bruce Morrow – Cottonwood/Verde Lynx
16. Nate Reisner – ADOT Northcentral Development Engineer
17. Steve Segner – Lodging Council
18. Jerry Showalter – Sedona Park Rangers
19. Al Spector – Sinagua Plaza
20. Jennifer Wesselhoff – Chamber of Commerce
21. Michael Yarbrough – Airport Noise Work Group

STAKEHOLDER INTERVIEWS SUMMARY

INTRODUCTION

During May and June 2016, the Kimley-Horn team interviewed 21 stakeholders including the five jeep and trolley owners who participated in a focus group discussion. The purpose of the interviews was to better understand the community's issues and concerns with the current transportation system and gather ideas for engaging residents in this transportation study. Interviewees were told their comments would be anonymous.

The stakeholders interviewed included business owners and representatives from the Lodging Council, Chamber of Commerce, ADOT, US Forest Service, Red Rock News, and Cottonwood transit. A list of the people interviewed is included in above.

The following is a summary of the **most salient stakeholder issues** synthesized from almost forty pages of interview notes. These are the issues most discussed by the Sedona residents and business owners. Although most of the stakeholders mentioned these key issues, they didn't always have the same positions. Example stakeholder comments are provided to show polarity on the issues.

The key issues have been posed as questions, which may need to be addressed during this transportation study. Each of these questions has the potential for sparking a public conversation about Sedona traffic.

- Is there a transportation problem in Sedona?
- Is it too much tourism or not enough capacity?
- Is it too many Big Ideas and too little substance?
- Uptown Traffic: Is it the cause of Sedona traffic problems?
- Uptown Parking: Is there a solution?
- Pedestrians: Are they part of the problem?
- Traffic in Oak Creek Canyon: Is there a solution?
- How to connect neighborhoods without using SR 89A?
- Roundabouts: Do they help or create congestion?
- I-17 Signs to Divert Traffic/Provide Travel Times: Good or bad?
- West Sedona Traffic: Is there congestion in West Sedona?
- Transit: Is it part of the solution?
- Are bicycle facilities and urban trails needed?
- How should the community be engaged?

KEY ISSUES

IS THERE A TRANSPORTATION PROBLEM IN SEDONA?

Stakeholders seem to be split on the issue of whether or not there is a transportation problem in Sedona that needs to be solved. If they believe there is a problem, they disagree on the cause and the magnitude of the problem. Some believe the expectation of residents of no traffic congestion is not realistic. A few business owners reported visitors are missing reservations due to traffic delays.

This could create an issue for the study as most people won't provide input on potential solutions if they don't think there is a problem that needs to be addressed. The traffic counts and AirSage origin-destination data can be used to identify what is the problem and provide the technical data to support potential solutions. Will the data be sufficient to get agreement on the problem? In addition, the project team may consider determining the resident's tolerance for varying levels of traffic congestion. The tolerance level can be used as evaluation criteria during alternative analysis and potential performance measures.

THERE ISN'T A PROBLEM

We don't have a problem
Can’t think of a time when I ran into a real traffic problem
We are spending quarter million to study something that isn’t much of a problem

ONLY HAVE A MINOR TRAFFIC ISSUE

This is minor traffic – much worse in other cities
Probably 25 weekends a year but not that bad
Only about 40 bad days a year – not enough to spend a lot of money to fix
Traffic is mainly bad on holidays/weekends
120 days out of the year where traffic is backed up and congested
We are blessed to have traffic issues because it means we are vital – it is a nuisance
Some traffic in West Sedona from 3-4 P.M. – mostly local when getting off work and shopping – slows you down three to four minutes

TRAFFIC IS A PROBLEM

Have to wait through two signals at an intersection is a traffic problem
System at capacity
ATV trying to find the trail heads creates a conflict between visitors and residents because when they drive on the streets
The citizens want the speed limits on SR 179 raised; however, sight distance will not allow speed limits raised
Speed disparity is also an issue. Mix of tourists, once in a lifetime users and local residents create a different mentality and need for use (pulling over to take photos, not familiar with roundabouts, etc.)
The regional peak in Sedona occurs in spring (March/April) and fall (September/October)

RESIDENT ATTITUDES TOWARD TRAFFIC

Residents have an unusual expectation of having no traffic – but no problem with going to Phoenix and sitting in traffic – don't a make a big deal out of traffic in other areas but they do in Sedona
Always going to have a traffic problem
Don't believe we have to just live with the traffic – we have to have a level of tolerance but are not providing the tourists the experience they should have when here
Issue is not roads but too many people in individual cars
Locals want a brand new road to prevent 15-minute delay on busy times
People are concerned about getting in and out of Safeway on Friday afternoon
Can we quantify the number of hours that we really have a traffic problem?
Need to provide transportation for out-of-towners
Are we focusing on moving the traffic or are we adding capacity?
Need an outsider to put that into perspective – extent of traffic issues
Shouldn't have to be inconvenienced; I deserve to get to where I want to go when I want to without interference
Tension between infrastructure needs and the sacrifices of the surrounding national forest; residents rely on the forest to fix their problems

CAUSES OF TRAFFIC CONGESTION

Back up is the Y (junction of SR 179 and SR 89A) – SR 179 isn't the issue
Funnel too many people into an area (uptown) that can't handle it – not an easy solution except to shift people out of cars
Real problem – SR 179 and the roundabouts
Problem is that everything goes through the Y and several roundabouts

Two traffic problems: people coming and going from Oak Creek Canyon and Friday afternoon traffic
Capacity at peak is a problem

IMPACT OF TRAFFIC CONGESTION

Merchants are saying that the traffic affects the businesses – feel people are so ticked by the delays that they don't stop at the businesses once they get into Sedona
Impacting business: jeeps get backed up in traffic and get behind on their schedule causing them to miss trips and visitors to miss other activities
Visitors arriving late for reservations at restaurants and jeep tours

IS IT TOO MUCH TOURISM OR NOT ENOUGH CAPACITY?

There seems to be tension between Sedona residents and the local tourism industry. Some state the problem is residents trying to get to the grocery store during peak travel times instead of planning trips better and others say the City and Chamber of Commerce are attracting too many visitors and have exceeded the capacity of not only the transportation system but also the surrounding forest.

TOURISM IS NOT THE PROBLEM

Hotels are not the problem – 2,500 rooms fully booked on Thursday nights, but you don't see that much traffic in town
Guests typically go out of Sedona and come in the afternoon (they don't usually go to Uptown)
Community can't survive without tourists
We need to convey that "this is not a tourism issue." Residents and employees are part of the story
You live in a community reliant on tourism you have to plan for and deal with it

STOP TOURISM GROWTH

Let's not advertise to bring more people – limit to the number people who can visit here
New tourists bring in money but goose killing golden egg if gets saturated – not anxious to build more transportation to put further stress on the forest
City recently received a letter from a local resident who is challenging the City to put a moratorium on lodging
Use some of the money from destination marketing into solving traffic problems

IS IT TOO MANY BIG IDEAS AND TOO LITTLE SUBSTANCE?

Many stakeholders talked about the same "big" ideas which according to them had been discussed for years without any action. Many of these ideas are controversial with some supporting and others feeling they are not needed. There seemed to be a lack of understanding on how these ideas would function and whether or not they would improve the traffic congestion. Some stakeholders felt it was time to have a technical analysis to identify those solutions which were not feasible, enabling the community to move forward.

Representatives from the US Forest Service discussed the need for the community to try to resolve traffic issues without impacting the national forest. Impacting the forest should be a last resort after all other alternatives are exhausted.

NEED ANALYSIS OF BIG IDEAS

Don't need another opportunity to generate ideas – but pick big ideas that have been floated – what is not worth considering but these
Off-handed statements are driving politics and decisions instead of actual data

ALTERNATIVE ROUTE FROM SR 179 TO SR 89A

Although many stakeholders felt an alternative route from SR 179 to SR 89A was needed, most differed on what is the appropriate solution. One of the alternative routes supported by the newspaper is a bypass bridge. Many stakeholders were opposed to the bridge due to environmental concerns. *(See section on Oak Creek Canyon Traffic for related comments.)*

Want an alternative route from SR 179 to SR 89A
How do fire and emergency services access Oak Creek Canyon if there is a fire?
Don't need a bypass
Big terrain issues – prime view sheds for major resorts
The paper's bypass doesn't really do anything

PAVING SCHNEBLY HILL ROAD

A few stakeholders thought this was a good idea but most did not think it solved the traffic problem and wanted to keep the road unpaved.

Schnebly Hill Road paving is inconsistent with the Forest Service plan – plan is to keep more primitive
Valuable to have this primitive and backcountry experience
We have enough paved roads
There is simply not the funding to complete this project as ballpark estimates are in the range of $50 million

RED ROCK CROSSING

This idea was discussed by most stakeholders. Some felt the original intent was to provide access from the Village of Oak Creek Canyon to West Sedona for grocery shopping and other essential services. Today more services are available in Village of Oak Creek Canyon and some stakeholders questioned whether this alternative route was still needed. Most cited environmental issues and concerns of adjacent property owners as reasons the project could not be implemented.

Don't like idea of crossing at Red Rock – it would create a traffic jam today in West Sedona
Local traffic alternatives to cross town and for emergency vehicles
People didn't want a bridge in front of the iconic scenic corridor; very divisive in the community
Inconvenience is worth keeping the character; not ready to sacrifice yet
Restrict crossing for transit, emergency, and school bus use only. Creates a scenic loop tour which people can only see if they ride transit and would not require improvements to Upper Loop and Verde School roads

UPTOWN TRAFFIC: IS IT THE CAUSE OF SEDONA TRAFFIC PROBLEMS?

There appears to be a strong disconnect between Sedona residents and Uptown business owners. Most stakeholders said residents don't go to Uptown and don't shop there. Uptown business owners seemed

concerned about residents blaming them for the city's congestion problems. Some residents believe the Uptown traffic congestion causes back-up onto SR 179 and in West Sedona.

The Uptown business owners also have varying opinions on the causes of traffic in Uptown. Some say it is the left-hand turns into parking spaces; others cite pedestrian crossings as slowing traffic; some feel it is a parking issue.

When implementing the public involvement plan, the project team will need to be aware of the potential that any project benefiting Uptown may be opposed by Sedona residents if they don't see the community benefit.

WHAT IS THE PROBLEM?

Only one way in/out of Uptown
Majority of traffic is passing through day trippers from Phoenix
On-street parking
Pedestrians crossing the street
Two highways feeding into one at the Y
Uptown merchants would say canyon traffic is the cause of the traffic problems but don't want an alternate route which kills a downtown
Left turns into parking spaces
Day trippers are the problem; but they are the shoppers in uptown
Illegal turns at the north end to turn around
Parking, especially on the streets is attributing to the congestion
It's a parking issue – transportation doesn't solve

POTENTIAL SOLUTIONS

"Yellow Shirts" (deployed by the City during peak congestion periods to direct traffic) help alleviate traffic in town but need more and more often
Create uptown bypass; could negatively impact businesses and the environment
Stop parking meters and put in a four lane road in uptown
Get rid of the on-street parking
Pedestrian bridges (see more comment on this topic under Pedestrians)
Forest Road traffic signal seems to back up to the roundabout; turn signal off to see if it makes a difference
Create two lanes by eliminating northbound left turn onto Jordan Road – but need roundabout at north end to turn around
It would help to have one lane with more space to back out of parking spaces
Two lanes north and one lane south; add signs to direct southbound traffic toward city parking lot
Center lane can be barricaded to create a second lane going south
No left turns
Cones to prevent left turns going north for parking
Need better signs to move people onto Apple to city parking
All jeeps should pick up and drop off at the city parking lot
Discussion to construct a roundabout at Art Barn Road to allow traffic to turn around instead of a U-turn back into downtown

UPTOWN PARKING: IS THERE A SOLUTION?

Almost all stakeholders felt there were parking issues in Uptown but again disagree on how to solve the problem. Most felt the City parking lot was not signed well and more parking is needed. There is also a split in attitudes toward the parking meters currently planned for Uptown. Most business owners opposed the meters but some felt they were a good addition and would attract the kind of people they wanted shopping in their businesses. Several stakeholders discussed creating a transportation hub in Uptown for parking, boarding tours, and accessing public transit.

WHAT IS THE PROBLEM?

Visitors are frustrated they can't find parking
People are stuck in their cars and circle for parking; many people don't stop because they can't find parking
No place for employee parking area
No place for RVs to park in uptown

METERED PARKING

Stop parking meters and put in a four-lane road in uptown
Need to make the metered parking highly visible

TRANSPORTATION HUB / ADDITIONAL PARKING

Two acres for parking with a visitor center
Need an additional/expanded parking lot off of Jordan Road
People can't find the municipal lot
Need another parking lot at Tlaquepaque
Parking lot on land behind the arts center; has a slope for a tiered parking structure; just two blocks from downtown; wouldn't obstruct the views
Concierge to welcome to Sedona with information on what to do; kiosks for water/maps

OTHER SOLUTIONS

Get rid of the on street parking
Previously completed parking study was a fabulous job; conclusion was the issue is management not lack of parking
The existing parking lot needs to be reconfigured to add more spaces; better utilize the space
City will say we don't have the money; maybe investors will build the garage for the parking revenue

PEDESTRIANS: ARE THEY PART OF THE PROBLEM?

Most stakeholders commented about pedestrian traffic in Uptown and future pedestrians in North Tlaquepaque. Again, there was disagreement on whether or not pedestrians created traffic congestion. Stakeholders were split on their support for an elevated pedestrian bridge in Uptown connecting the existing two story buildings. Most complimented the efforts of the "yellow shirts" (traffic control aids) and the improvements they had seen in control in pedestrian traffic.

WHAT IS THE PROBLEM?

Pedestrians are not the problem

Pedestrian crossings at signals are fine; it is the non-signalized crossings which are the problem
Pedestrian cross walks add to the traffic backups
Flashing pedestrian signal didn't back up traffic; now (after converting to a full signal) the signal is causing more backup
Have not experienced pedestrians being an issue
Heavy pedestrian activity at roundabout can be an issue at the Y
Pedestrian access is very difficult as there are no gaps in traffic. 15-minute wait times to cross have been experienced

PEDESTRIAN CROSSINGS

Probably need three pedestrian crossings—or tunnels—in Uptown
Create safe walkways/crossing for pedestrians
Connect the two – two-story buildings (located on opposite sides of the street) with pedestrian walkway
Roundabouts do not help with pedestrian access. There has been discussion as to signalizing roundabouts for pedestrian crossing

OTHER SOLUTIONS

Put fences to prevent jaywalking in Uptown
Goal is to have it as a pedestrian; densely developed walking district
Plant planters higher to move people to the crosswalks
Oak Creek walk; under the bridge and come up on the other side; would need to build steps and ramps; could be done as a district wide improvement
When "yellow shirts" are managing pedestrian crossings it is working; need to be trained on how to move traffic
Benches, walking, shade on the walking path in uptown to increase pedestrian use installing plaques with historical facts

NORTH TLAQUEPAQUE PEDESTRIAN CROSSING

Several stakeholders stated the owner wanted to build a pedestrian overpass but was not allowed by either ADOT or the City. A person working closely with the owner stated that they did not think the overpass was warranted. There is a lot of disagreement on how the pedestrians will impact SR 179 traffic. [Note that during a subsequent discussion with the ADOT Northcentral District staff, it was clarified that ADOT was processing a permit for a Rectangular Rapid Flashing Beacon (RRFB) to be installed on SR 179 at the Tlaquepaque pedestrian crossing].

TRAFFIC IN OAK CREEK CANYON: IS THERE A SOLUTION?

All stakeholders agreed there is a problem with traffic in Oak Creek Canyon, especially on weekends and summer holidays. There were several ideas suggested for improving the congestion but most felt they would be difficult to implement.

WHAT IS THE PROBLEM?

Too many cars not too many people
Canyon access and parking is an issue
Canyon is more than just a nuisance; a potential safety issue

If travelers are not expecting a long delay, it can be a big impact
Residents want to address traffic congestion; it can take up to 2 ½ hours to travel three miles
Accidents and fires create severe situations
Back up on long and big weekends and now happening during the week during holiday weeks
Visitors check-in to resorts in Canyon during afternoon and then can't get back into town for the reservation due to traffic back up; restaurants are upset guests not getting the experience they expect
Restricted number of people to park – forces people on the highway with a large number of kids walking on the road
Last 4-5 years; afternoon Friday, Saturday, Sunday inbound Oak Creek Canyon has gotten much worse – every weekend, and not just holiday weekends, from noon to 6 P.M.
Loma Casa is a high end lodging conversion at the south end of the Canyon. Steep grades are making it difficult to implement a signal. There is thought to install a roundabout at the intersection with 89A

SHUTTLE

Eliminate day use parking in canyon and require shuttle
Shuttle only access to Oak Creek Canyon during peak travel times (except local traffic)
Shuttle in Oak Creek Canyon won't solve the backup problems in Uptown
This alternative would need to be led by the businesses, not ADOT or the City

PROVIDE TRAVEL TIMES

Cameras at entrance of the Canyon; need to be monitored real time
Provide travel times via message boards on I-17 and at both ends of the Canyon
Electronic sign – put notice on the delays in the canyon

OTHER SOLUTIONS

Nothing off the table
Four lanes through the Canyon with a designated bike lane
Wide areas for passing and pulling to park are in terrible condition; need to be paved so cars can safely pull over
If we could remove all parking and install bike lanes
No parking along the highway anytime
No parking during specific days and times; could be enforcement issue
Parking lot at the top of the Canyon

HOW TO CONNECT NEIGHBORHOODS WITHOUT USING SR 89A?

Even though there wasn't agreement on the amount of congestion in West Sedona, most stakeholders felt more connections between neighborhoods were needed both north and south of SR 89A. A few shared their "secret" routes for getting from West Sedona to Uptown.

WHAT IS THE PROBLEM?

No connectivity between communities
Need alternative connections south of 89A
Town is organic; no grid system
Need more connector roads like Thunder Mountain?

Alternate routes for the local residents and keep 179 for the higher volume visitor traffic
Lot of retired residents who make multiple trips during the day
Not much land to work with – lot of surrounding wilderness
Built community – would require condemnation – lot of gated communities
Lot of sensitive cultural resources – if you build a road

POTENTIAL CONNECTIONS

Apache trail connection (Red Rock News #1)
Local street connections through the currently open land near old treatment plant paving the connectors for the residents
Soldier Pass is a big recreational area with trails and open space values; tough to make a connection due to several gated subdivisions

ROUNDABOUTS: DO THEY HELP OR CREATE CONGESTION?

Stakeholders also had different opinions about the roundabouts. Most seemed to like them and offered suggestions where additional roundabouts are needed. Although some stakeholders complained about the roundabouts, it was mostly that people didn't know how to use them. There was no comment that the roundabouts should be removed.

I like the roundabouts
Roundabouts compound the problem because people don't know how to use them
ADOT put in the roundabouts when the community said we wanted to keep our rural character. ADOT said at that time the new roadway wouldn't handle future capacity today, but we wanted what we wanted regardless of future concerns
Need a roundabout at the Art Barn to reduce the left turns in Uptown

I-17 SIGNS TO DIVERT TRAFFIC/PROVIDE TRAVEL TIMES: GOOD OR BAD?

Almost all stakeholders talked about having signs on I-17 to direct Sedona traffic to SR 260 and SR 89A instead of SR 179. Most thought this was a good idea but a few felt it was not needed and would only cause more congestion in West Sedona. Most seemed to like the idea of having Grand Canyon travel times via Sedona and Oak Creek Canyon posted on I-17 for traffic coming from the north and south.

The following comments were provided by ADOT representatives.

Need to ensure the language on the posting is not pushing tourists into a longer route (i.e.: Slow Traffic on 179, use 260). Business along 179 would also take issue with posting alternative routes
Regular users of 179 would use Cornville Rd instead of the 260 route. Cornville Rd is not sized to accommodate re-routed state route traffic
Travel time postings on I-17 would be acceptable as the user still has a choice. ADOT would be supportive of this approach; however, I-17 is a safety corridor and postings along the corridor are specific to safety not travel times
Initial thought is to place DMS boards at 3 locations on I-17. Ballpark estimate $500,000 per location at $40-$70,000 in maintenance. There is no funding currently for these projects. The TSMO focus is Travel Time from Phoenix to Flagstaff and Variable Speed Limits (VSL) on I-17
Alternative to DMS would be through cell phone technology

WEST SEDONA TRAFFIC: IS THERE CONGESTION IN WEST SEDONA?

Again, stakeholders are split on whether or not there is traffic congestion in West Sedona. Some experience congestion around noon, others when school gets out and employees get off work around 3 P.M. There can be moderate congestion requiring two traffic signal cycles to move through an intersection at that time. This issue may be related to the expectations residents have about congestion. What is their tolerance for traffic delays?

Most of SR 89A in West Sedona operates at a Level of Service C. The main issues are access management and signal operations
Need to weigh the increased traffic congestion with additional pedestrian crossings
A raised median will increase safety but create loss of access for businesses which would be a political issue
In general, there are not a lot of complaints about West Sedona

TRANSIT: IS IT PART OF THE SOLUTION?

Most stakeholders did not talk about transit until prompted by the interviewers. Most of the comments were related to current service and the former Roadrunner service. Some commented about the Park-and-Ride and shuttle ideas that have been discussed in the past. It seems most were supportive of some type of transit but weren't sure whether the service should be planned to primarily serve residents, visitors, or both.

GENERAL COMMENTS ABOUT TRANSIT

Short term is more roads and higher capacity. Long term solution is to get people out of cars – not too many people but too many cars
Residents are harder to turn into transit users – visitors are used to living in a different place and using other transit systems
Citizens want to see a public transit system
Don't need transportation for poor people
All of the businesses are on the state highway – lot of towns have a center that is people centric as a community gathering point and good for transit

TRANSIT FOR RESIDENTS/EMPLOYEES

One employer provides half-price bus passes – if more employees used the bus it would reduce traffic
Doesn't make sense for local residents to use transit
Lynx is for commuters for people from out of town
Need to set up a system that also benefits the residents - Verde Lynx is not functional for a resident who wants to move around town

TRANSIT FOR VISITORS

We don't have any transit for visitors
Free trolley
Great set up to make transit work for visitors; design a system where they become a captive audience (transit only to the scenic locations)
Once you get here the car is parked at hotel and you don't need it to go to places into town

Using transit to take people places can't exceed the capacity of the trailheads – taking groups of people and dumping out at a trailhead needs to be balanced to maintain the small group and individual experiences people come here for

CURRENT LYNX SERVICE

Lynx is the best thing
Not frequent enough service
There is an opportunity to grow the system
Take it to go to Bashas', and then wait 90 minutes not frequent enough

FORMER ROADRUNNER SERVICE

Was a colossal failure
People didn't want to pay for service they weren't going to use
Wasn't given a good chance
Wanted the service to pay itself
Didn't feel that the system had a chance to succeed during time when SR 179 was under construction.
Mistake in type of vehicle that they chose – City Council over-rode the recommendation and selected a trolley
Perception that nobody was riding it, but tourism was at an all-time low

POTENTIAL SOLUTIONS

Build a park and ride at Cultural Park (overflow college parking) for day trippers to park and take a circulator to the city parking lot/transportation hub, Hillside and popular trail heads such as Bell Rock, operate 7 days a week, 9 A.M. to 4 P.M.
Contracted trolley shuttling for special events hasn't been successful
Potential transit route from city parking lot to VOC at the Hilton could take 50-100 cars off the streets
Business council has considered a new service running from the High School to the College from 6 P.M. to 1 A.M., Friday and Saturday nights
Would like to see transit to West Fork lot in the canyon
Transit from city parking lot to Hillside parking lot – Saturday and Sunday – step on and step off – not a bus looking vehicle – runs every 15-20 minutes
A van run to trailheads
Use more trolleys – subsidize the private companies and tie in Uber cars
Telluride close the town during festivals
Look to other parts of the country like Cape Cod and Key West – what have they done

ARE BICYCLE FACILITIES AND URBAN TRAILS NEEDED?

Most stakeholders did not discuss the need for bicycle paths and/or an urban trail system; however, the City Bicycle Coordinator was included in the interviews and provided information.

Don't feel safe riding a bike in the community
SR 179 has great bike lanes – need to make West Sedona look like SR 179 with more traffic calming; median island, pedestrian refuge, physical barrier between bike lane and the traffic

Silver-level bike community (very popular for mountain biking), but bikers are driving to the trail head because they don't feel safe on the road – should be able to bike from hotel to trailhead
More bike infrastructure would help
Bike share program could be integrated with transit stops
There are a few little connections off SR 89A into the neighborhoods, but no urban trail system
Need a system similar to Ft. Collins which has almost 100% off-street paths and a multimodal connection system
Continue to develop more walking districts

HOW SHOULD THE COMMUNITY BE ENGAGED?

None of the stakeholders felt there was one best way to provide information to residents or to engage them in the study. They felt engagement is a necessary part but had very few suggestions on how to do it effectively. Most felt holding public meetings were not effective and many stakeholders stated they don't attend them. The following information will be used to influence the outreach plan.

JUST DO SOMETHING

Won't get consensus – City just needs to move forward
Quit worrying about the complainers
Lots of talk but no action
Group of 100 – come out in full force – look like the majority but they aren't
Haven't there been studies in the past? Be nice to take action.
Long term projects - need to start now
We try to make everyone happy – we listen to lowest common denominator – then form a committee with people who should not be on a committee and nothing gets done
Should do something but whatever we do there will be push back
Every time you try to solve problems we can't because can't agree

ISSUES TO CONSIDER

Naysayers will always debunk data
Lot of merchants have remote owners and a lot are not residents
No one organization that gets to all of the people
Oak Creek residents do get involved in Sedona issues
Lot of professional folks want to get involved in the nuts and bolts
Lot of community organizations: arts, recreation, business, uptown associations, homeowner associations
Community Plan had a lot of input was well accepted but not much participation in other studies
Average age of resident is early 60's mostly retired; there is a tension between business owners and the retired population
Sentiment about traffic is at a higher level now than ever before
So few things to complain about is why people come here so traffic is our rallying cry
No issue too small to have an argument or complain about
Words are important – we banter the words we have a traffic problem – we have situations from time to time but not a traffic problem

DESIRED OUTCOMES AND INFORMATION

Need a future vision
Get citizens together to back the plan and ask for action
More actual planning; draw out scenarios as a design
Stay in concept and vision/goal without some graphic design isn't successful
Use scenarios that don't lock you into one thing
How do we define a successful system and the tradeoffs to achieve it?

PUBLIC MEETINGS

Sedona Academy used the Town Hall format with balanced pro-growth and anti-growth participation but spent too much time word scything
Public meetings are not effective – people don't come
Get a lot of people to public meetings if controversial
If you don't have public meetings, people ask why
Don't need big open houses on what residents want and what the problems are
Start outreach after the objective information is available – don't start with what do you think
Never going to attend another public meeting – opportunity for strident people to get up to stand up and give nothing helpful
People come to a meeting because of a fixed opinion – not to have a reasonable discussion

Appendix C – Travel Time Data

GOOGLE TRAVEL TIME DATA

Google Travel Time data for various directional routes in Sedona were collected for a period that spanned from March 1, 2017 to May 31, 2017. Travel Time data was analyzed for three key routes that will serve as performance indicators for developed strategies:

- Northbound SR 179 (Bell Rock Road to "Y")
- Southbound SR 179 ("Y" to Bell Rock Road)
- Southbound SR 89A (Trout Farms to "Y")
- Northbound SR 89A ("Y" to Trout Farms)
- Northbound SR 89A West Sedona (Lower Red Rock Loop Road to "Y")
- Southbound SR 89A West Sedona ("Y" to Lower Red Rock Loop Road)

Figure C.1, Figure C.2, and **Figure C.3** illustrate the ten days between March 1 and May 31, 2017 that experienced the highest travel time on each of the above routes. Also shown is the day with the lowest travel time (thick red line) to depict baseline uncongested travel time.

On SR 179, a travel time of 60 minutes was observed on May 28, 2017, Memorial Day weekend. The other most congested days had a travel time of 35 to 40 minutes as compared to a baseline travel time of about 12 minutes.

On SR 89A southbound, a travel time of over one hour and 20 minutes was experienced on May 28, 2017. The other most congested days had a travel time of 45 to 50 minutes with exception to April 15, which experienced about 60-minute travel time. Baseline travel time is 7 minutes.

Travel time on SR 89A northbound in West Sedona is more variable with significantly lower peaks. With a baseline travel time of 12 minutes, congested travel time was 13 to 23 minutes.

Figure C.1: Northbound SR 179 (Bell Rock Road to "Y") Google Travel Time

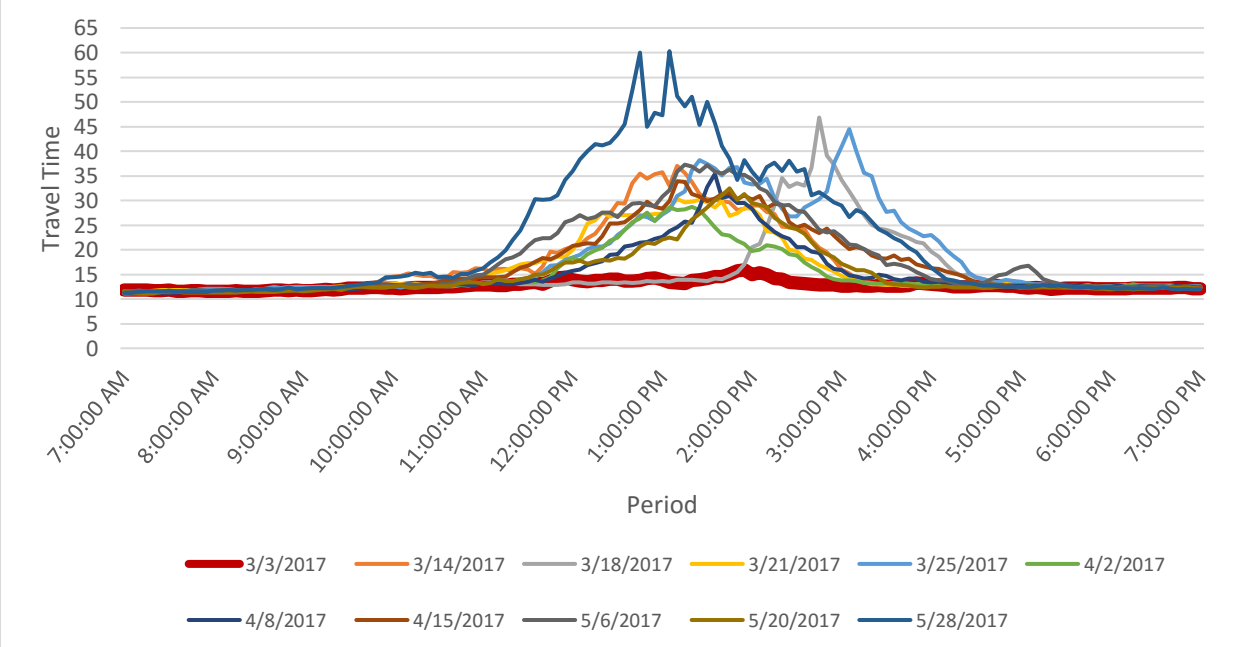


Figure C.2: Southbound SR 89A (Trout Farms to "Y") Google Travel Time

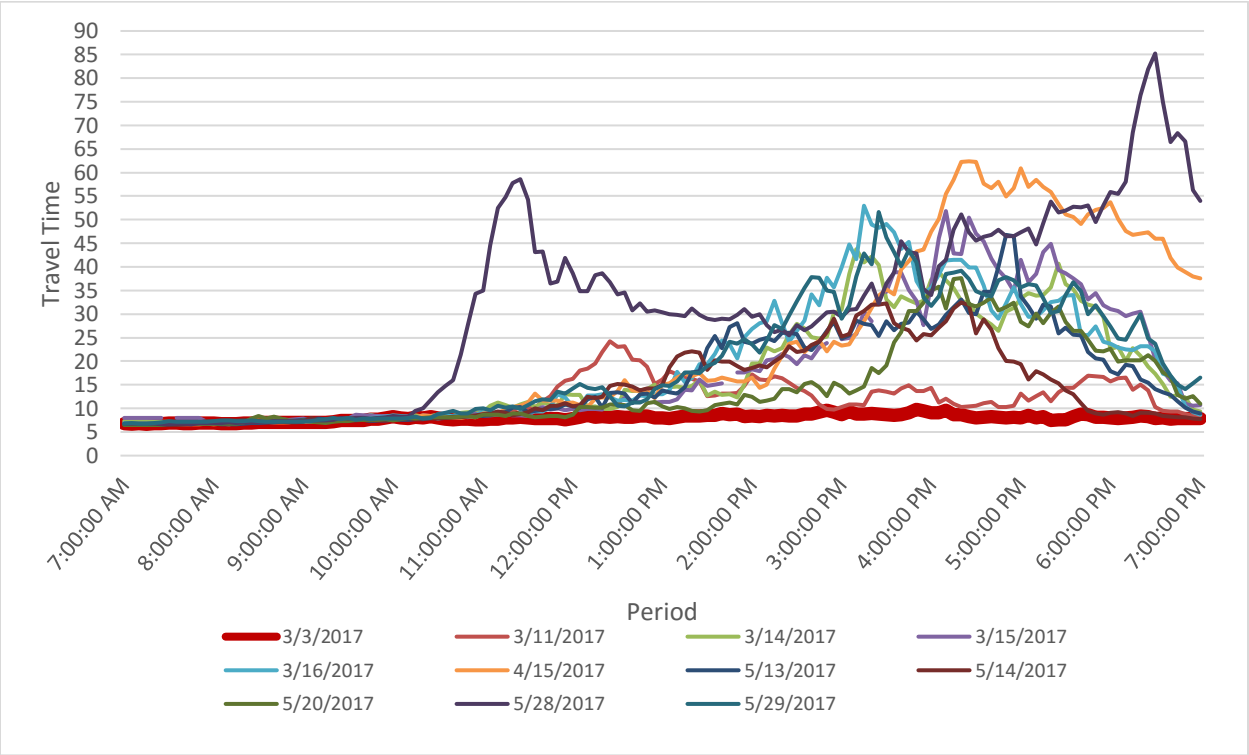
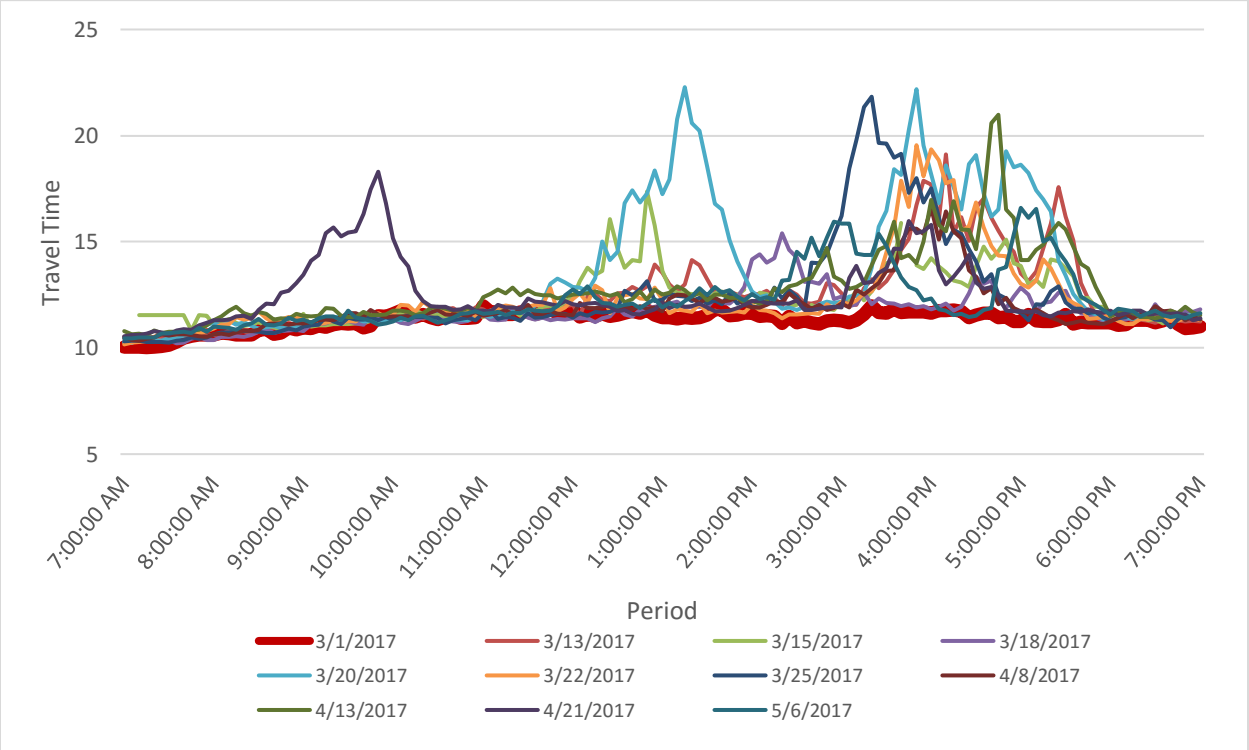


Figure C.3: Northbound SR 89A West Sedona, (Lower Red Rock Loop Road to "Y") Google Travel Time



TRAVEL TIME TRENDS AND PATTERNS

The following observations were made for the three-month period of data collection for SR 89A and SR 179 during Sedona's peak season:

- The travel time along southbound SR 89A (Trout Farms to "Y") was equal to or greater than 42 minutes during eight days of the three-month data collection period. In sum total, the SR 89A route experienced nine hours where the travel time was 42 minutes or greater.
- The travel time along northbound SR 179 (Bell Rock Boulevard to "Y") was equal to or greater than 36 minutes during six days of the three-month data collection period. In total, the northbound SR 179 route experienced 4.25 hours where the travel time was 36 minutes or greater.

To provide a more detailed review of the travel time data, the use of percentiles, a common statistical measure, provides further insight on the variation of travel time experiences within the three-month data collection period.

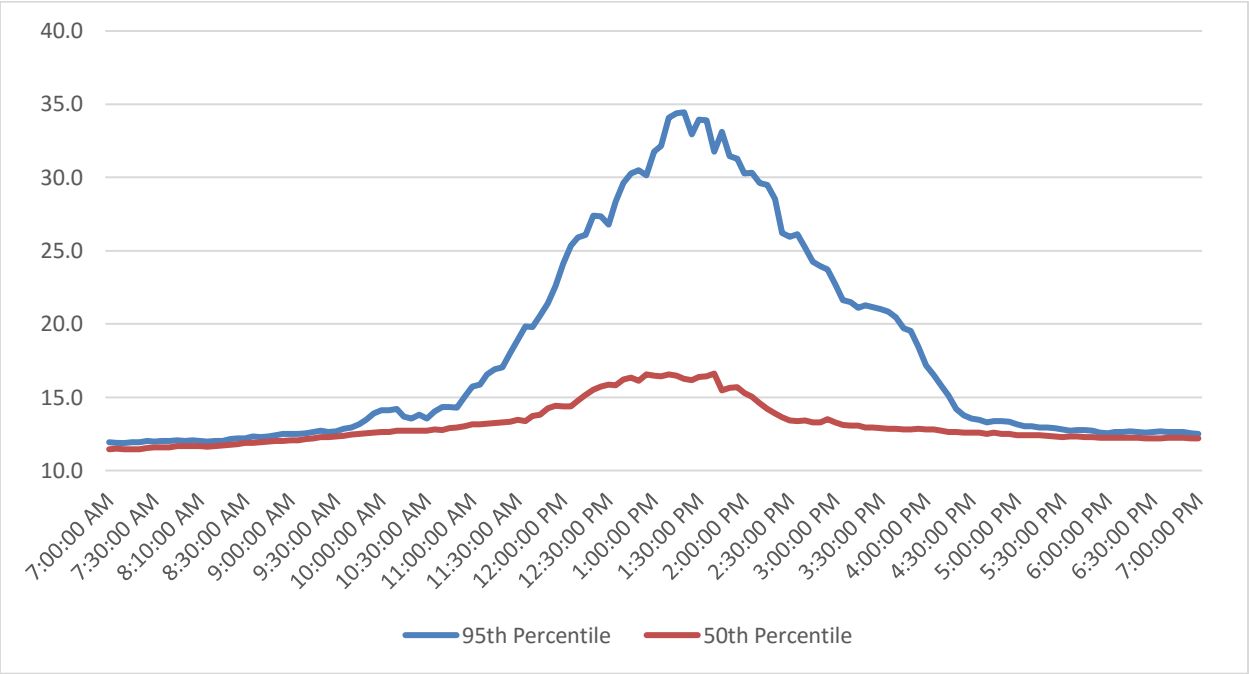
Figure C.4 to **Figure C.9** show a comparison of the 50th and 95th percentile travel time measurements plotted for each five-minute increment (between 7:00 AM – 7:00 PM) on SR 89A and SR 179 by direction.

The 50th percentile curve indicates the travel time value at which 50% of the measured corridor travel time points (each five-minute period between 7AM and 7PM) are below the 50th percentile curve and 50% are above the curve. It represents the average congestion condition on the corridor.

The 95th percentile curve indicates the travel time value at which 95% of the measured corridor travel time points are below the 95th percentile curve and 5% are above the curve. It represents how bad delay is on the heaviest traffic days on the corridor. During the three-month data collection period, the 95th percentile approximately represents the fifth highest congestion day.

The charts show there is a significant spread between the 50th and 95th percentile depending on the direction of travel along the routes. For example, northbound SR 179 has a 95th percentile travel time of approximately 34.4 minutes, an increase of 18 minutes from the 50th percentile travel time.

Figure C.4: Northbound SR 179 (Bell Rock Road to "Y") Google Travel Time



Southbound SR 179 has a 95th percentile travel time of 14 minutes, an increase of just 1.3 minutes from the 50th percentile travel time. This indicates that the traffic patterns along the northbound SR 179 are much more volatile compared to the southbound SR 179.

Figure C.5: Southbound SR 179 ("Y" to Bell Rock Boulevard) Google Travel Time

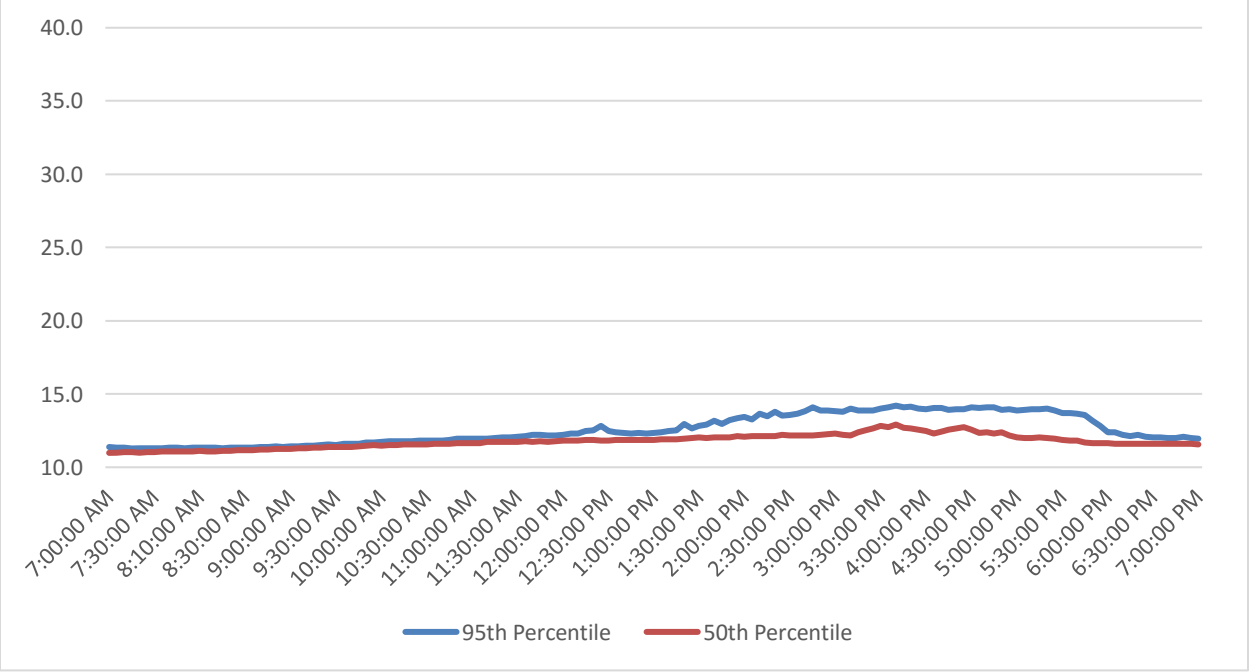


Figure C.6: Southbound SR 89A (Trout Farms to the "Y") Google Travel Time

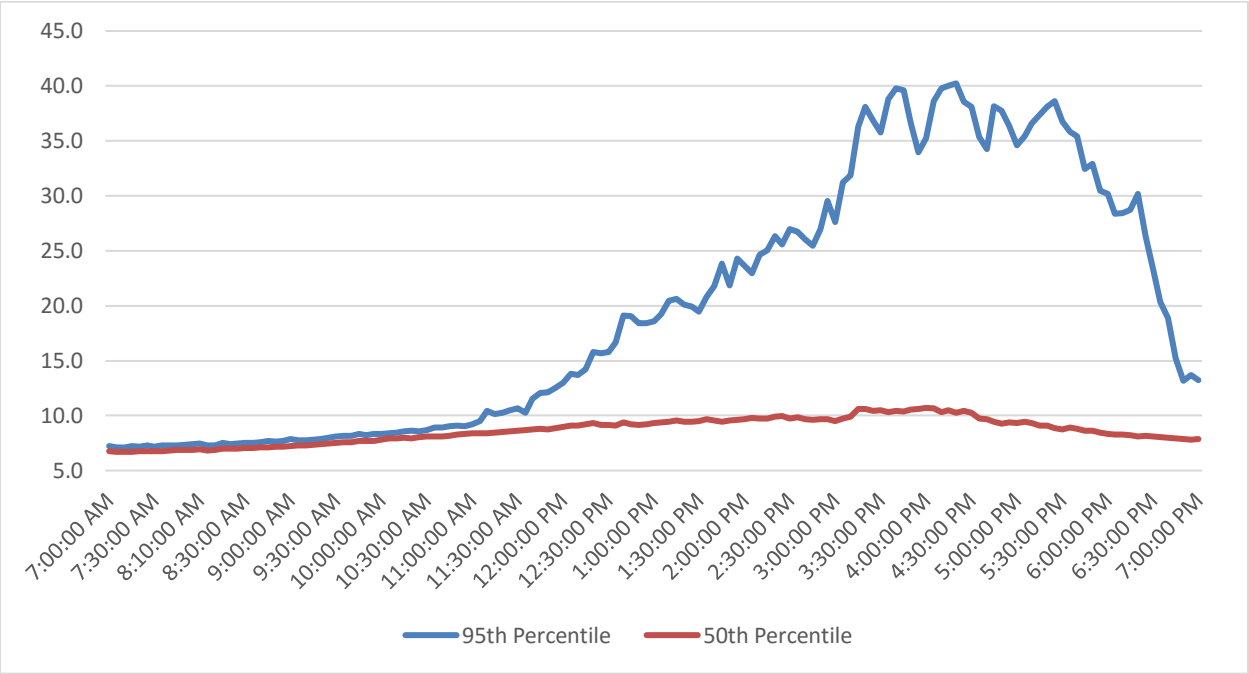
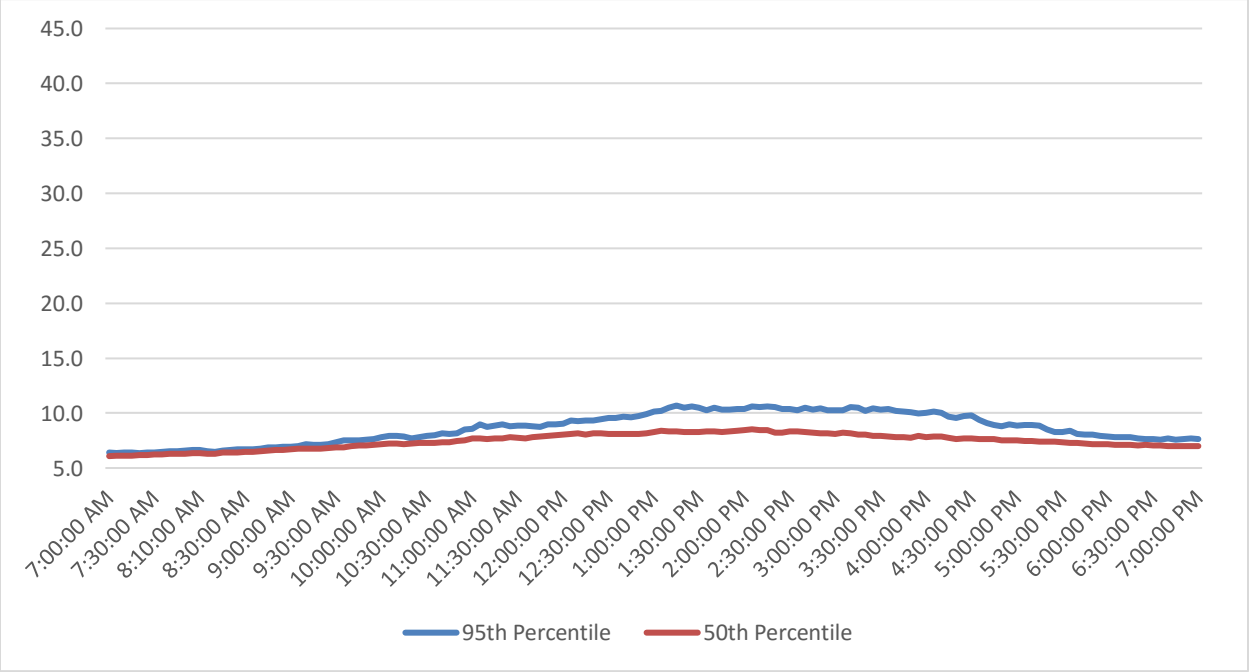


Figure C.7: Northbound SR 89A ("Y" to Trout Farms) Google Travel Time



Northbound SR 89A in West Sedona has a 95th percentile travel time that approached 18 minutes, an increase of 6 minutes from the 50th percentile travel time. Based on field observation, congestion is observed as vehicles descend Cooks' Hill, east of Airport Road, and approach the Ranger Road roundabout.

Figure C.8: Northbound SR 89A (Lower Red Rock Loop Road to "Y") Google Travel Time

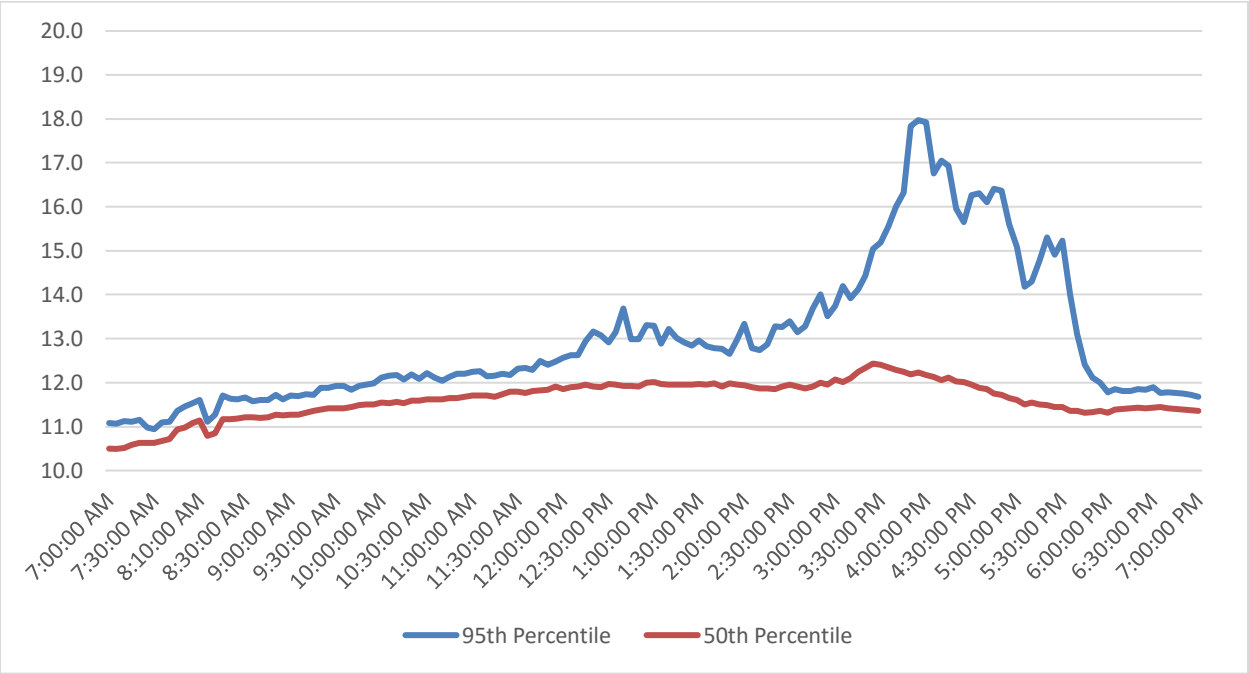


Figure C.9: Southbound SR 89A ("Y" to Lower Red Rock Loop Road) Google Travel Time

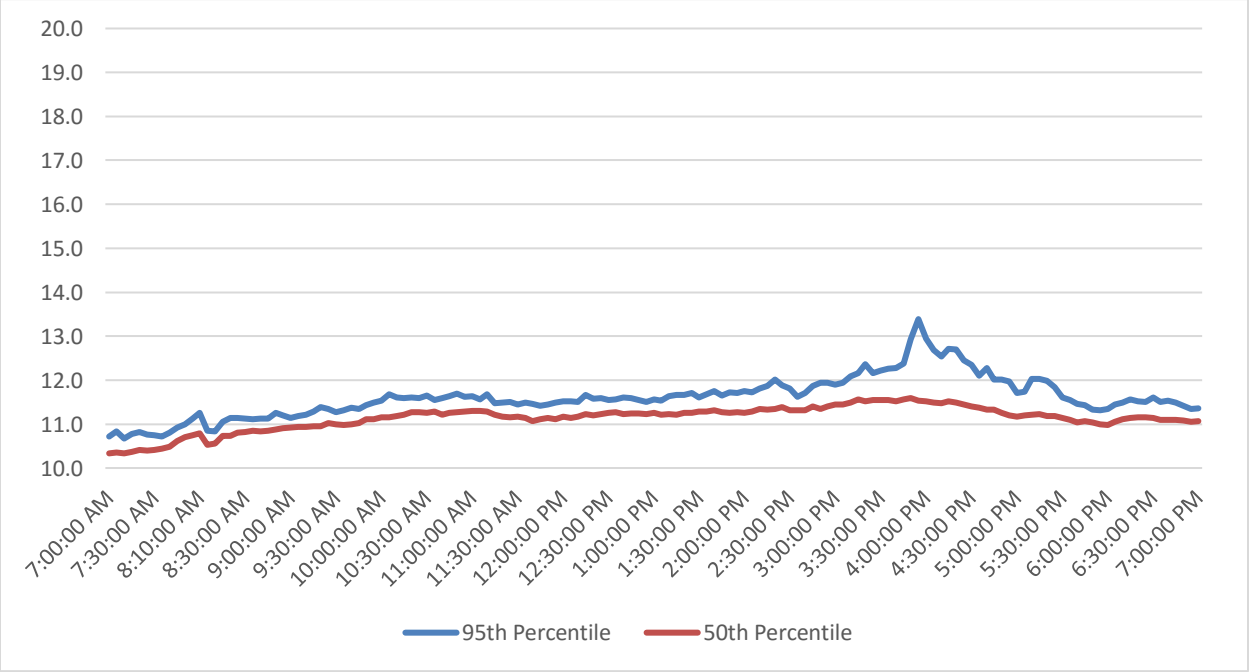


Figure C.10, Figure C.11, and Figure C.12 illustrate the number of days for which maximum travel time observed on that day fell within a defined ten-minute travel time bin. Southbound SR 89A (Trout Farms Road to "Y") shows significant variability in travel times with multiple days in different bins.

Conversely, northbound SR 89A through West Sedona (Lower Red Rock Loop Road to "Y") shows a much more consistent travel time, with 88 of the 92 days falling within the ten to 20-minute travel time bin.

Figure C.10: Southbound SR 89A (Trout Farms to "Y") Maximum Travel Time Frequency

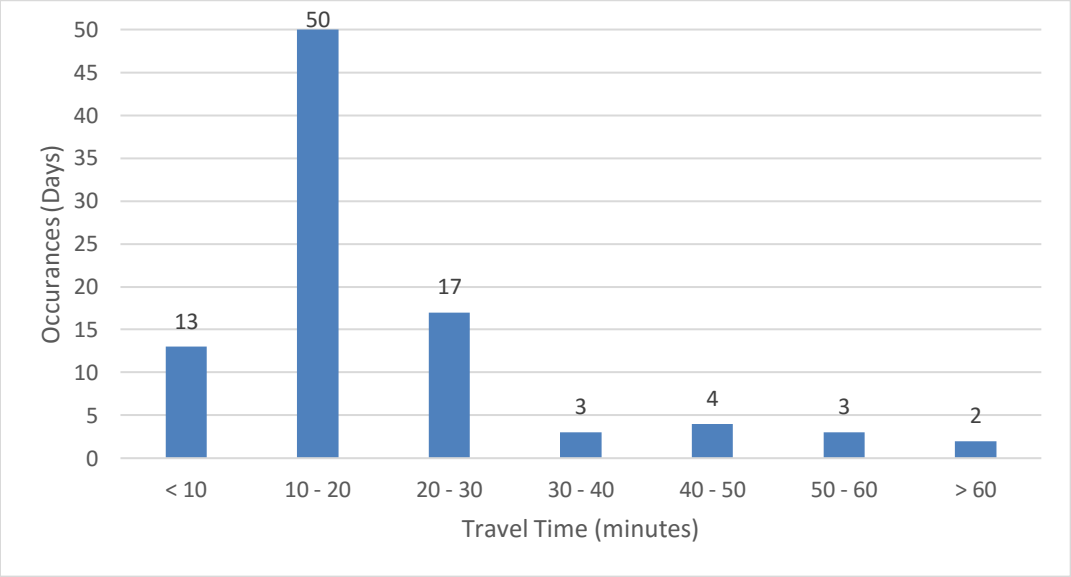


Figure C.11: Northbound SR 179 (Bell Road Blvd to the "Y") Maximum Travel Time Frequency

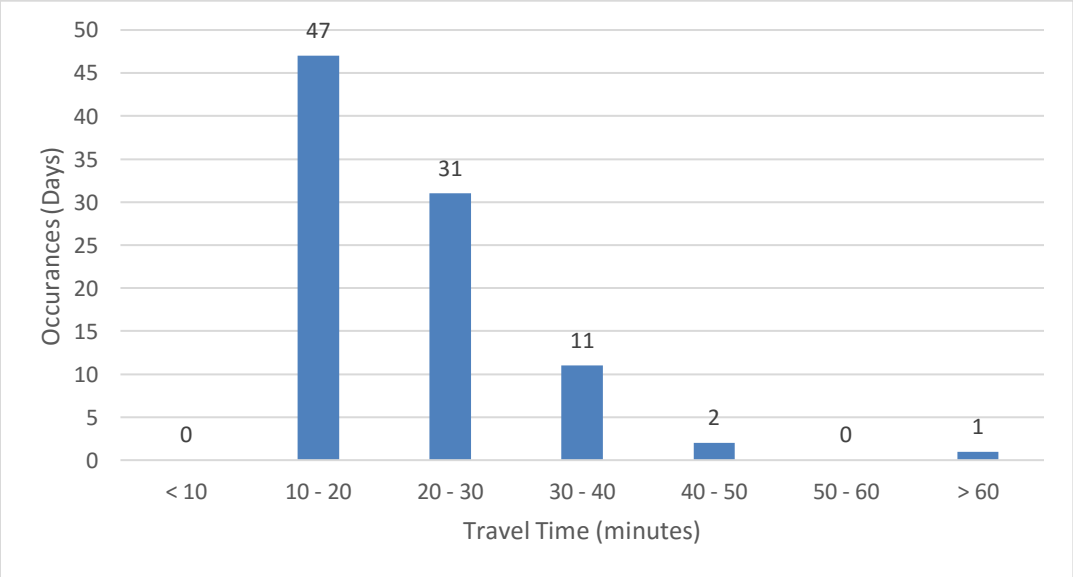
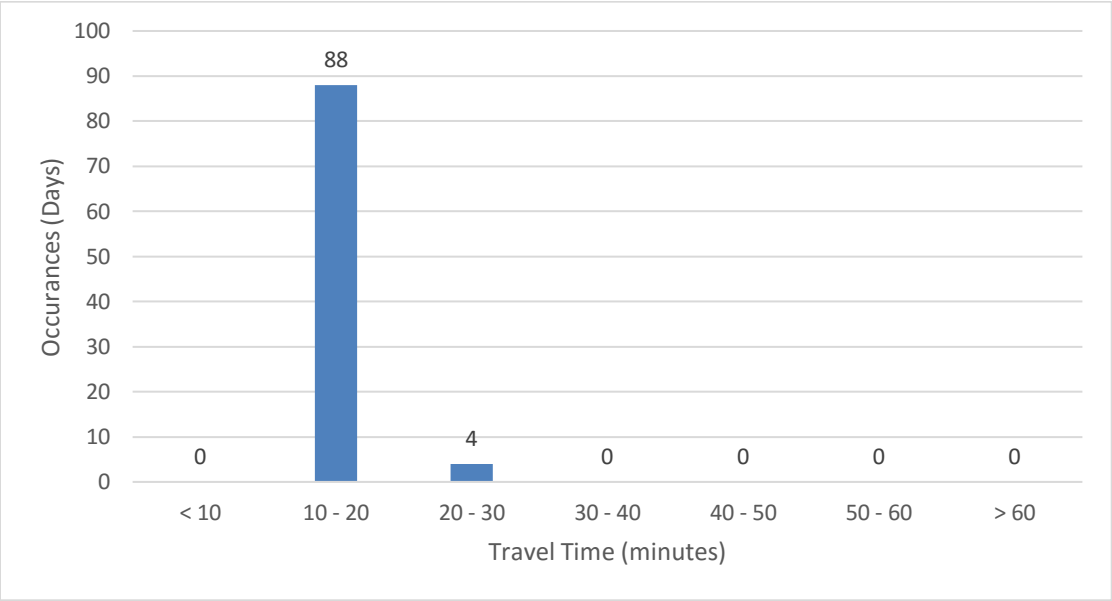


Figure C.12: Northbound SR 89A (Lower Red Rock Loop Road to "Y") Maximum Travel Time Frequency



Appendix D – AirSage Mobility Pattern Data

Figure D.1: AirSage Mobility Zones

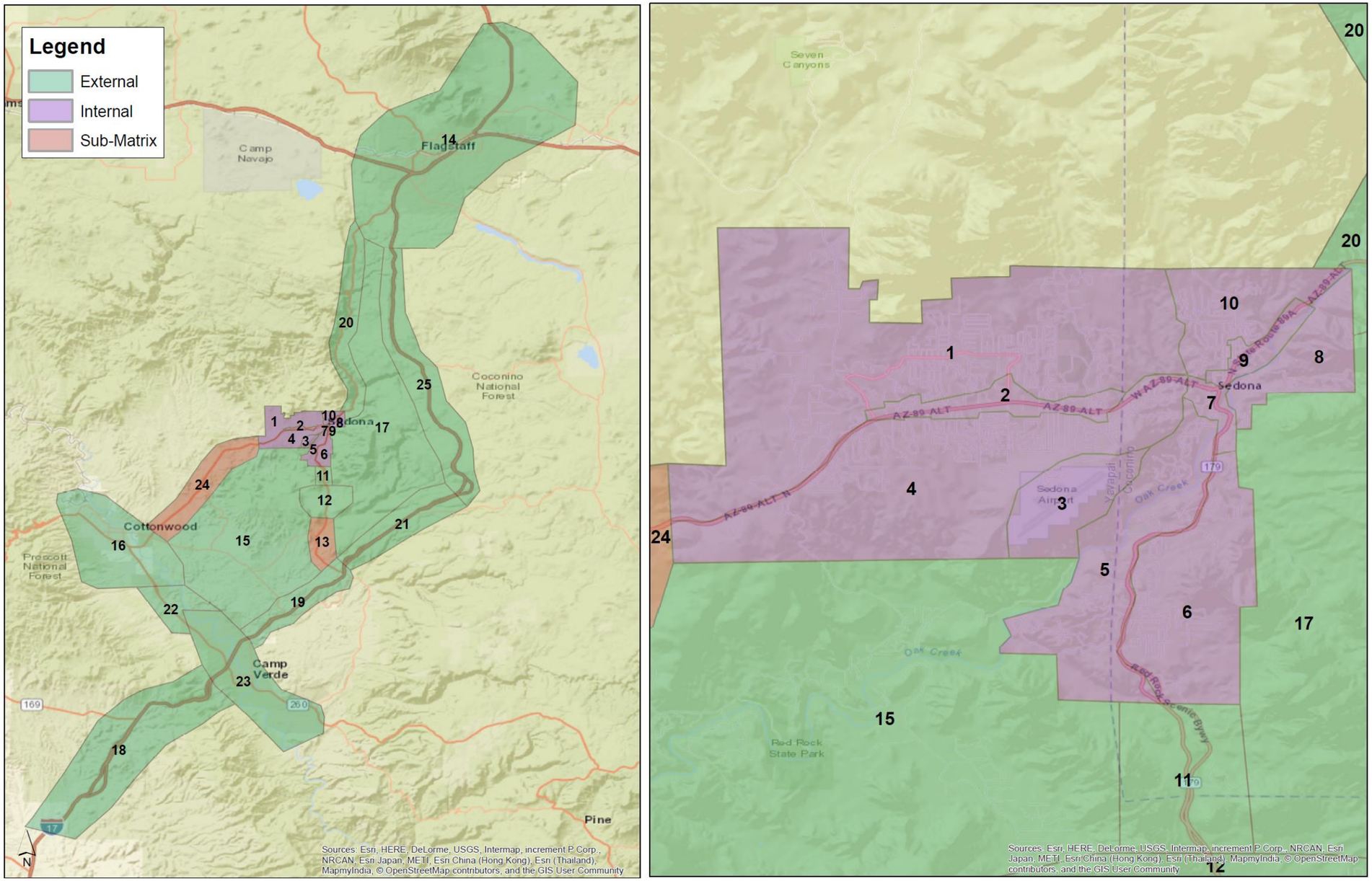


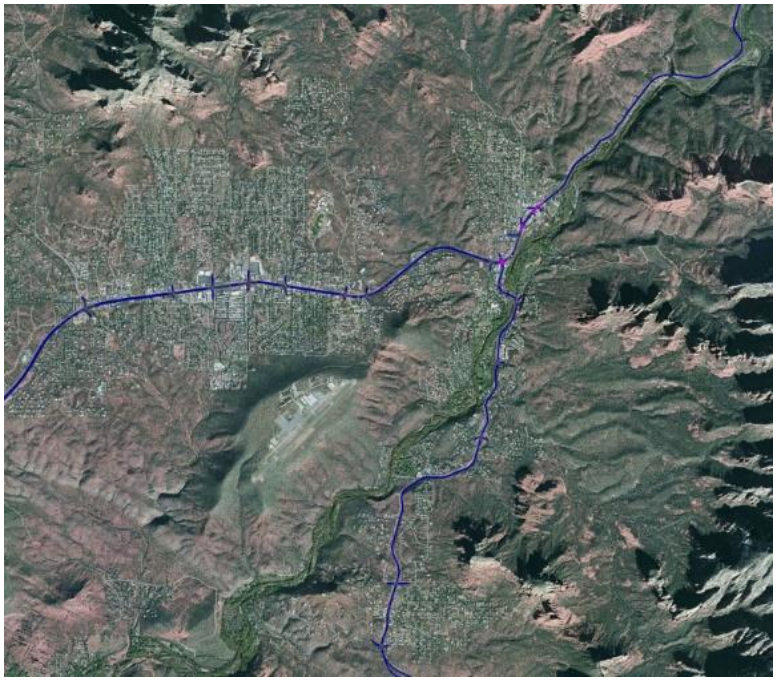
Table D.1. AirSage Mobility Pattern Data, Number of Trips to/from Origin/Destination Zones

	Destinations																				
Origin	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Village of Oak Creek (12)**	**Flagstaff (14)**	**15**	**Cottonwood (16)**	**17**	**I-17, S. of SR 260 (18)**	**19**	**Oak Creek Canyon (20)**	**21**	**Camp Verde (23)**	**25**
1	1331	327	124	611	375	42	236	193	353	91	35	363	236	263	840	333	1021	155	312	9	196	98
2	329	976	79	329	378	26	188	113	365	75	8	668	327	220	1292	278	748	137	340		222	96
3	131	63	194	113	99	4	27	51	97	24	11	187	120	64	234	91	444	60	150	7	50	28
4	653	289	102	3141	856	55	396	258	635	152	59	1030	603	375	1567	502	1698	219	586	11	298	176
5	436	536	81	1078	1694	24	492	180	514	75	103	1142	579	628	445	386	2293	305	404	68	374	269
6	36	44	8	69	44	65	8		32	9	9	75	33	90	23	27	185	27	44	8	11	15
7	108	167	18	302	298	9	449		27	22	13	632	280	179	610	115	864	203	166	9	143	77
8	145	99	21	208	198	13	4	255	21		12	219	247	78	308	112	708	95	114		85	73
9	265	318	92	569	435	9	11	21	699	12	28	841	832	197	856	191	1737	295	367	7	389	203
10	49	104	30	137	107	4		4	16	124	4	95	161	34	73	46	312	44	71		52	35
11	64	9	13	46	141	16	23	16	28		161	116	41	133	26	22	98	37	28	5	10	15
Village of Oak Creek (12)	419	716	188	1180	1278	117	800	300	1002	106	112	3279	772	619	973	339	2092	809	365	59	618	224
Flagstaff (14)	188	339	88	538	439	55	378	345	1072	386	15	601	116429	298	854	713	11132	1492	755	497	2003	3434
15	269	262	56	524	690	97	214	59	291	18	106	549	335	1269	366	116	1191	518	176	17	783	254
Cottonwood (16)	753	1049	156	1437	319	8	615	234	754	70	20	829	901	348	71805	107	3438	1147	170	34	3433	204
17	276	288	189	722	614	50	184	279	552	286	27	279	772	190	212	1553	1634	296	977	63	185	426
I-17, S. of SR 260 (18)	959	799	396	1909	2033	150	947	700	1521	272	79	2067	8567	1042	2900	987	27284	3065	1230	416	8005	7137
19	82	95	86	193	292	13	162	106	346	37	4	866	1523	491	878	144	3596	5145	177	152	3502	823
Oak Creek Canyon (20)	279	381	164	729	445	50	211	285	796	368	17	265	802	168	246	1035	1951	226	1478	23	231	511
21		17		11	59	7	4	12	35			84	280	26	38	62	1858	299	15	121	228	180
Camp Verde (23)	319	363	112	526	466	16	298	202	424	65	39	864	2673	1088	3409	248	10849	4005	286	164	25597	1585
25	73	74	34	157	185	4	37	105	326	105		172	5019	114	163	432	5844	570	481	298	684	3680
Grand Total	**7161**	**7312**	**2231**	**14531**	**11446**	**835**	**5686**	**3719**	**9907**	**2296**	**860**	**15223**	**141532**	**7913**	**88119**	**7842**	**80977**	**19149**	**8693**	**1967**	**47098**	**19542**

Appendix E – Traffic Simulation Model

TRAFFIC SIMULATION MODEL

A detailed traffic simulation model was developed to represent traffic conditions on SR 89A and SR 179. The traffic simulation model was used to evaluate existing and improved conditions based on strategies developed during the study process.



VISSM Model, Regional View

VISSM Model, SR 179/SR 89A intersection

The employed software, PTV VISSIM, allows the modeler to adjust variables to provide a realistic modelling of all road users including vehicles, pedestrians, bicyclists, and buses.

The model allows for detailed analysis of different geometric configurations and levels of traffic volumes.

The simulation model incorporated all of SR 89A and SR 179 within the City.

The Uptown area included the signalized intersections of Forest Road and Uptown cross walks.

The SR 179 corridor extended from the northern boundary of the Village of Oak Creek to the "Y" including each roundabout in between.

SR 89A in West Sedona included the nine signalized intersections and two roundabouts within the "Y" area.

MODEL CALIBRATION

The base simulation model was calibrated to reflect 2016 traffic conditions. It was calibrated following established VISSIM calibration protocols utilized by agencies nationwide. The calibration process includes the validation of two critical measurements: modeled traffic volumes and modeled travel time.

Modeled traffic verifies calibration and shows how closely the simulated traffic volumes are to observed traffic volumes from field data. Traffic volumes collected for the study during peak periods were input into the model and iteratively balanced until VISSIM protocols were met as an acceptable fit.

A second indicator of a calibrated model is target travel time. The target travel time was determined based on a review Google Travel Time data collected during March - June, 2017, and was deemed to appropriately represent highly congested conditions. **Table D.1** shows target travel time, and simulated travel time.

Table E.1. Target Travel Time Summary

Route	Target Travel Time (min)	Simulated Travel Time (min)
Northbound, SR 89A (Rainbow Trout Farm to "Y")	42.0	42.3
Southbound, SR 179 (Bell Rock Boulevard to "Y")	36.0	35.6

Appendix F – Crash Data

Table F.1. High Crash Intersections

Location	Total Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Ped/Bike Crashes	Common Contributing Factors
SR 89A/Southwest Drive	8	2	0	6	0	Angled/Left-turn collisions; failure to yield ROW, inattention/distraction
SR 89A/Andante Drive	8	2	0	6	1	Rear-end collisions; failure to yield ROW, speeding, inattention/distraction
SR 89A/Stutz Bearcat Drive	8	2	0	6	0	Angled/Left-turn, rear-end, and sideswipe collisions; failure to yield ROW
SR 89A/Arroyo Pinon Drive	7	4	0	3	1	Head-on, angled/left-turn collisions; failure to yield ROW, disregarded traffic signal
SR 89A/Shelby Drive/Rodeo Road	21	7	0	14	3	Rear-end, angled/left-turn collisions; inattention/distraction, failure to yield ROW, speeding
SR 89A/Coffee Pot Drive	35	7	0	28	1	Rear-end, angled/left-turn, sideswipe collisions; inattention/distraction, improper turn, speeding, failure to yield ROW
SR 89A/Mountain Shadows Drive	20	10	0	10	5	Rear-end, angled/left-turn collisions; inattention/distraction, failure to yield ROW, disregarded traffic signal
SR 89A/Soldiers Pass Road	13	5	0	8	2	Rear-end, left-turn collisions; speeding, inattention/distraction
SR 89A/Airport Road	11	4	0	7	0	Rear-end, angled/left-turn collisions; speeding, inattention/distraction, failure to yield ROW
SR 89/Brewer Road	26	4	0	22	1	Rear-end, sideswipe collisions; failure to yield ROW, speeding, followed too closely
SR 89A/SR 179	132	12	0	120	3	Rear-end, sideswipe, angled collisions; failure to yield ROW, improper turn, unsafe lane change, failure to keep in proper lane
SR 89A/Forest Road	8	4	0	4	1	Angled/left-turn, sideswipe, rear-end; failure to yield ROW, failure to keep in proper lane

Table F.2. High Crash Segments

Location	Length (mi)	Total Crashes	Injury Crashes	Fatal Crashes	PDO Crashes	Ped/Bike Crashes	Contributing Factors
SR 89A, east of Cultural Park Place	0.9	16	8	1	7	0	Single vehicle crashes; speeding, failure to keep in proper lane, overturn/rollover, ran-off the road
SR 89A, from Arroyo Pinon Drive to Road Runner Drive	0.1	9	3	0	6	1	Rear-end collisions; failure to yield ROW, speeding
SR 89A, from Carol Canyon Drive to Stutz Bearcat Drive	0.3	30	6	0	24	1	Rear-end, side-swipe; speeding, inattention/distraction, following too closely
SR 89A, from Rodeo Road to Kallof Place	0.4	50	12	0	38	0	Speeding, inattention/distraction
SR 89, from Mountain Shadows Drive to Inspirational Drive	0.1	17	4	0	13	0	Rear-end; following too closely, speeding, inattention/distraction
SR 89A, 0.8 miles northeast of Lomacasi Lane	0.8	36	5	1	30	1	Rear-end, single vehicle, rear-to-side collisions; following too closely, speeding
SR 89A, Rolling Hills Road to SR 179	0.6	11	4	1	6	1	Rear-end collisions; inattention distraction, failure to keep in proper lane, speeding
SR 179, From SR 89A to Schnebly Hill Road	0.3	24	7	0	17	1	Rear-end collisions; speeding, following too closely, inattention/distraction
SR 179, From Canyon Drive to Painted Canyon Drive	0.7	12	4	0	8	0	Rear-end collisions, single vehicle crashes; Inattention/distraction
SR 179, 0.9 miles south of Indian Cliffs Road	0.9	18	7	0	11	0	Single vehicle crashes, collision with fixed objects; run-off the road, speeding, failure to yield ROW