

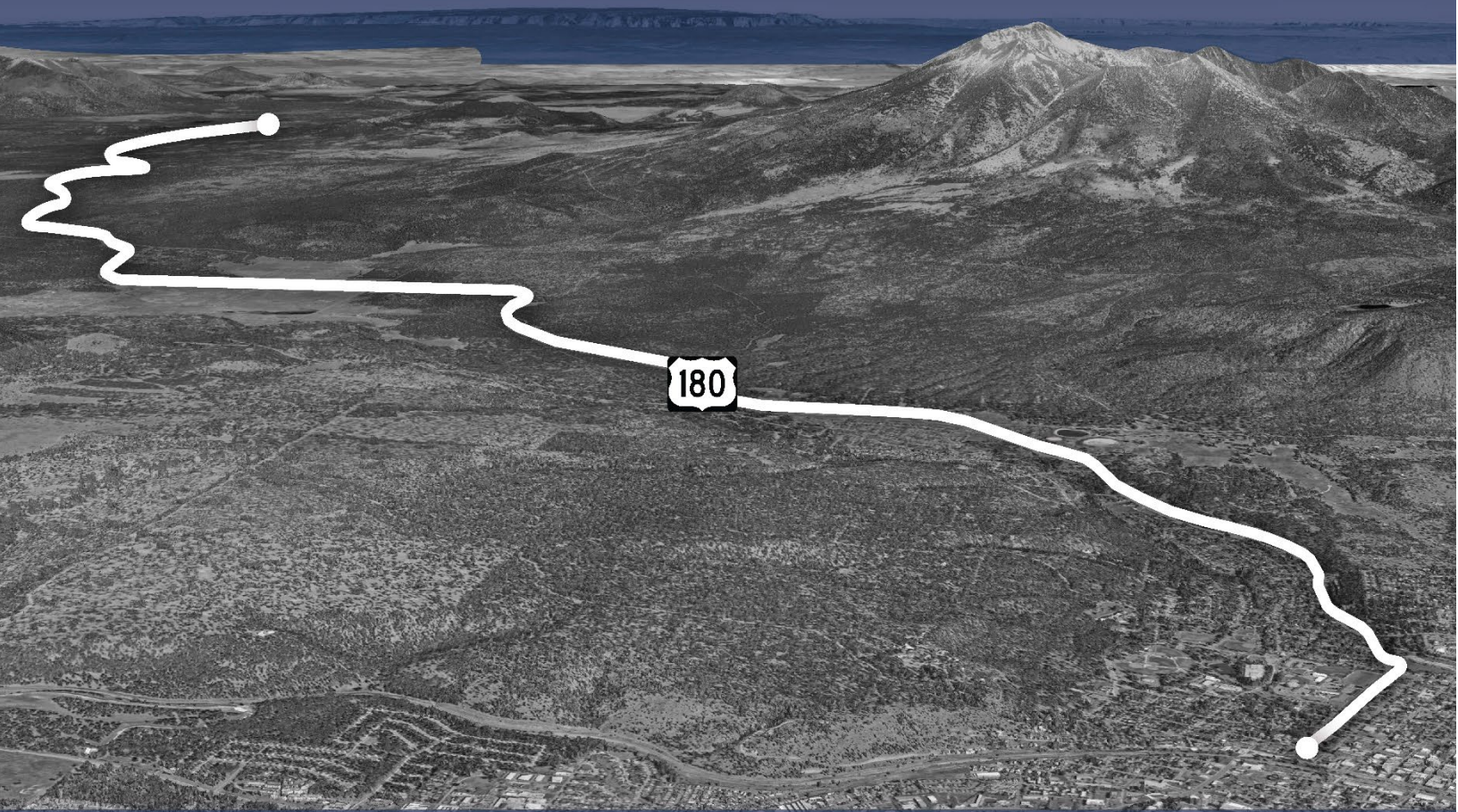


US 180 Corridor Master Plan

Final Report



June 2022



Acknowledgments

The Arizona Department of Transportation (ADOT) would like to sincerely thank the City of Flagstaff City Council and the Coconino County Board of Supervisors for their continuous involvement and support of this plan. ADOT would also like to extend a special appreciation to our Project Partners who contributed countless hours to the development of this Corridor Master Plan. ADOT was the lead and sponsor of this plan. Decision-making occurred via a consensus-based process with our Project Management Partners below, while considering input from stakeholders and the public at key milestones.

City of Flagstaff City Council

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Mayor Coral Evans
Vice Mayor Jamie Whelan
Councilmember Celia Barotz
Councilmember Jim McCarthy
Councilmember Charlie Odegaard
Councilmember Scott Overton
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Councilmember Regina Salas
Councilmember Adam Shimoni

Coconino County Board of Supervisors

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Elizabeth Archuleta (Chair)
Matt Ryan (Vice-Chair)
Art Babbott
Lena Fowler
Jim Parks

Present

Patrice Horstman (Chair)
Jeronimo Vasquez (Vice-Chair)
Matt Ryan
Judy Begay
Lena Fowler

We acknowledge the diligent service and valuable input from Project Management and our Project Partners, and would like to provide special recognition to:

Project Management

Dan Gabiou, ADOT Project Manager
Jason James, ADOT Project Manager
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Steve Orosz, ADOT Northcentral District
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Project Partners

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EXECUTIVE SUMMARY

US 180 Corridor Overview

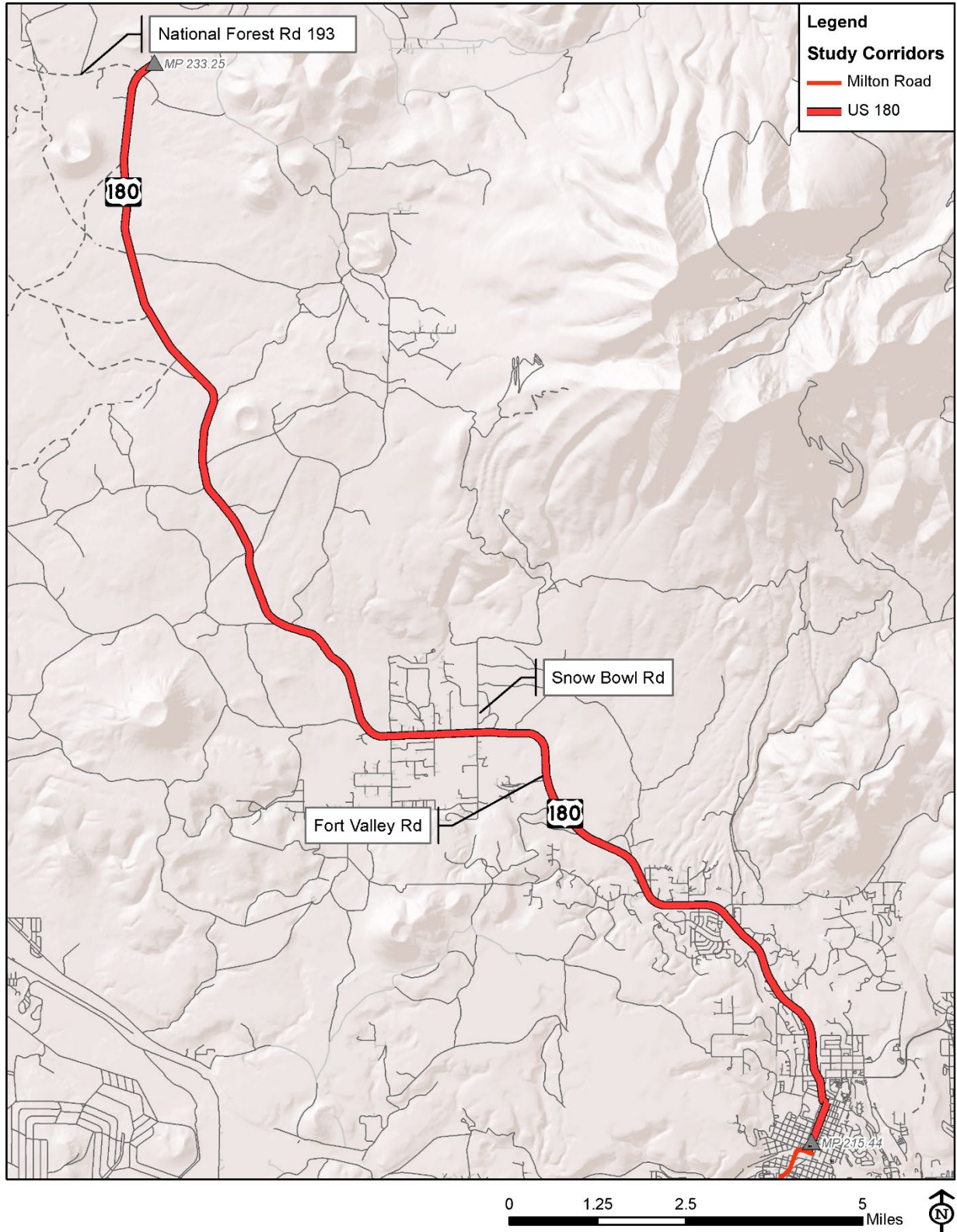
US Highway 180 (US 180) is primarily an east-west running highway that travels through Texas, New Mexico and Arizona. Arizona’s portion is about 170 disconnected miles as it has been re-routed over the last several decades. In Arizona, US 180 goes through lightly populated areas between St. Johns and Holbrook, and then shares alignment with Interstate 40 (I-40) for approximately 85 miles to the City of Flagstaff. From Flagstaff, US 180 traverses northwest to its western terminus in Valle, Arizona. Illustrated in **Figure ES-1**, the US 180 Corridor Master Plan evaluates a 17.4-mile section of the highway northwest of the City of Flagstaff from the intersection of Historic Route 66 and Humphreys Street (Mile Post 215.44) to the Crowley Pit Snow Play Area (Mile Post 233.25).

This segment of US 180 is also known as the Fort Valley Highway 180 Scenic Corridor and is designated by the State of Arizona as a Scenic Road for its rural character and mountainous setting around the San Francisco Peaks. US 180 is the primary arterial thoroughfare for nearby rural residents and is suitable for low volume residential traffic. However, visitors seeking access to the Grand Canyon, Arizona Snowbowl, and other recreational sites within Coconino National Forest are dependent on US 180. The winter season is particularly challenging for traffic circulation on US 180, and at peak times the corridor is congested in a gridlock fashion, negatively affecting local traffic while also posing a tremendous threat to emergency vehicle’s ability to effectively traverse the corridor. While winter congestion is often viewed as the key issue, addressing inadequate conditions for bicyclists, pedestrians, and bus riders is also essential.

The US 180 corridor strives to provide travel options for alternative modes of travel for those who walk, bike, or take public transit, but the current infrastructure to support multimodal travel options is insufficient with long stretches of no sidewalks and with narrow sidewalks where they exist. There are also no on-street bike lanes or bike ways, and the primary facility for pedestrian and bicycles is an off-street trail at some portions of the study corridor. Addressing the traffic congestion while also implementing safe and efficient travel by all modes of transportation is the priority for US 180 CMP.



Figure ES-1: US 180 CMP Study Corridor



US 180 CMP Purpose & Need

The purpose of the US 180 Corridor Master Plan (CMP) is to identify a 20-year vision for the US 180 corridor and addresses the Project Partner’s seven goals (**Figure ES-2**). This was done by evaluating a mixture of previously recommended and newly introduced System Alternatives. These System Alternatives included a mix of alternatives that utilize and maintain the existing US 180 right-of-way, alternatives that would require an expanded right-of-way, and alternative routes separate and in addition to the US 180 corridor itself.

The System Alternatives are also complemented by a series of Base Build Spot Improvements – which constitute targeted, near term, primarily low investment (compared to the Build Alternatives) mitigation measures that support mid and long-term System Alternatives.

The US 180 CMP process included public and stakeholder involvement that consisted of a thorough, pragmatic and community-vetted set of qualitative and quantitative evaluation criteria over a three-tiered evaluation of the System Alternatives. This process was designed to ultimately reach a Recommended Alternative by achieving an informed consensus of the Project Partners, while obtaining desires and feedback from stakeholders and the community. Reference *Section 4.0 - Recommended Alternative* for the information about the Recommended Alternative.

US 180 CMP Vision Statement

The Vision for the US 180 Corridor (which includes Humphreys Street and Fort Valley Road) is to enhance community character while maintaining acceptable operations in a manner that respects all users, modes of travel, local business, residential property, and the environment. The Vision for US 180 balances improvement with preservation. The improvements to US 180 will help create an environment of shared benefits. The US 180 Corridor Master Plan has determined—through extensive analysis and public input—that ADOT cannot simply build its way out of congestion within this corridor. Therefore, it is recommended here that US 180 be enhanced within the confines of the existing roadway prism.

Specifically, this means that for at least a 20-year period (through 2041), no new through lanes are recommended for US 180 and no US 180 to I-40 bypasses are recommended. All multimodal improvements, as specified below, are designed to avoid or minimize encroachment and impacts to existing businesses or property to the best extent practicable.

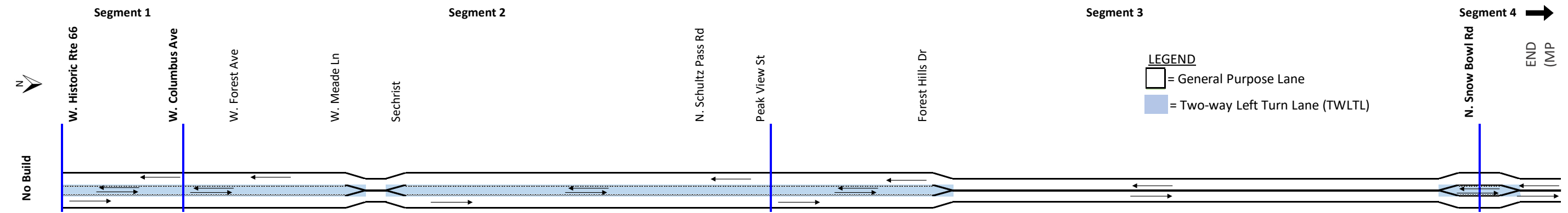
Table ES-1 provides a list of the final inventory of Spot Improvements included with the No-Build Plus Recommended Alternative.

The Recommended Alternative, and corresponding listing of spot improvements, are based on existing ADOT policies and the Controlling Design Criteria. Should ADOT policies change, any impacted recommendation should be re-evaluated as applicable.

In developing transportation projects, there is sometimes a tradeoff between safety, capacity, convenience, and/or comfort of mode based on transportation controls and design that result in impacts to travel times. These tradeoffs must be carefully considered in a future analysis that goes beyond the scope of a planning document.

Some intersection and/or mid-block crossing locations that are identified as future opportunities in the US 180 Corridor Master Plan may not be implemented as proposed after being analyzed through the planning process and evaluation criteria agreed upon by partners. However, these opportunities could present themselves as we move into the future. Approval to build such crossings requires a technical evaluation process which may not support the implementation of the improvements or may require additional enhancements such as intersection improvements, median refuges, grade separations or location adjustments. If the intersection and segment level of service or other potential negative impacts improve or can be mitigated from the predicted level of service identified in the study at the horizon year, then the additional pedestrian crossings could be considered if warranted in the future. Even though this is a 20-year plan, potential changes from real to projection may be checked on a five-year basis.

Table ES-1: US 180 No-Build Plus Recommended Spot Improvements



Spot Improvements					
Humphreys Street	Columbus Street	Forest Avenue	Sechrist Elementary School	Schultz Pass Drive	Snow Bowl Road
<ul style="list-style-type: none"> Restrict U-Turns Ladder/High-Visibility Cross walks ADA-compliant curb ramps Pedestrian crossing improvements Transit signal prioritization[#] Add NB dual left turn lanes at Humphreys Street and Route 66 and additional NB receiving lane to Cherry Avenue as ROW becomes available** 	<ul style="list-style-type: none"> Ladder/High-Visibility Cross walks ADA-compliant curb ramps Bicycle signal detection and actuation Transit signal prioritization[#] increase pedestrian staging area 	<ul style="list-style-type: none"> Two raised medians in existing south leg turn lane. Keep the raised medians for the pedestrian refuge and for the center running lane alts, the center lane will have to merge into the other lane at these segments Pedestrian crossing hybrid beacon* ADA-compliant curb ramps Sidewalk widening Combined Bike Lane/Right Turn Lane for WB Forest Ave. to NB US 180 with bicycle shared-lane markings 	<ul style="list-style-type: none"> NB right turn lane extension Pedestrian crossing hybrid beacon* ADA-compliant curb ramps Advanced pedestrian warning signage Existing bus stop on the NB side (east side) Enhanced lighting at pedestrian crossing 	<ul style="list-style-type: none"> ADA-compliant curb ramps Bicycle signal detection and actuation Transit signal prioritization[#] 	<ul style="list-style-type: none"> Additional left turn lane (SB Snow Bowl Rd) Enhance pavement striping of existing pavement section to create an additional NB receiving lane on Snow Bowl Road Ladder/High-Visibility Cross walks Pedestrian crossing hybrid beacon* Roundabout (pending further consideration)
Additional Spot Improvements					
<ul style="list-style-type: none"> DMS Signage Rumble strips in non-residential areas Safety edges Delineators Guard rails Turn lane extensions Speed feedback signage (temporary applications only) Wildlife crossing at MP 224.8, MP 228.8, and MP 218 Add sidewalk where not present within City of Flagstaff limits 			<ul style="list-style-type: none"> Shoulder widening between Magdalena Rd (MP 219.16) and Hidden Hollow Rd (MP 219.65) Restrict U-Turns Right turn restrictions Enhanced crosswalks Pedestrian scale lighting (FUTS) Pedestrian warning signage Pedestrian hybrid beacon crossing at Humphreys St and Fine St. and on US 180 at Meade St, Anderson St, near the Museum, and Blue Willow St* Bicycle signage Enhanced Transit Shelters Planned bus stop on the NB side of Anderson Road (east side) 		
<p>*ADOT requires ped crossing and new signals to meet ADOT warrants prior to installing them on Milton and US 180. The project partners would like for monitored test crossings to be allowed, where appropriate. ADOT has warranting criteria for these features and believes the warrants should meet prior installing the features.</p> <p>[#]Proposed transit signal priority is for future consideration only, and will be considered for implementation upon meeting ADOT warrant and/or TIA that concludes no negative impacts to vehicular operations.</p> <p>**The NB dual left turn lane at Humphreys Street and Route 66 and receiving lane to Birch Street are intended to be implemented as part of redevelopment. The location of where the NB receiving lane drops (Birch St) should be reevaluated during design.</p>					

1.0 US 180 CORRIDOR MASTER PLAN OVERVIEW

1.1 US 180 Corridor Overview

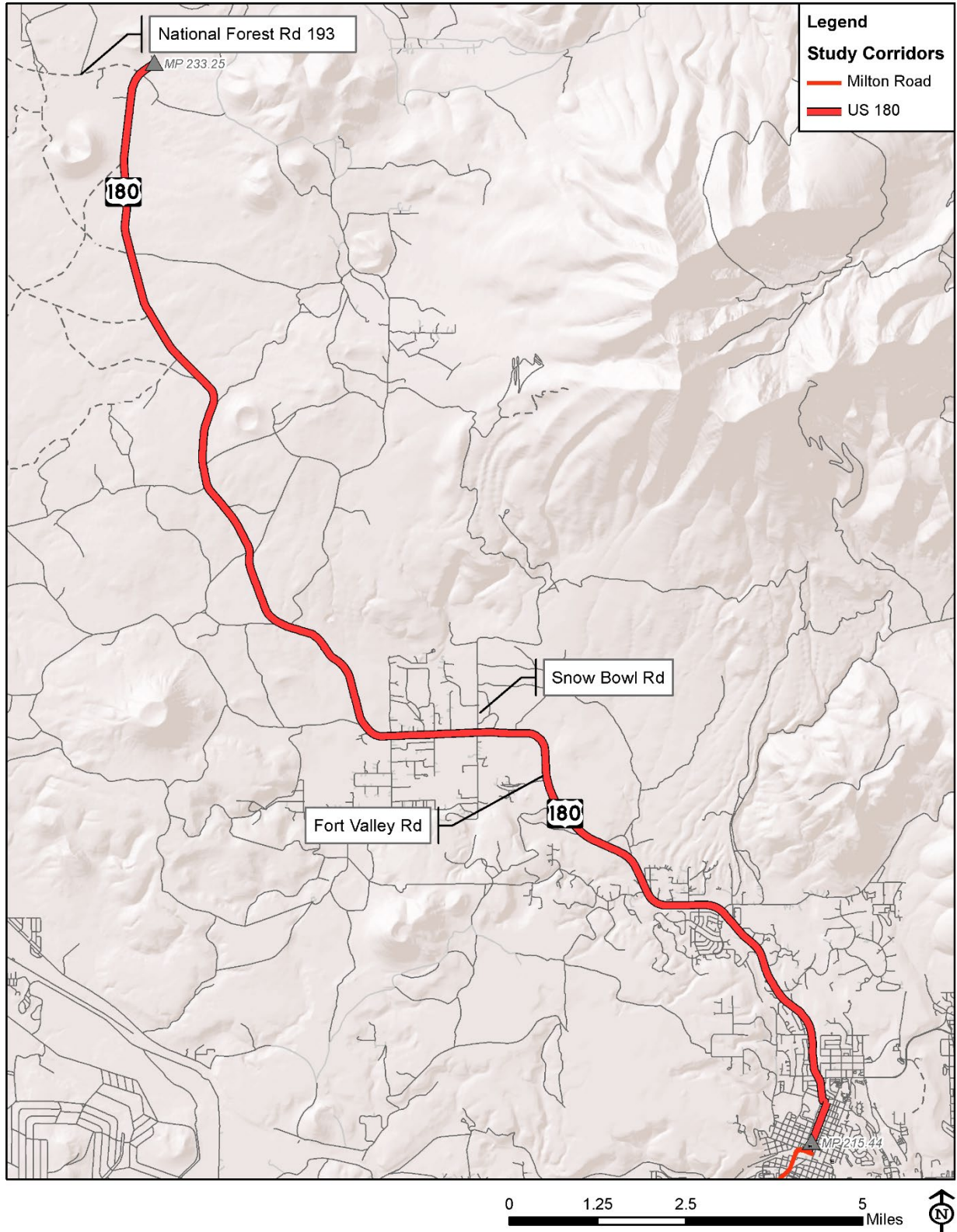
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Figure 1-1: US 180 CMP Study Corridor



1.2 US 180 CMP Purpose & Need

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1.3 US 180 CMP Vision Statement

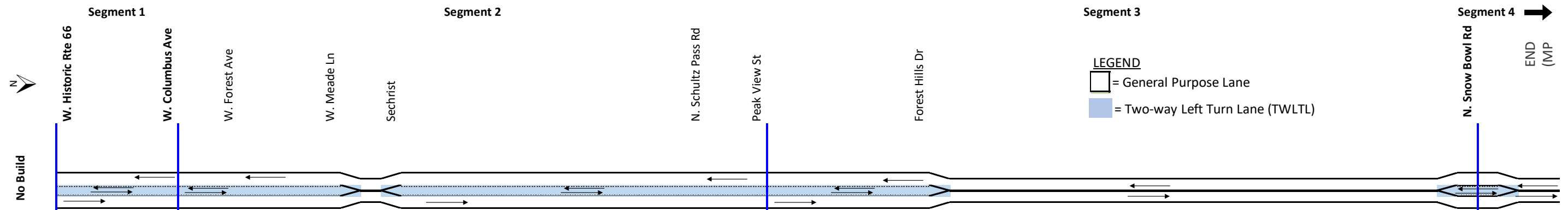
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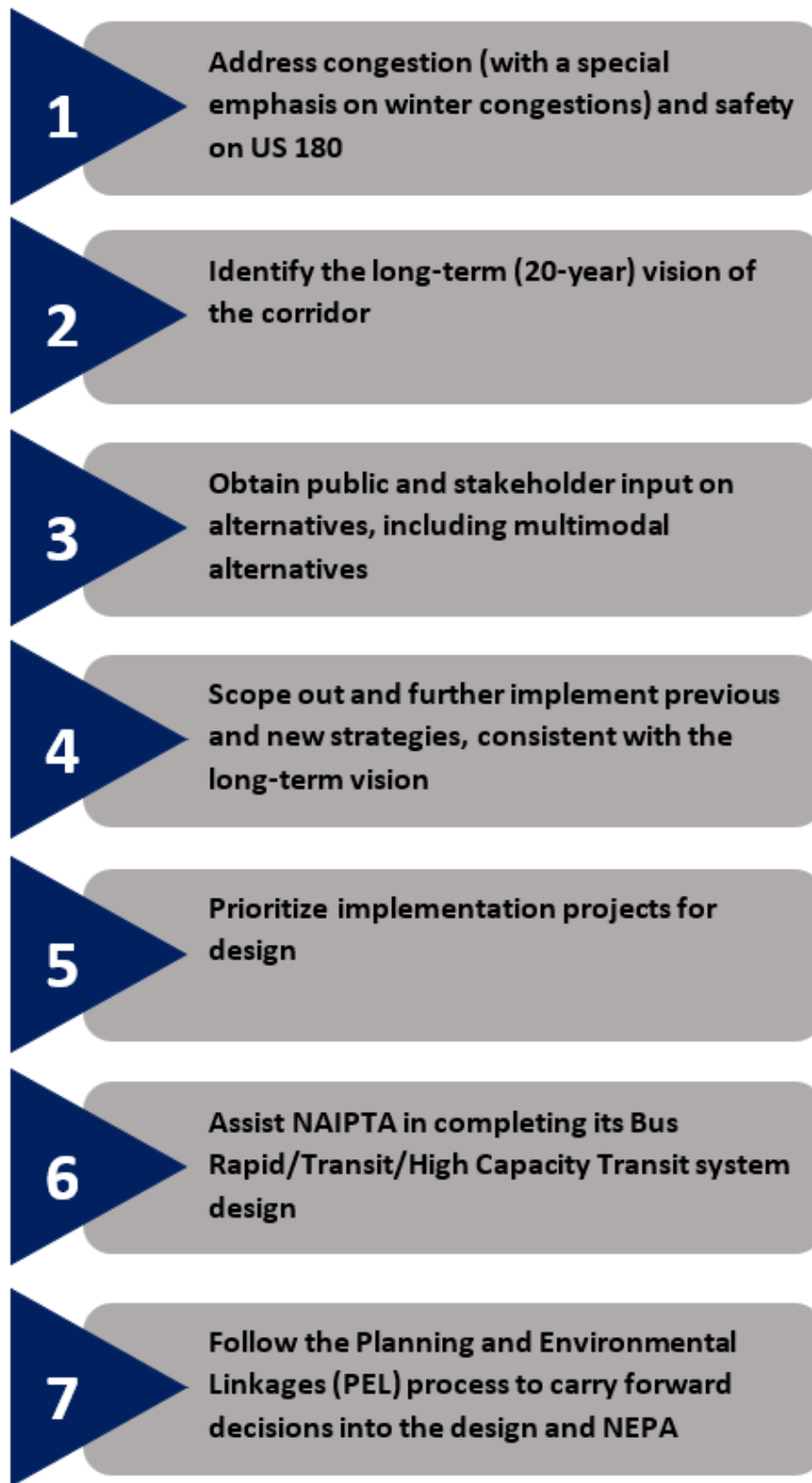
1.3a Project Partner Goals & Objectives

As part of the CMP Process, a team of Project Partners was assembled by representatives from the following agencies:



The Project Partners were established to guide the success of the US 180 CMP planning process and consultant’s efforts by maintaining a positive and supportive working relationship with all partnering agencies, communicating regularly, and staying committed to the project’s core values. The Project Partners met early in the planning process to agree upon and create a Charter (Please see Appendix A) to establish a set of fundamental principles and values for the Partners to abide by for the duration of the planning process. The Project Partners also established the following seven goals (**Figure 1-2**) for the US 180 CMP which are not prioritized in any particular order.

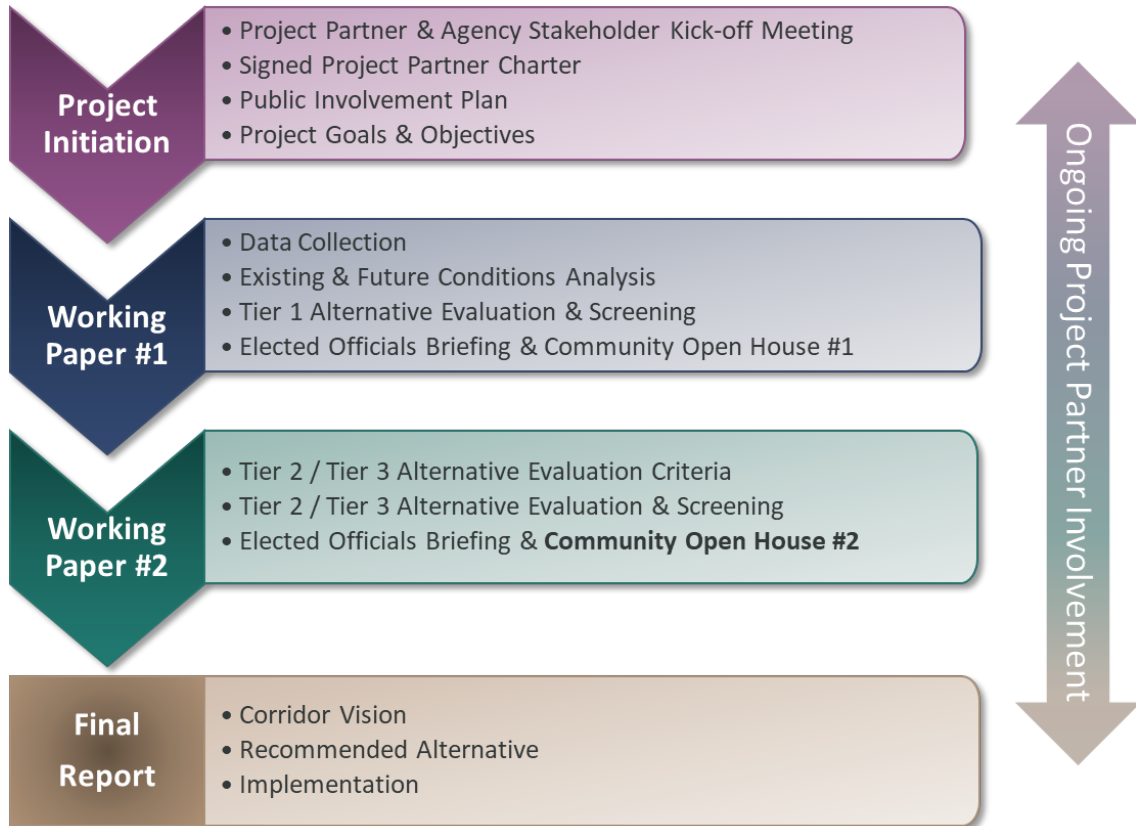
Figure 1-2: US 180 CMP Goals



1.4 Planning Process

The US 180 CMP consisted of a thorough and lengthy process that consisted of a three-tiered technical analysis that was supported by invaluable contributions from the Project Partners, stakeholders, and members of the public. **Figure 1-3** below depicts the general steps in the US 180 CMP planning process.

Figure 1-3: US 180 CMP Process Flow Chart



This process was supported by the dedication of the Project Partners who worked tirelessly and attended 25 meetings over the course of the four-year planning process to help guide the consultant, offer important input, desires, feedback on draft documents, development of the alternatives and evaluation criteria, refinement of alternatives, creation of controlling design criteria and spot improvement inventories, and ultimately review and select the Recommended Alternative.

1.4a Public Engagement Process Summary

As part of the CMP initiation, a Public Involvement Plan (PIP) for the US 180 CMP was developed in accordance with ADOT’s formal PIP and public involvement requirements. The US 180 CMP PIP demonstrated how ADOT will engage people of all races, cultures and income levels, including

minority and low-income populations in the US 180 CMP planning process. Refer to Appendix B to review the US 180 CMP Public Involvement Plan.

The two rounds of public outreach conducted for the US 180 CMP consisted of a combination of an in-person open house meeting, a virtual open house meeting, elected official briefings, and extensive comment card and project survey feedback from residents and business owners. A summary of each open house meeting is provided below. Refer to Appendix C for the first and second Public Meeting Summary Report for additional information.

Public Open House Meeting #1

The foundation of the Tier 1 Alternative Evaluation process was based on public and stakeholder feedback on the Preliminary System Alternatives presented in *Working Paper #1 – Existing & Future Conditions* (view on project [website](#)). The majority of the feedback was received at Public Open House Meeting #1 held at Flagstaff High School on May 17, 2018 in which 186 community members attended.

The primary objective of Public Open House Meeting #1 was to present the Preliminary System Alternatives for the US 180 CMP study corridor and seek public input to help the Project Partners determine which Preliminary System Alternatives should move forward into the Tier 2 Alternative Evaluation process.

Additional input and guidance on the Tier 1 Alternative evaluation process was received from a series of Project Partner meetings and from City of Flagstaff City Council and Coconino County Board of Supervisors briefings

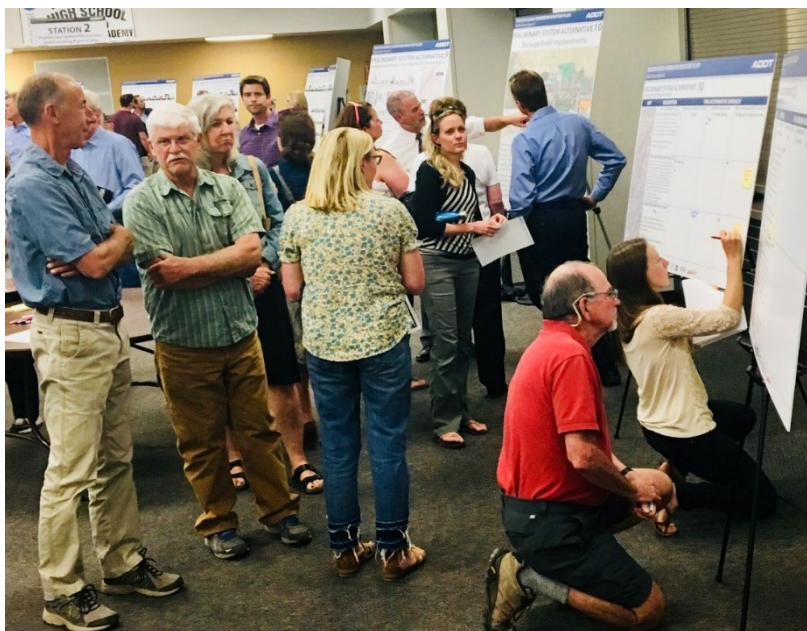


Photo of public participation at the Public Open House Meeting #1 Held at Flagstaff High School on May 17, 2018, in which 186 community members attended.

Public Open House Meeting #2

Public Open House Meeting #2 occurred on November 19, 2020, held virtually due to the COVID-19 Pandemic. The purpose of Public Open House Meeting #2 was to present the detailed three-Tier Alternative Analyses results and solicit public and stakeholder input on the Tier 3 Alternatives. Public feedback received from the open house meeting was an important contribution to complement the technical findings and assist the Project Partners in the selection of the Recommended Alternative. In fact, the public’s opinion was directly integrated into the selection of the Recommended Alternative, as reflected in the series of graphics.

Public Open House Meeting #2 began with a brief presentation to explain the three-tier alternative evaluation process, provide an overview of the Tier 3 Alternative Evaluation analysis, metrics and results, and notify the participants of the online community survey. The online community survey included a series of 24 targeted questions. A total of 107 survey responses were received. In addition to feedback received from the community survey, there was also a Live Question and Answer (Q&A) session to allow meeting participants the opportunity to ask questions about the alternatives, alternatives evaluation process, and the CMP process as a whole to project representatives in a live format. The Live Q&A session was one hour long with 74 participants and a total of 41 questions recorded and answered. Public input from the survey was the feedback that contributed to the outcome of the final alternative selected.



Screenshot of the Virtual Public Open House #2 held on November 19, 2021. The virtual room was accessed here:
<http://us180corridormasterplan.com/>

2.0 US 180 CORRIDOR PROFILE

US 180 is a multi-functional corridor serving residents as well as regional visitors as the gateway to the Grand Canyon and recreational sites in the Coconino National Forest.

Existing land uses along the US 180 corridor evolve from an urban/suburban character setting along the southern portions of the US 180 CMP corridor near the Flagstaff City Hall and transition to more rural residential and natural area open spaces (Coconino National Forest) along the central and northern segments of the US 180 CMP corridor.

Describing the corridor from south to north, along Humphreys Street in downtown Flagstaff, a diverse mixture of urbanized land uses including Flagstaff City Hall, Wheeler Park, Marriott Residence Inn, various shops and restaurants and convenience commercial uses catering to locals and tourists dominate the road frontage along Humphreys Street from Milton Road to Columbus Ave. Flagstaff High School, Bashas' grocery store and other retail services are located at/near the Columbus/Fort Valley Road (US 180) intersection. Some other noteworthy destinations along US 180 include the Pioneer Museum, Coconino Center for the Arts, Sechrist Elementary School, and Flagstaff Arts and Leadership Academy.

Moving north along the corridor, a series of low to medium density single family residential homes, 2-3 multi-family residential communities, intermittent commercial services, and the Museum of Northern Arizona are found along US 180 to Shultz Pass Road.

Moving north, the land use character becomes distinctively more rural in nature as it continues through Fort Valley Ranches and the Baderville area. Snow Bowl Road provides access to the Snow Bowl Ski Resort.

Continuing north, open spaces of the Coconino National Forest dominate the US 180 corridor landscape. The winter recreation areas of the Arizona Nordic Village and Crowley Pit are located here.

The Wing Mountain Snow Play Area had been a popular family destination attracting thousands of visitors every snow season. On peak winter usage, up to 1,000 visitors were not uncommon. The facility has 500 parking spaces. However, the operator canceled their special use permit to operate the facility and Wing Mountain is closed for the 2017-2018 winter recreation season and into the foreseeable future.

The Arizona Nordic Village has also been a popular winter (and summer) destination for cross country skiing, snowshoeing and other outdoor adventures. Also operated under a special use permit from the USFS, the destination remains popular and will likely expand its operations in the coming years.

Crowley Pit has historically been a smaller and less formal snow play area, but it too is closed for the 2017-2018 snow season. Challenged by the lack of structured parking, "No Parking" signs have been placed along the shoulders of US 180 (near Crowley Pit and beyond) to assist with safety in the area.

2.1a Land Ownership

As **Figure 2-1** clearly demonstrates, the United States Forest Service is the largest landowner (Coconino National Forest) along the 17-mile US 180 CMP corridor. The areas within the current Flagstaff municipal limits are almost entirely owned by private ownership interests. Private ownership interests are also centralized in the Fort Valley/Baderville area along both sides of US 180 between Snow Bowl Road (FS 516) and Bader Road.

2.1b Existing Zoning

Consistent with the existing open space and land ownership patterns, the vast majority of the lands in the US 180 CMP study area are zoned “Open Space and Conservation” by Coconino County in the northern and central stretches of the corridor. Please see **Figure 2-2** for additional detail.

The southern stretch of the US 180 corridor is more suburban/urban in nature as you arrive into the City of Flagstaff. Private properties located in the Fort Valley/Baderville area are zoned low density rural residential districts that include Rural Residential 2-acre minimum, 2.5-acre minimum and 4-acre minimum under the Coconino County Zoning Ordinance.



Aerial view from the Kachina Peaks of the City of Flagstaff along the US 180 Corridor near the southern terminus.

Figure 2-1: Land Ownership Map

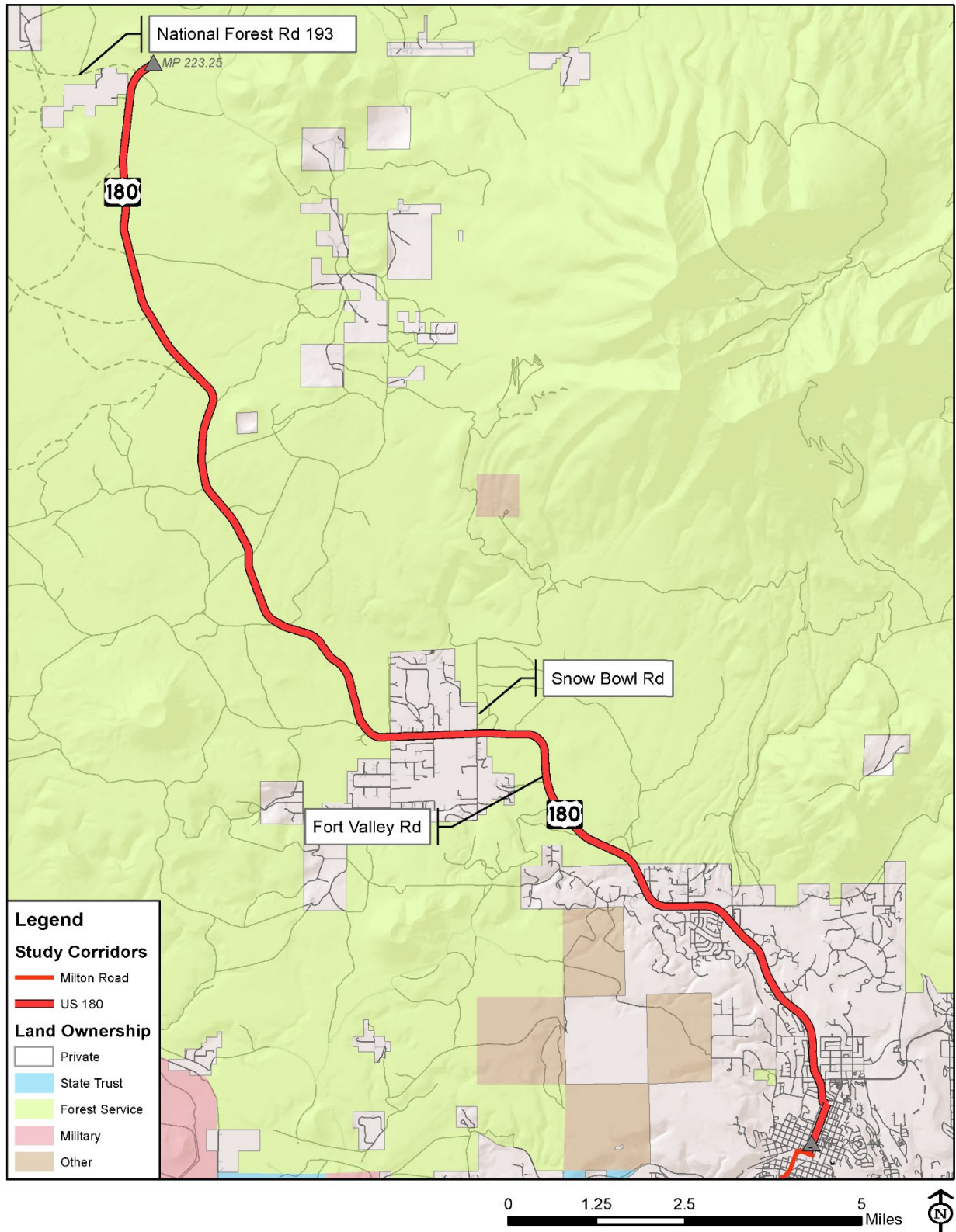
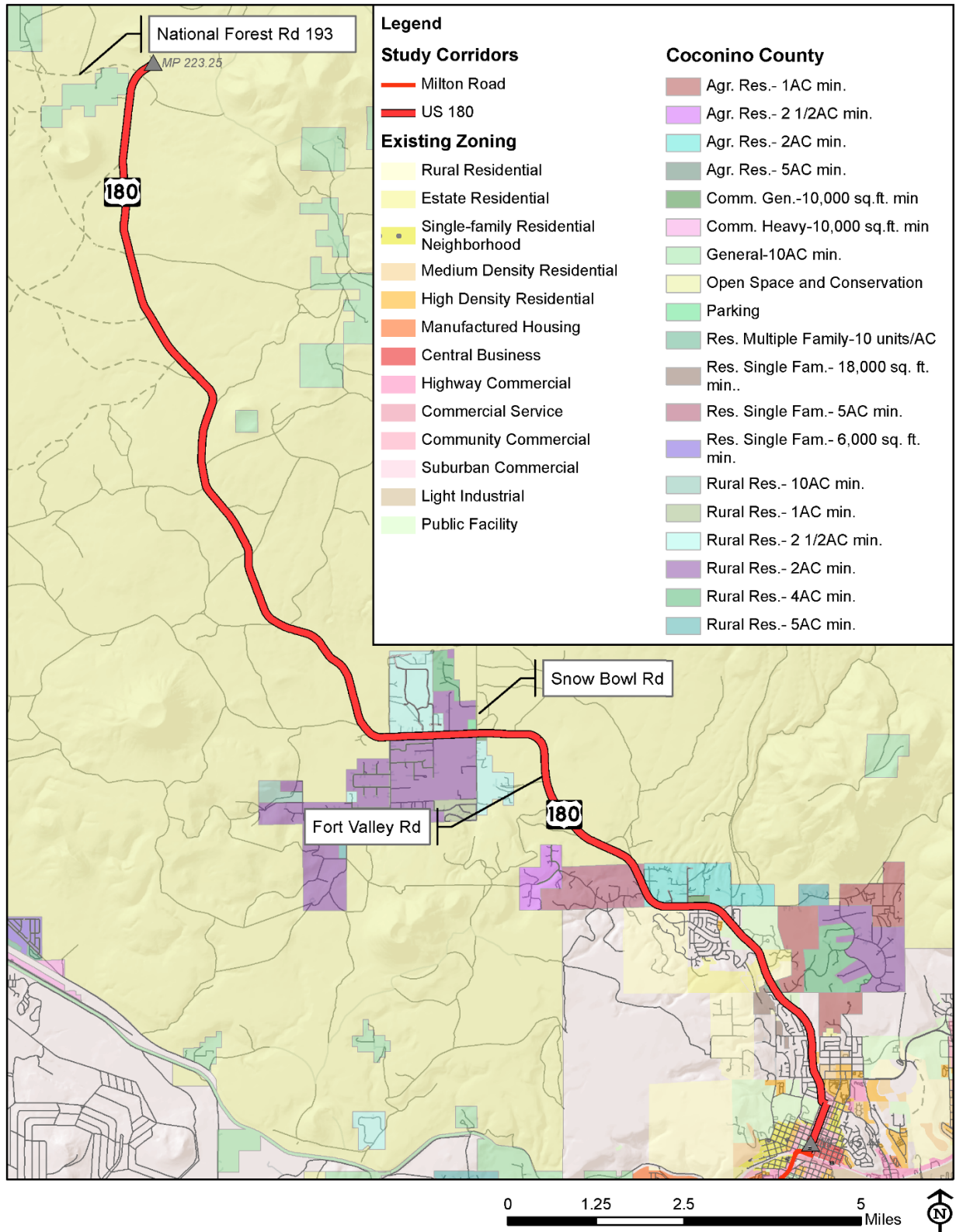


Figure 2-2: Existing Zoning Map



2.2 Existing Roadway Conditions & Characteristics

The functional classification of US 180 changes through the corridor study limits. **Figure 2-3** and Error! Reference source not found. depict the current FHWA approved functional classification for roadways within the study area. Roadways that are not functionally classified by FHWA are not eligible for federal funding. The functional classification of the roadways within the study corridor are as follows:

- FHWA/ADOT functional classification – Humphreys Street/US 180 is classified as a Minor Arterial from SR 40B to Peak View Street (approximately 0.3 miles west of Shultz Pass Road). West of Peak View Street, US 180 is classified as a Major Collector. FHWA identifies Minor Arterials in an urban setting as roadways that provide service for trips of moderate length distributing traffic with urban connections for rural collectors at a geographic range smaller than principal arterials. Major Collectors in a rural setting are defined by the FHWA as roadways that collect traffic from Local Roads generally providing intra-county travel to any county seat and other major destinations with Arterial routes. The intersecting streets on Humphreys Street / US 180 are classified as local roads and Major Collectors (Aspen Avenue, Birch Avenue, Cherry Avenue, Columbus Avenue, Forest Avenue, Navajo Drive, Meade Lane and Shultz Pass Road).
- City of Flagstaff functional classification – Humphreys Street / US 180 within the study corridor is classified as a Major Arterial. City of Flagstaff Municipal Code defines a Major Arterial as a roadway with high capacity for longer trips connecting major regional activity centers with interregional, intra-regional, and interstate travel. The intersecting streets on Humphreys Street / US 180 are classified as local roads, Minor Arterials (Columbus Avenue east of Humphreys Street / US 180 and Forest Avenue), and Minor Collectors (Aspen Avenue, Birch Avenue, Cherry Avenue, Elm Avenue west of Humphreys Street / US 180, Navajo Road, Beal Road, Meade Lane, Fremont Boulevard and Peak View Street).

The US 180 CMP study corridor is primarily a three-lane corridor with one through lane in each direction and a center two-way left-turn lane south of Shultz Pass Road. Refer to **Table 2-1** for sidewalk and bike lane inventory throughout this corridor. Between Shultz Pass Road and the Wing Mountain Snow Play Area, US 180 is a two-lane roadway with one lane in each direction with the exception of the vicinity of Snow Bowl Road. US 180 widens to a three-lane roadway in the vicinity of Snow Bowl Road with one lane in each direction and a two-way left-turn lane. Dedicated left-turn and right-turn lanes exist at intersections. Curb, gutter and sidewalk exists on both sides of Humphreys Street. Curb, gutter and sidewalk does not exist on most of the US 180 CMP study corridor. **Figure 2-5**, **Figure 2-6**, and **Figure 2-7**, and depicts the existing lane configurations along the corridor, and the left/right-turn lane lengths at the following intersections:

- Humphreys Street and Milton Road;
- US 180 and Columbus Avenue;
- US 180 and Forest Avenue; and
- US 180 and Shultz Pass Road.

The posted speed limit on Humphreys Street / US 180 is 25 miles per hour (mph). The posted speed limit on US 180 is 35 mph between Humphreys Street and Creekside Drive, 45 mph between Creekside Drive and Forest Hills Drive and 55 mph between Forest Hill Drive and the Wing Mountain Snow Play Area.

Figure 2-8 and **Figure 2-9** depict the traffic control for the study area intersections along the along the US 180 study corridor. In addition to the traffic signals, there are several stop-controlled intersections along the corridor. On Humphreys Street, the stop-controlled intersections are located at approximately 360-foot intervals along the roadway, while the roadway in more rural settings only exhibits stop signs on the side streets intersecting US-180.

Further summarized in **Table 2-1**, the characteristics previously described fluctuate across the US 180 CMP study corridor, including the exiting right-of-way. The existing right-of-way is not available for all portions of US 180, but for the sections where its available, it varies from 37' at its most narrow point, to 210' at its widest point. Generally, the US 180 right-of-way is narrower within the City of Flagstaff city limits and is typically wider outside of the City's limits as US 180 meanders through rural areas of Coconino County and the Coconino National Forest.

Table 2-1: Existing Roadway Characteristics Inventory

From	To	TWLTL	Adjacent to Lane	Right-of-way	Speed Limit
Harmony Lane	Snowbowl Road	No	Unpaved shoulder	70 - 110	55
Snowbowl Road	1300 feet east of Snowbowl Road	Yes	Paved shoulder	NA	55
1300 feet east of Snowbowl Road	Humphreys Peak Parking East Lot	No	Paved shoulder	NA	55
Humphreys Peak Parking East Lot	Fort Valley Ranch Road	No	Paved shoulder	NA	55
Fort Valley Ranch Road	Forest Hills Lane	No	Paved shoulder	37 - 110	55
Forest Hills Lane	Hidden Hollow Road	Yes	Paved shoulder	37 - 67	45
Hidden Hollow Road	Peak View Street	No	Unpaved shoulder	66	45
Peak View Street	Fremont Boulevard/ Schultz Pass Road	No	Unpaved shoulder	77 - 100	45
Fremont Boulevard/ Schultz Pass Road	Country Club Spur	Yes	Unpaved shoulder (SB), curb and sidewalk (NB)	82	45
Country Club Spur	Estates Street	No	Unpaved shoulder (SB), curb and sidewalk (NB)	103	45
Estates Street	Driveway south of Estates Street	Yes	Unpaved shoulder (SB), curb and sidewalk (NB)	135	45
Driveway south of Estates Street	Winding Brook Road	Yes	Paved shoulder (SB), curb and sidewalk (NB)	105 - 210	45
Winding Brook Road	Blue Willow Road	Yes	Curb (SB), curb and sidewalk (NB)	85	45
Blue Willow Road	Colton Court Parking Lot	No	Curb (SB), curb and sidewalk (NB)	80	45

From	To	TWLTL	Adjacent to Lane	Right-of-way	Speed Limit
Colton Court Parking Lot	North Creekside Lane	Yes	Curb (SB), curb and sidewalk (NB)	80	45
North Creekside Lane	West Creekside Place	No	Curb (SB), curb and sidewalk (NB)	98	45
West Creekside Place	Quintana Lane	Yes	Curb (SB), curb and sidewalk (NB)	70 -105	35
Quintana Lane	Sechrist Elementary School Lane	Yes*	Guardrail (SB), curb and sidewalk (NB)	65 - 90	35
Sechrist Elementary School Lane	Meade Lane	No*	Guardrail (SB) and paved shoulder (NB)	65	35
Meade Lane	Anderson Road	No	Guardrail (SB) and paved shoulder (NB)	90	35
Anderson Road	Forest Avenue	Yes	Curb and sidewalk (SB), paved shoulder (NB)	65	35
Forest Avenue	Navajo Road	Yes	Curb and sidewalk (SB), paved shoulder (NB)	75	35
Navajo Road	Humphreys Street	No	Curb and sidewalk	60 - 83	25
Humphreys Street	Birch Avenue	Yes	Curb and sidewalk	50	25
Birch Avenue	Aspen Avenue	No	Curb and sidewalk	50	25
Aspen Avenue	Santa Fe Avenue/Route 66	No	Curb and sidewalk	50	25

Source: MetroPlan, U.S. 180 Winter Traffic Study

Notes:

TWLTL = two-way left turn lane; SB = southbound; NB = northbound.

*Median Island at Sechrist Elementary School

Figure 2-3: Functional Classification Map

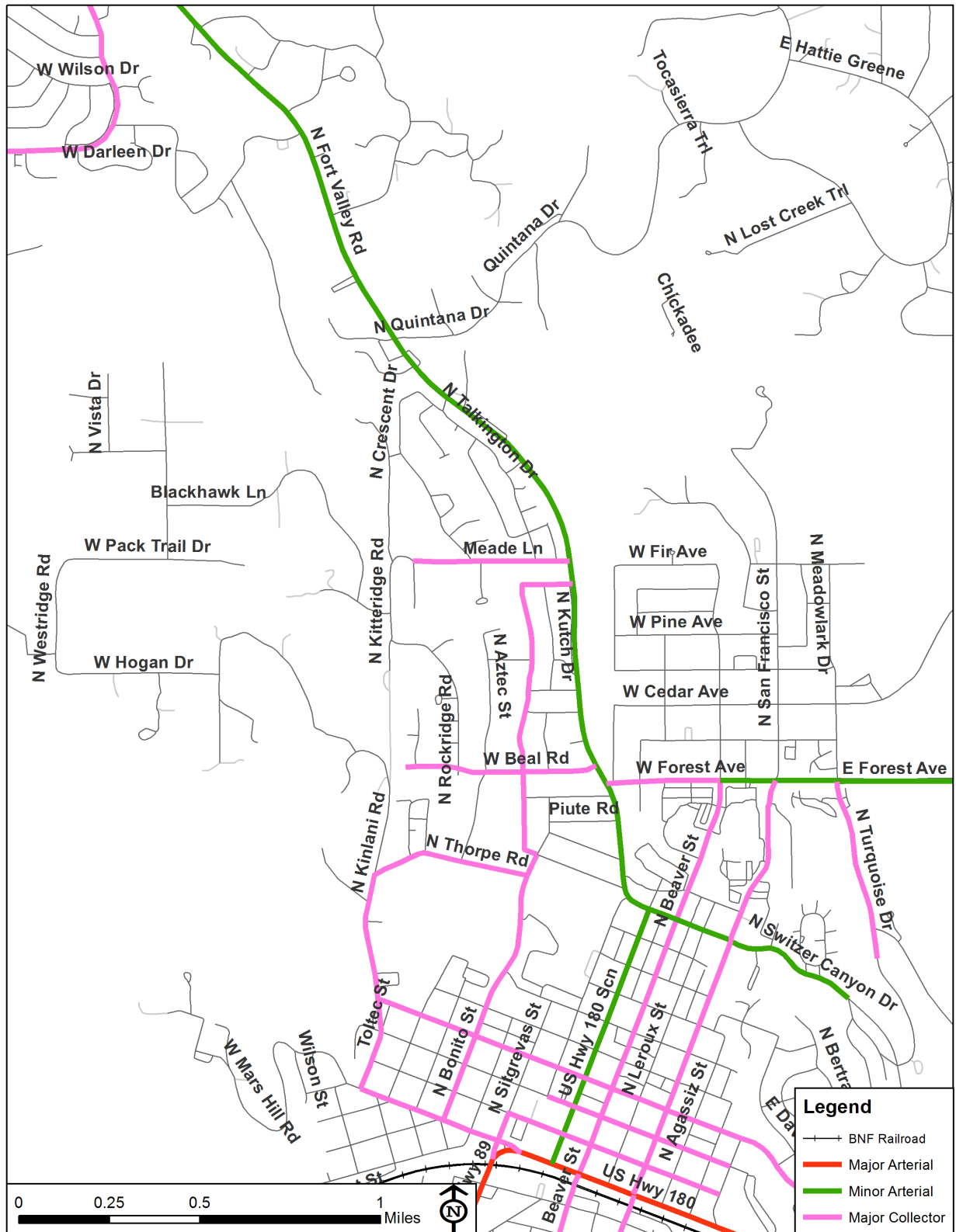


Figure 2-4: Functional Classification Map (continued)

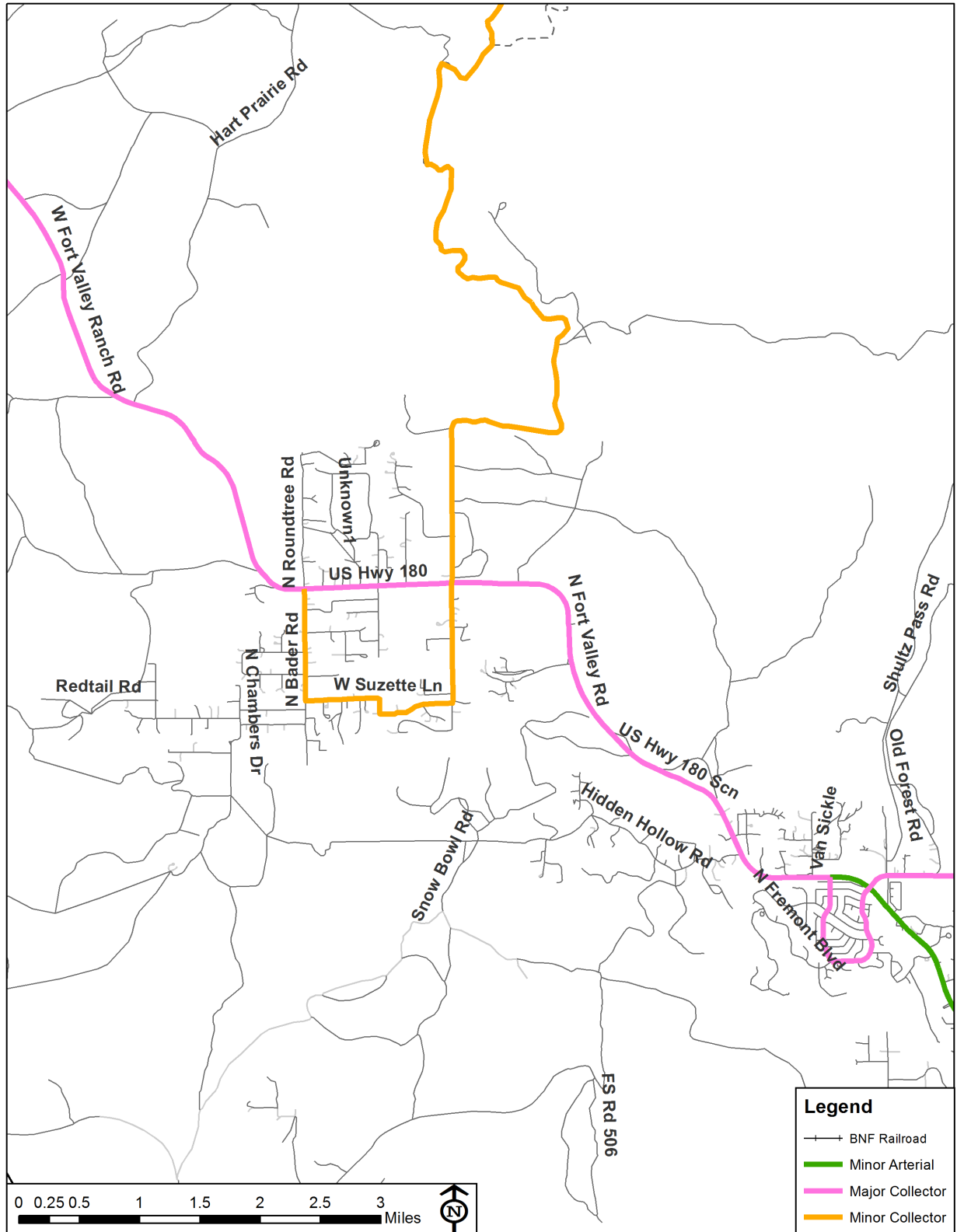


Figure 2-5: Lane Configuration Map

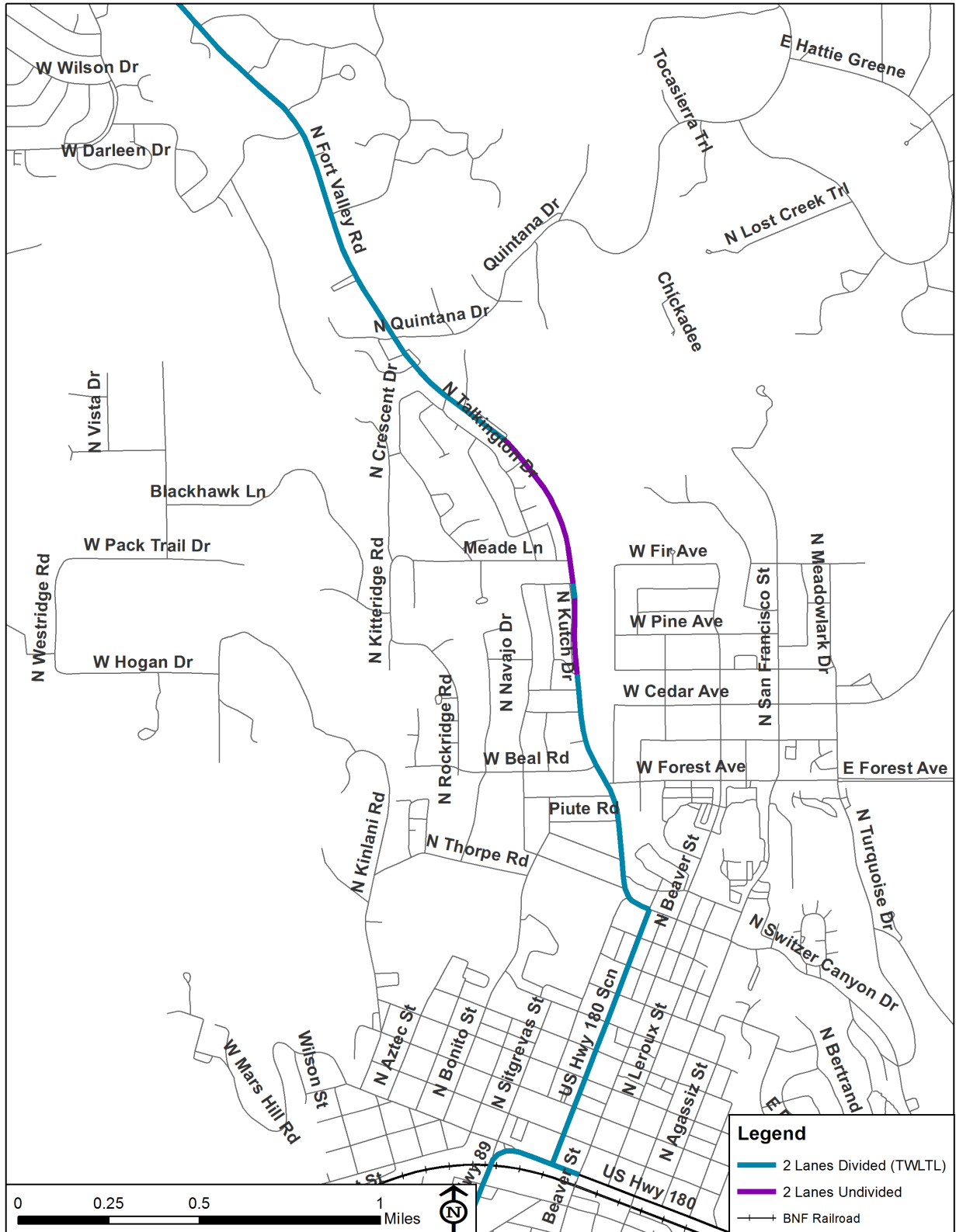


Figure 2-6: Lane Configuration Map (continued)

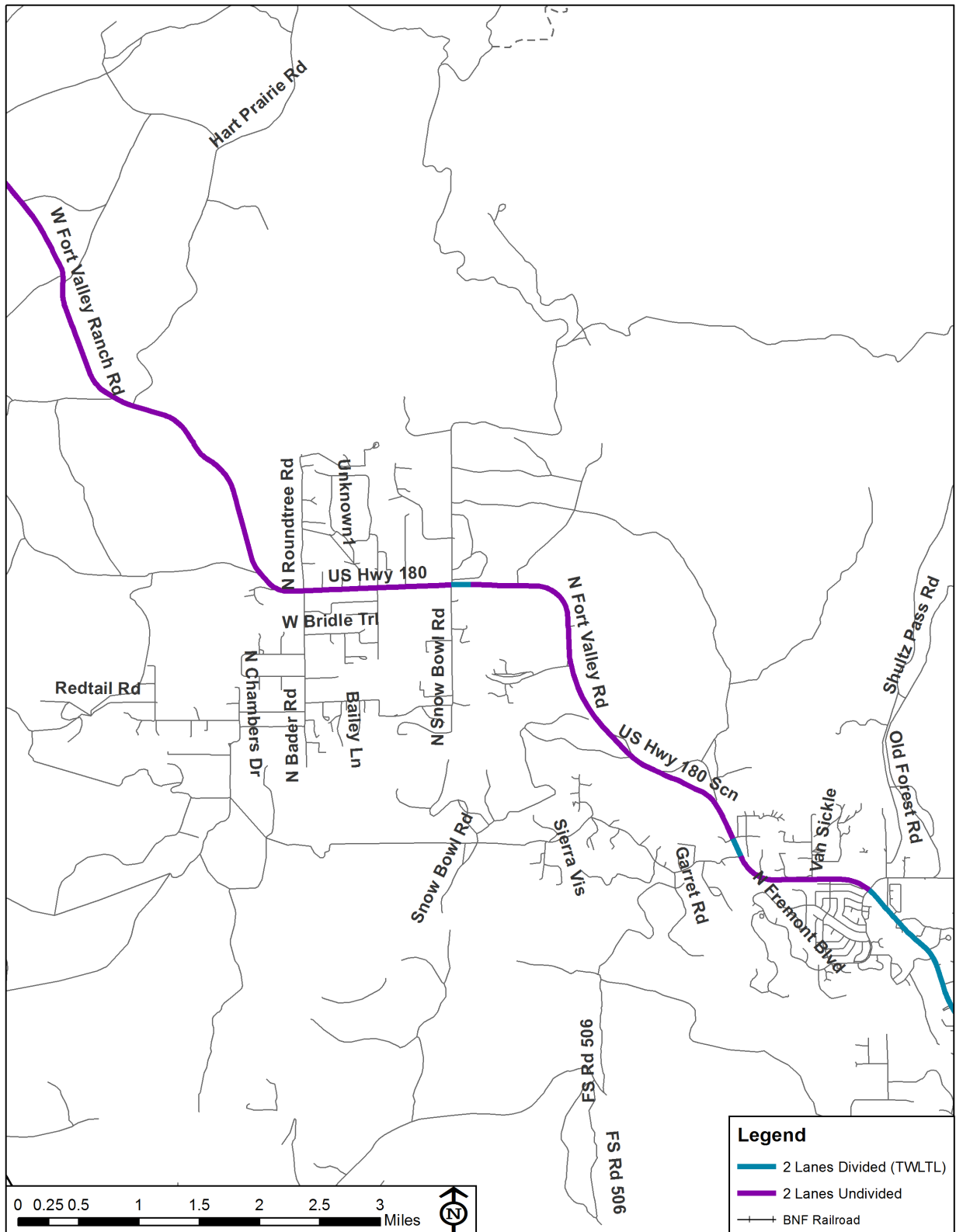


Figure 2-7: Intersection Lane Configuration Map

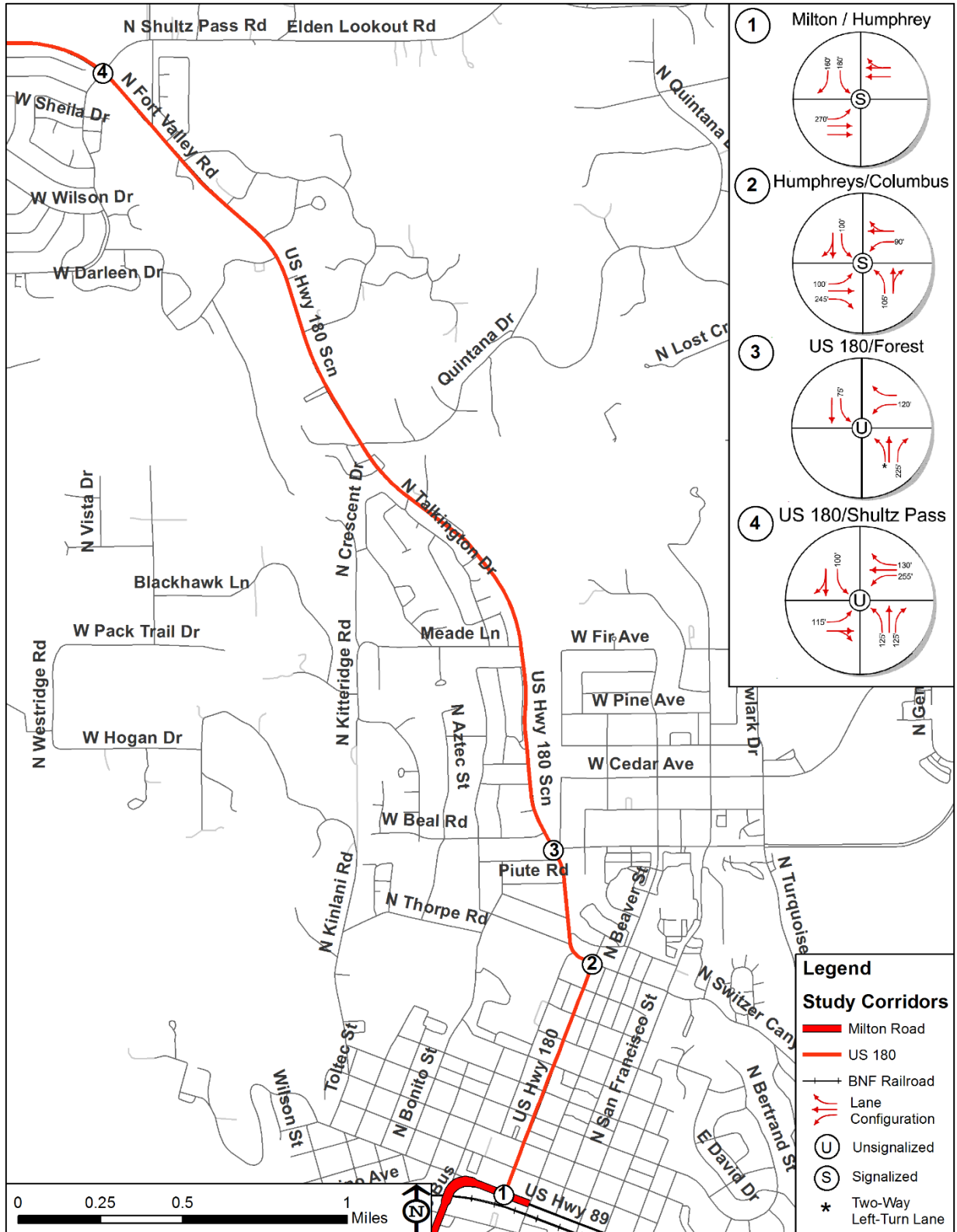


Figure 2-8: Intersection Traffic Control Map

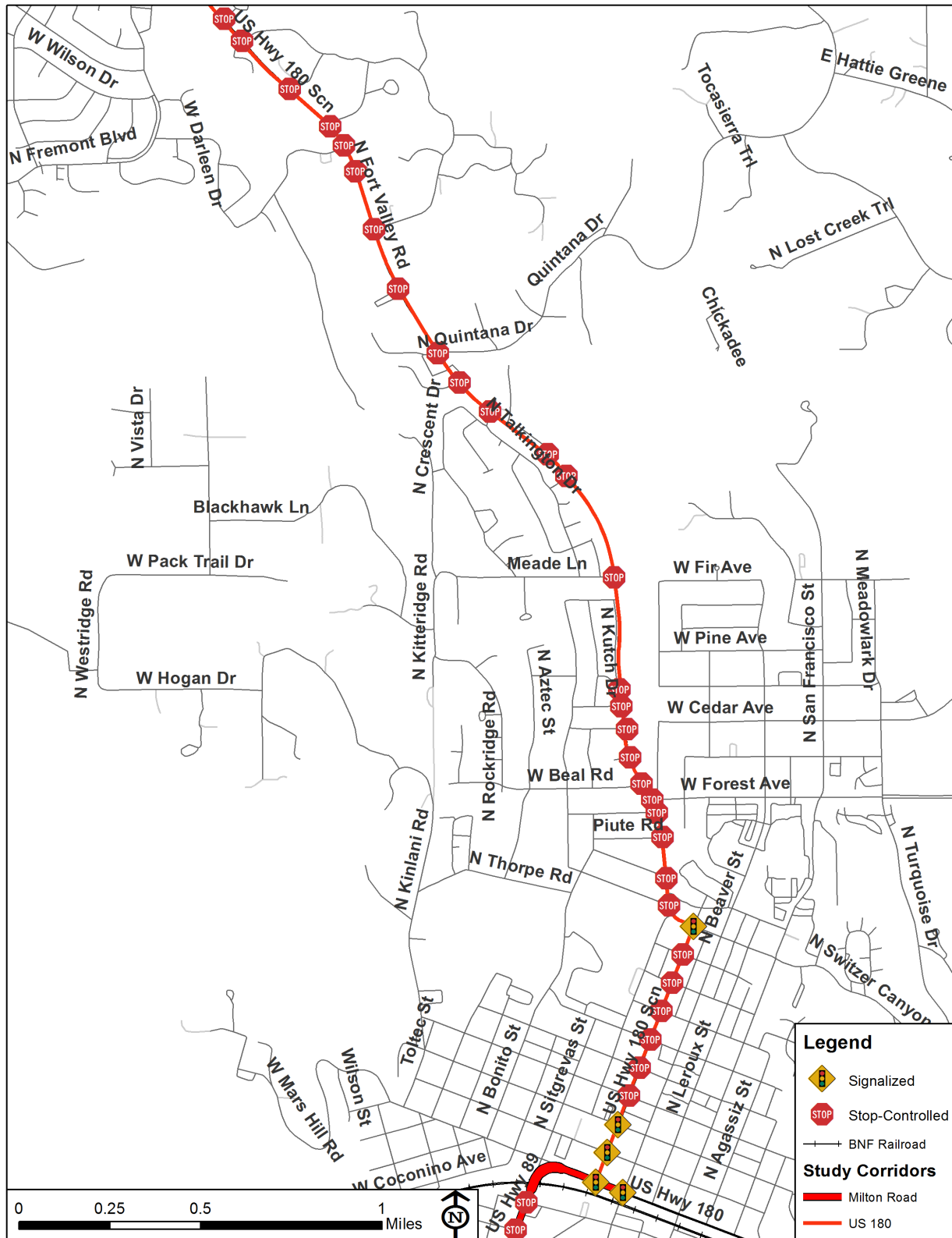
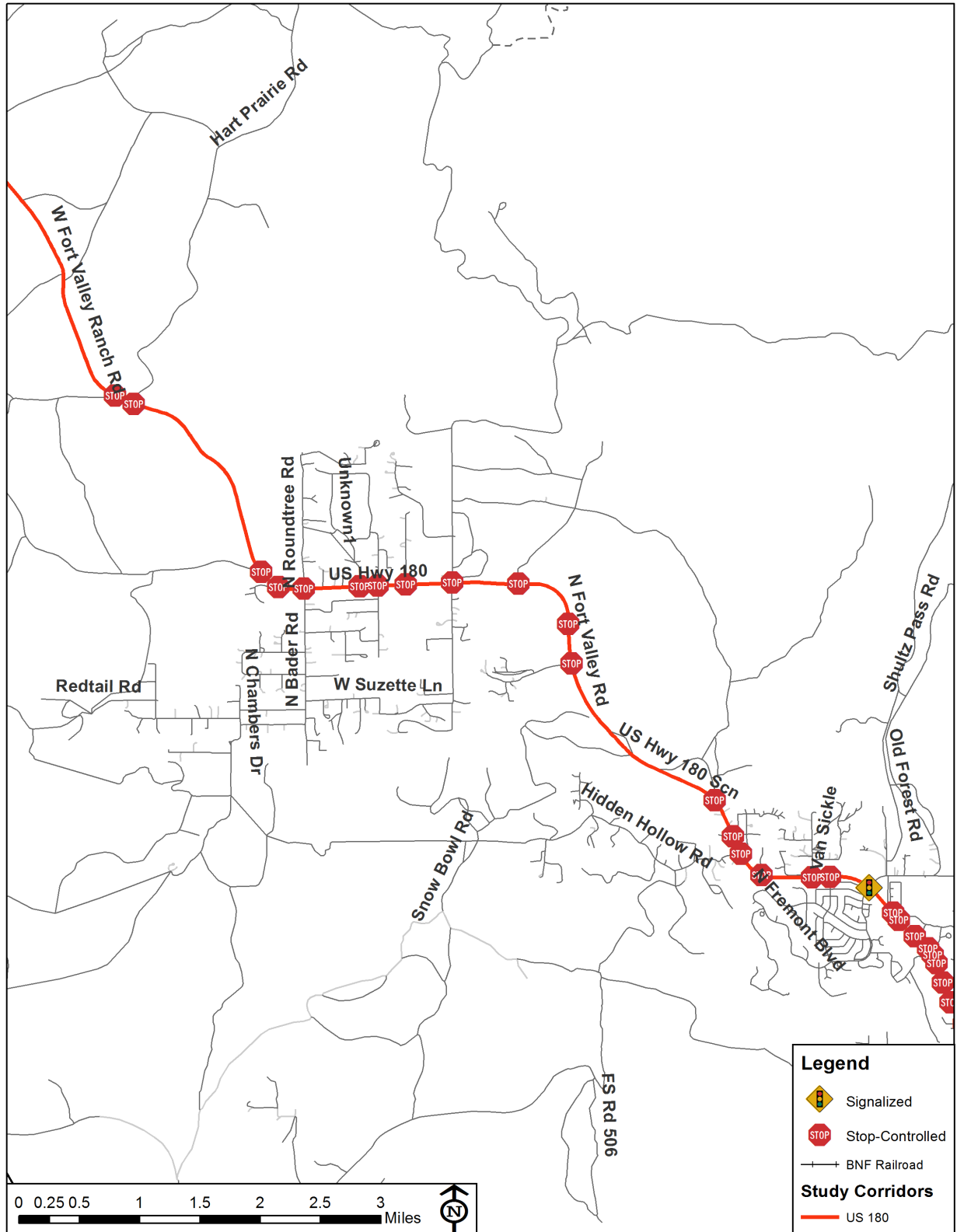


Figure 2-9: Intersection Traffic Control Map (continued)



2.2a Existing Traffic Volumes & Level-of-Service (LOS)

Peak hour turning movement counts were collected in fifteen-minute intervals from 11:00 AM to 1:00 PM and from 4:00 PM to 6:00 PM at various signalized and unsignalized intersections along the study corridor. It is important to note that the study corridor does not have a traditional AM peak hour, but rather a significant Mid-Day peak hour. Therefore, Mid-Day and PM peak hour traffic volumes were collected at intersections along the corridor.

Traffic congestion levels were estimated for the US 180 study corridor using the existing 24-hour daily traffic volumes. The degree of congestion is expressed in terms of level-of-service (LOS) and only applies to vehicles. Please note that multimodal improvements can have a negative impact on vehicle LOS. LOS is a rating system from “A”, representing the best operation, to “F”, representing the worst operation. In general, LOS A and B represent no congestion, LOS C and D represent moderate congestion, and LOS E and F represent severe congestion, as presented in **Table 2-4**.

The delay and LOS are calculated for the intersection and each approach. **Table 2-2** lists the LOS criteria for signalized and unsignalized intersections as stated in the HCM manual.

Table 2-2: Level-of-Service Criteria at Signalized and Unsignalized Intersections

Level-of-Service	Average Control Delay	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

LOS for the study intersections were analyzed using *Synchro 9* software, which utilizes the criteria in **Table 2-2**. The input and output of these analyses are provided as Appendix E to this report. **Table 2-3** presents the 2017 LOS summary for the study intersections along the US 180 corridor. The existing volumes and turning movement counts are also graphically shown in **Figure 2-10** for the following signalized intersections:

- Humphreys Street and Milton Road;
- US 180 and Columbus Avenue;
- US 180 and Forest Avenue; and
- US 180 and Shultz Pass Road.

The signalized and unsignalized study area intersections operate at LOS “D” or better with the existing traffic volumes, existing lane geometrics and existing signal timing. All the approaches operate at LOS “D” or better with the exception of the southbound approach at the intersection of Milton Road and Humphreys Street, which operates at LOS “E” during the PM peak hour. ADOT’s target LOS goal is LOS D for the Flagstaff Region.

Table 2-3: Intersection Existing Level-of-Service

Intersection	Approach	2017 MD Peak		2017 PM Peak	
		LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)
Milton Rd and Humphreys St	Northbound	-	-	-	-
	Southbound	D	49.3	D	51.3
	Eastbound	A	6.8	C	20.3
	Westbound	B	13.6	C	21.8
	Overall	B	19.6	C	28.5
Humphreys St and Columbus Ave	Northbound	B	15.8	B	19.2
	Southbound	C	25.0	C	32.5
	Eastbound	C	32.4	D	41.2
	Westbound	C	29.6	D	45.8
	Overall	C	25.8	D	35.0
US 180 and Forest Ave	Northbound	A	0.0	A	0.0
	Southbound	A	2.3	A	3.2
	Eastbound	-	-	-	-
	Westbound	B	13.2	D	29.7
	Overall	A*	3.6	A*	7.6
US 180 and Shultz Pass Rd	Northbound	B	19.9	C	20.3
	Southbound	C	20.1	C	20.2
	Eastbound	A	6.5	A	6.6
	Westbound	A	6.1	A	7.2
	Overall	A	8.5	A	9.3

*Synchro output did not include HCM LOS. LOS reported is based on the Average Delay

Figure 2-10: Existing Peak Hour Traffic Volumes – (MD) PM Peak Hours

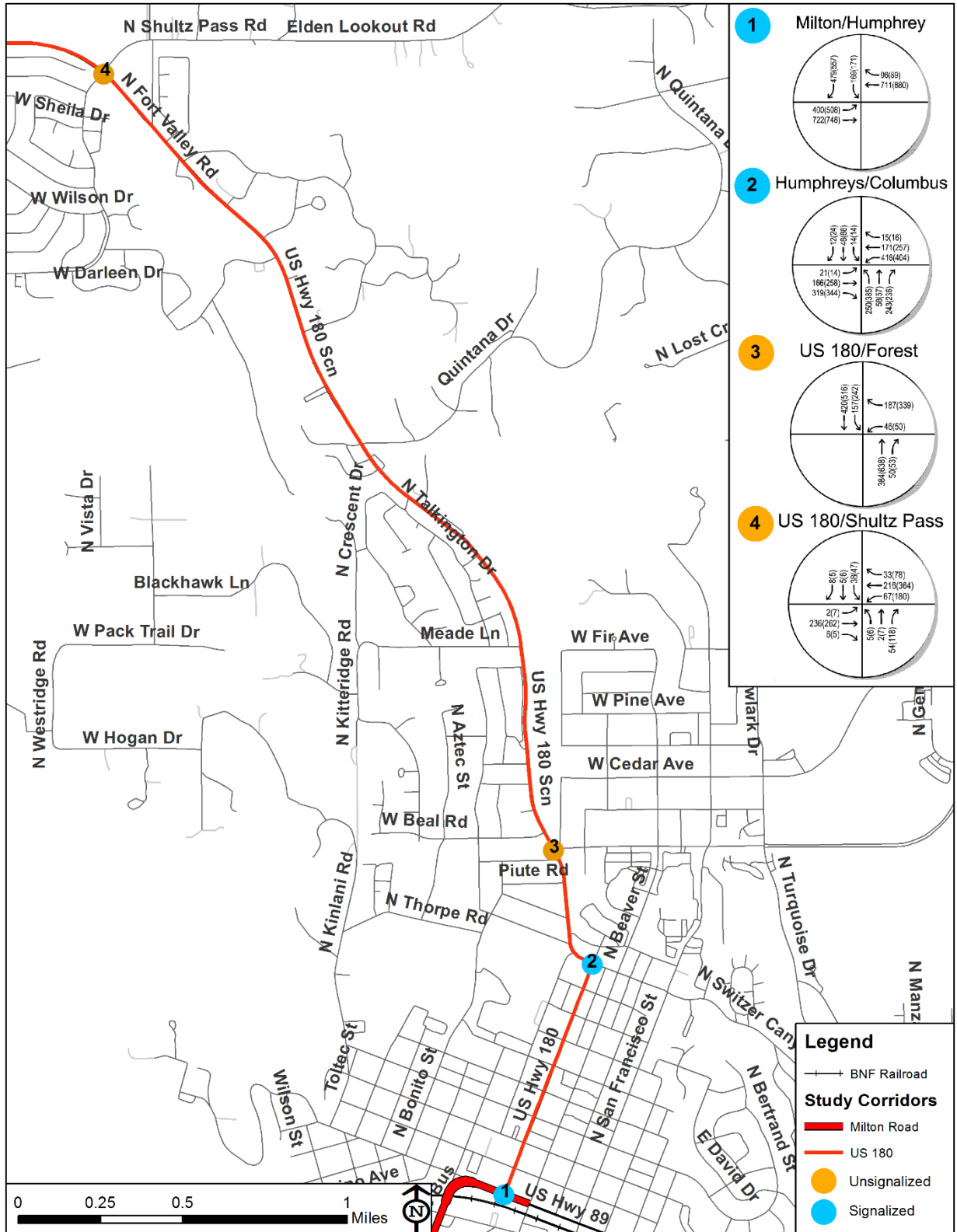


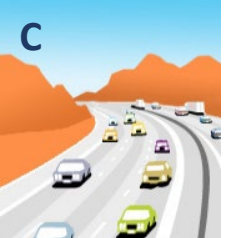

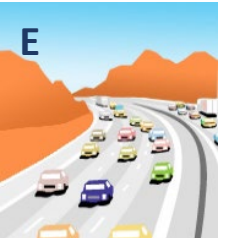
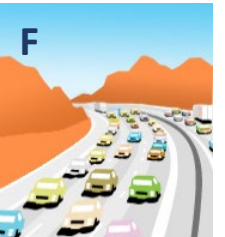


Table 2-4: Level of Service Criteria for Urban Street Facilities

Level-of-Service	Characterized by Highway Capacity Manual as:
	<p>Primarily free-flow speed. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at the boundary intersections is minimal. The travel speed exceeds 85 percent of the base free-flow speed.</p>
	<p>Reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67 percent and 85 percent of the base free-flow speed.</p>
	<p>Stable operation. The ability to maneuver and change lanes at mid-segment locations may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50 percent and 67 percent of the base-flow speed.</p>
	<p>Less stable condition in which small increases in flow may cause substantial increases in delay and decrease in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40 percent and 50 percent of the base free-flow speed.</p>
	<p>Unstable operation and significant delay. Such operation may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30 percent and 40 percent of the base free-flow speed.</p>
	<p>Flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base free-flow speed. Also, LOSF is assigned to the subject direction of travel if the through movement at one or more boundary intersections has a volume-to-capacity ratio greater than 1.0.</p>

Bicycle & Pedestrian Counts

Table 2-5 and **Table 2-6** summarizes the pedestrian and bicyclist activity at study area intersections within the US 180 study corridor during the Mid-Day and PM peak hours.

The highest number of pedestrians crossing US 180 occurred at Columbus Avenue. Pedestrian volume is generally observed to be higher during the PM peak hour at the study area intersections. There is both active and latent demand for more crossings. These intersections were chosen for bike and pedestrian counts because these are the major intersections within the city limits. Please see the list below for an inventory of intersections with a traffic signal and or crosswalk:

- Humphreys Street is signalized with one crosswalk on the north leg of the intersection
- Columbus Avenue is signalized with crosswalks on all four legs of the intersection
- Forest Avenue is stop-controlled with crosswalks on the south and east legs of the intersection.
- Schultz Pass Road is signalized with crosswalks on all four legs of the intersection.

The highest number of bicyclists crossing US 180 occurred at Shultz Pass Road. Bicycle volume is observed to be higher during the PM peak hour at the study area intersections.

Table 2-5: Existing Pedestrian Crossing Volume

Intersection	North Leg		South Leg		East Leg		West Leg	
	Mid-Day	PM	Mid-Day	PM	Mid-Day	PM	Mid-Day	PM
Humphreys St	6	20	0	0	0	0	0	0
Columbus Ave	0	1	0	4	0	7	24	13
Forest Ave	0	0	1	6	1	7	0	0
Shultz Pass Rd	1	0	0	0	0	0	0	1

Table 2-6: Existing Bicycle Crossing Volume

Intersection	North Leg		South Leg		East Leg		West Leg	
	Mid-Day	PM	Mid-Day	PM	Mid-Day	PM	Mid-Day	PM
Humphreys St	2	6	0	0	1	1	0	1
Columbus Ave	0	3	1	6	0	3	3	3
Forest Ave	0	0	0	5	1	7	0	1
Shultz Pass Rd	0	17	1	2	0	8	1	3

2.2b Existing Non-Motorized Mobility

Existing Bike Facilities

Bicycle lanes do not exist on Humphreys Street between Milton Road and Columbus Avenue. Bicycle accommodations consisting of wide shoulders exist on both sides of US 180 between Columbus Avenue and Snow Bowl Road. There are no existing bike lane roadway marking or signs posted in association with the existing bike facilities with the exception of the “Begin Right Turn Lane Yield to Bikes” signs at right-turn lanes between Sechrist Elementary School and Valley Crest Street. The Flagstaff Urban Trail System (FUTS) trail does exist along the south side of US 180 from

Navajo Drive to Stevanna Way where it crosses the US 180 roadway and continues north to Schultz Pass Road.

Existing Pedestrian Facilities

Continuous sidewalks exist on both sides of Humphreys Street between Milton Road and Columbus Avenue. Between Humphreys Street and Shultz Pass Road, sidewalk exists on both sides of US 180 along the developed frontage, with the exception of a sidewalk gap south of Sechrist Elementary school on the north side of US 180. Some of the sidewalks in this section are part of the Flagstaff Urban Trail System (FUTS), which includes a trail along US 180 from Navajo Road to Schultz Pass Road for approximately 2.8 miles, or about 16% of the study corridor. Sidewalk does not exist on either side of US 180 between Shultz Pass Road and the northern terminus of the corridor (MP 233.25).

Existing Transit Services

Mountain Line is the transit agency in Northern Arizona operating Mountain Line, Mountain Express, Mountain Lift and Mountain Link systems in Flagstaff.

Mountain Line and Mountain Lift services are available along the US 180 study corridor. Bus service is not available on Humphreys Street between Aspen Avenue and Columbus Avenue and on US 180 between Navajo Drive and Forest Avenue. Mountain Line Route 5 runs on Humphreys Street between Milton Road and Aspen Avenue, on US 180 between Humphreys Street and Navajo Drive and between Forest Avenue and Peak View Road. Bus stops for Route 5 of Mountain Line are located at the following locations along the US 180 study corridor:

- North of Forest Avenue – northbound direction,
- South of Whipple Road – southbound direction,
- North of Meade Lane – northbound direction
- South of Meade Lane – southbound direction,
- South of Louise Drive – northbound direction,
- North of Stevanna Way – southbound direction,
- North of Blue Willow Road – northbound direction,
- South of Valley Crest Street – northbound direction, and
- South of Research Center Drive – southbound direction.

The bus stop located south of Valley Crest Street have covered structure to accommodate sitting pedestrians and provide shading structures.

Mountain Express is a seasonal service between downtown Flagstaff and Arizona Snowbowl, free for passengers. It operates on Humphreys and US 180, picking up passengers at the Flagstaff High School park-and-ride stop, south of Louise Drive – northbound direction, and north of Stevanna Way – southbound direction. This service is funded through a partnership with Arizona Snowbowl, who recognizes the importance of transit to mitigate Snowbowl traffic and its congestion impacts on residents along US 180.

Mountain Lift is a shared-ride program, which is an origin to destination, demand-responsive paratransit service that mirrors Mountain Line fixed-route service in terms of service times and

areas. Mountain Lift service is available to people with disabilities who do not have the functional ability to ride fixed-route buses, either permanently or under certain conditions. US 180 between Hidden Hollow Road and Forest Avenue falls within the Mountain Lift service area.

2.2c Existing Access Management & Current Guidelines

Access management is defined as the process or development of a program intended to ensure that major arterials, intersections and freeway systems serving a community or region will operate safely and efficiently. Effective access management programs control the location, spacing, design, and operation of driveways, median openings and intersections to reduce the number of vehicular conflict points. Driveway and access management guidelines for ADOT and City of Flagstaff are summarized below:

ADOT

A summary of the ADOT Traffic Engineering Guidelines and Procedures (TGP) Section 1060 – Median Openings for urban areas is summarized below:

1. All median openings shall be designed to include median storage lanes for both directions of travel.
2. Spacing between median openings at intersections shall not be less than 330 feet.
3. In urban areas, median openings between intersections may be established for public safety and convenience if the opening is not closer than 660 feet to an intersection with an improved public street or another median opening.
4. Median openings may be established for business generating relatively high traffic volumes, provided that:
 - a. The minimum left-turn traffic volume is 500 vehicles per day or 100 vehicles during the peak hour in urban areas where the major street speed limit is less than 40 miles per hour.
 - b. The minimum left-turn traffic volume is 350 vehicles per day or 70 vehicles during the peak hour in urban areas where the major street posted speed limit is 40 mph or greater.
 - c. The distance to the nearest adjacent median opening is not less than 330 feet.

City of Flagstaff

A summary of the City of Flagstaff access management guidelines, included in Engineering Design Standards and Specifications for New Infrastructure Section 13-10-006-0001 are as follows:

1. Distances between centerlines of adjacent intersections shall be a minimum of 135 feet, regardless of the direction of the intersection streets.
2. The minimum spacing of driveways to signalized and unsignalized intersections shall be in accordance with **Table 2-7**.

Table 2-7: Minimum Spacing of Driveways to Intersections per City of Flagstaff

Posted Speed (mph)	Spacing	
	Signalized	Unsignalized
≤ 30	230	-
30	-	115
35	275	135
40	320	155
45	365	180

Current Access

Each access point along the study corridor was identified through field review and a review of aerial mapping. All driveways and intersections along the US 180 study corridor are full access. Full access driveways and intersections generally allow all traffic movements on all approaches. These intersections are either STOP controlled on both the side streets or traffic signal controlled.

Figure 2-11 and **Figure 2-12** illustrate the locations of existing access points and intersections along the study corridor. The US 180 corridor has a large number of access points along the corridor, particularly concentrated along the Humphreys Street segment. This creates multiple potential conflict points for bicyclists, pedestrians, and vehicles, increasing the risk of collisions and congestion along the corridor. There is a total of 138 driveways along the US 180 CMP corridor, with nearly 50% of them located on Humphreys Street between Route 66 and Columbus Street. The number of each type of access are listed below:

- Seven alleys;
- 114 full access (without stop sign); and
- Five full access (with stop sign).

Humphreys Street has a two-way left-turn lane between Milton Road and Columbus Avenue. US 180 has a two-way left-turn lane between Humphreys Street and Shultz Pass Road. Due to the absence of the raised median along the corridor, access control at existing driveways and intersections is limited.

Figure 2-11: Existing Access Points Map

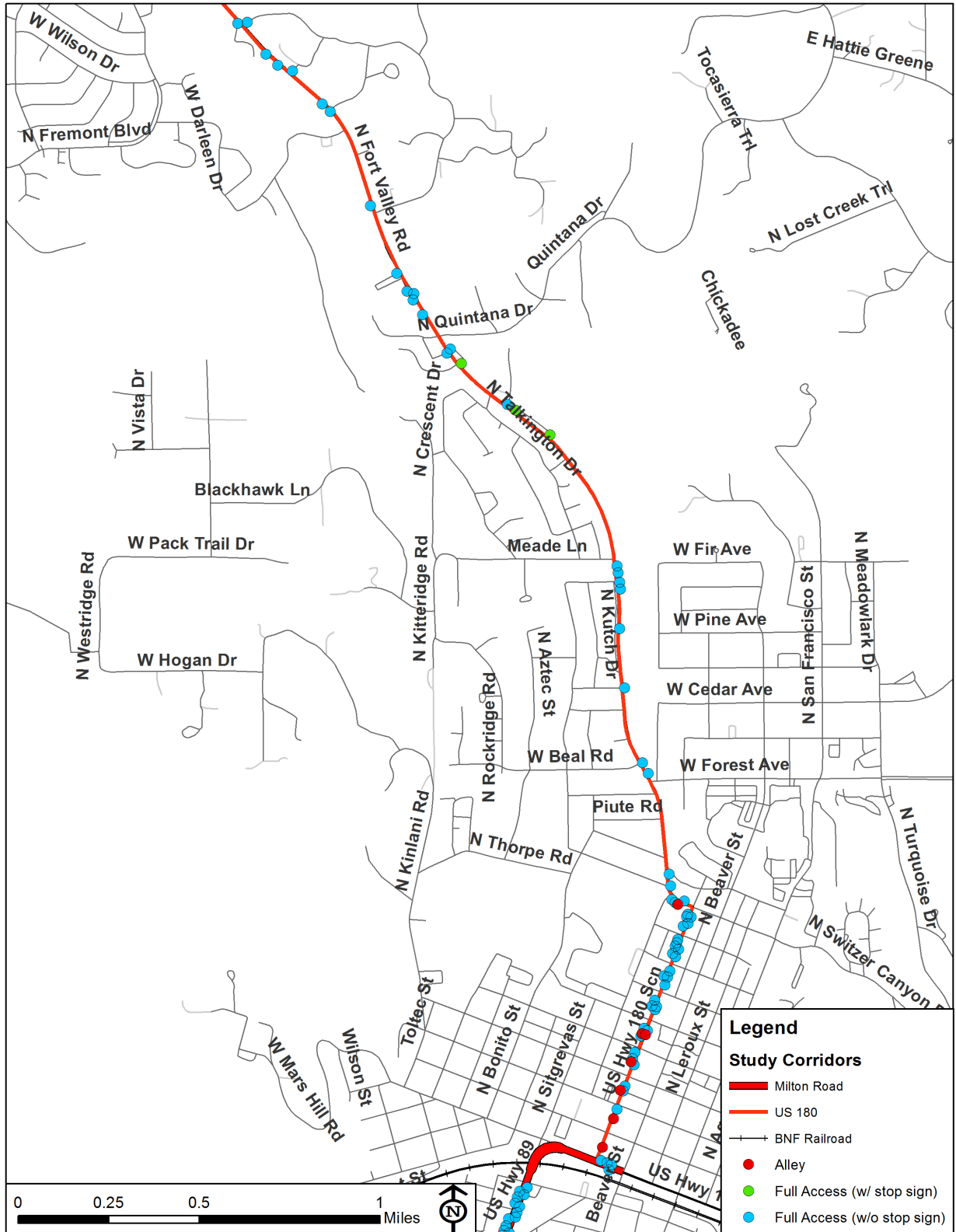
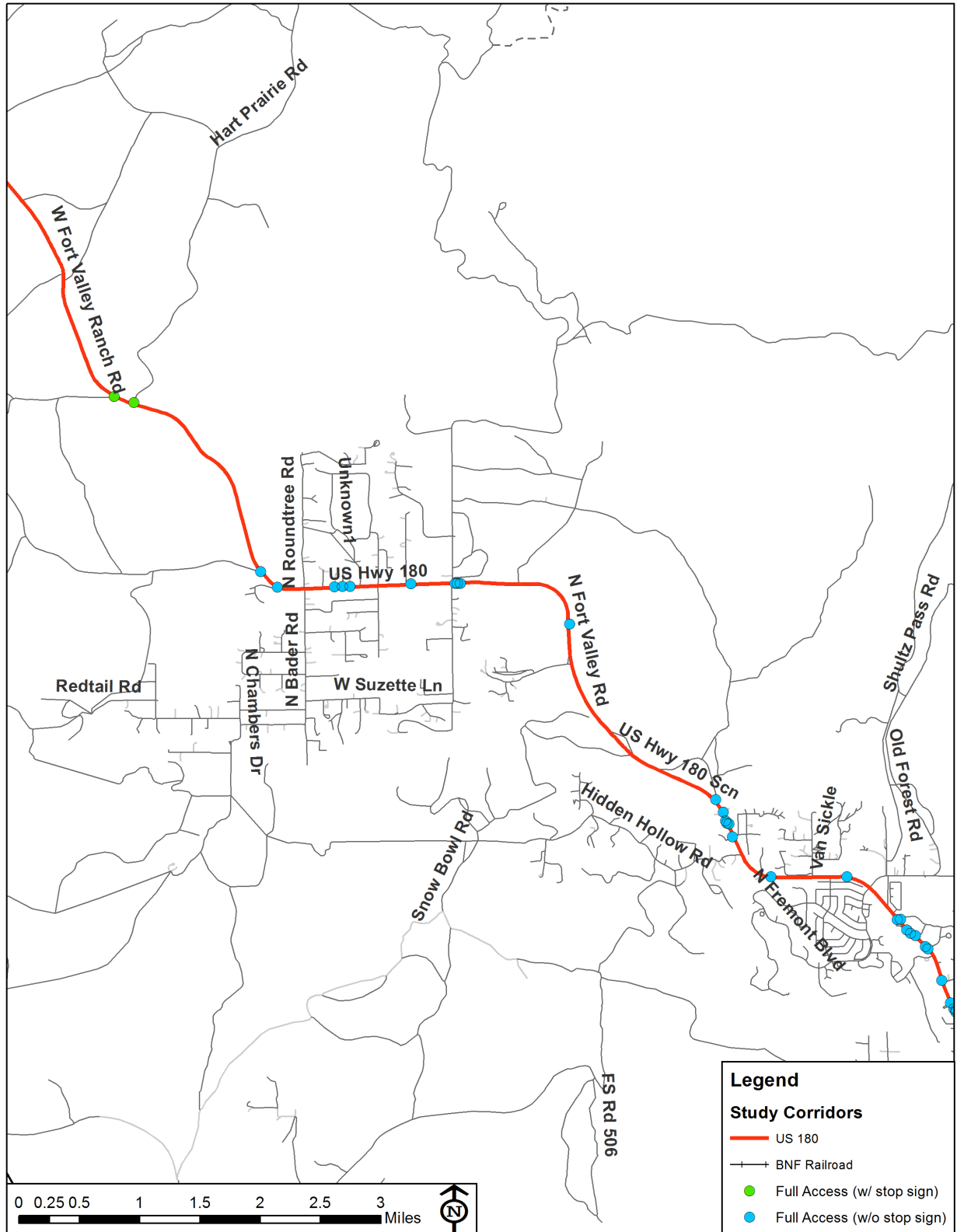


Figure 2-12: Existing Access Points Map (continued)



2.3 Safety Considerations

An extensive crash analysis was conducted as part of the US 180 CMP planning process. Five years of crash data (January 2012 – December 2016) was analyzed to determine trends, patterns, crash types, crash rates and intersection crash breakdown analysis. 145 of 575 crashes (25%) within the study corridor resulted in an injury crash, which is less than the statewide average injury crash percentage for the year 2012 to 2016 (31%). A comparison of total crashes that occurred within the five-year period for the US 180 study corridor and the Statewide average is shown in **Table 2.8**. For a more in-depth review and analysis of crash data, see the Safety Section of *Working Paper #1 – Existing & Future Conditions* (view on project [website](#)).

An updated safety analysis should be conducted in future design stages to accommodate growth derived since the data analysis utilized in this report.

Table 2-8: Crash Severity Comparison – All Crashes

Crash Severity	Number	US 180 %	Statewide Average %*
Fatal	7	0.12%	1%
Injury	146	25%	31%
Property Damage Only	422	75%	68%

*Average of all crashes from 2012-2016

A comparison of pedestrian/bicycle crashes that occurred within the five-year period for the US 180 study corridor and the Statewide average is shown in **Table 2.9**.

Table 2-9: Pedestrian & Bicycle Crash Severity Comparison

Crash Severity	Number	US 180 %	Statewide Average %*
Fatal	2	0.1%	1%
Injury	338	23%	31%
Property Damage Only	1,149	77%	68%

*Average of pedestrian/bicycle crashes from 2012-2016

Figure 2-13 illustrates the percentage of crashes that occurred along the corridor during the five-year analysis period based in the severity of crashes.

Figure 2-14 shows the location of crashes along US 180 on a map and categorizing them by the severity of the injury. There is the highest concentration of crashes along the Humphreys Road segment of US 180, where land use density and concentration of driveways are the highest.

Figure 2-13: Percentage of Crashes by Injury Severity

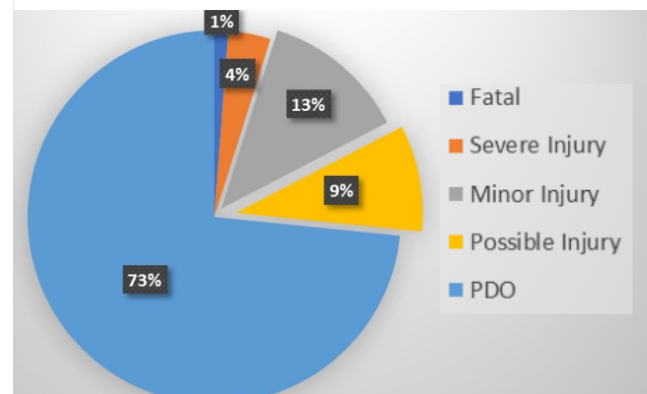
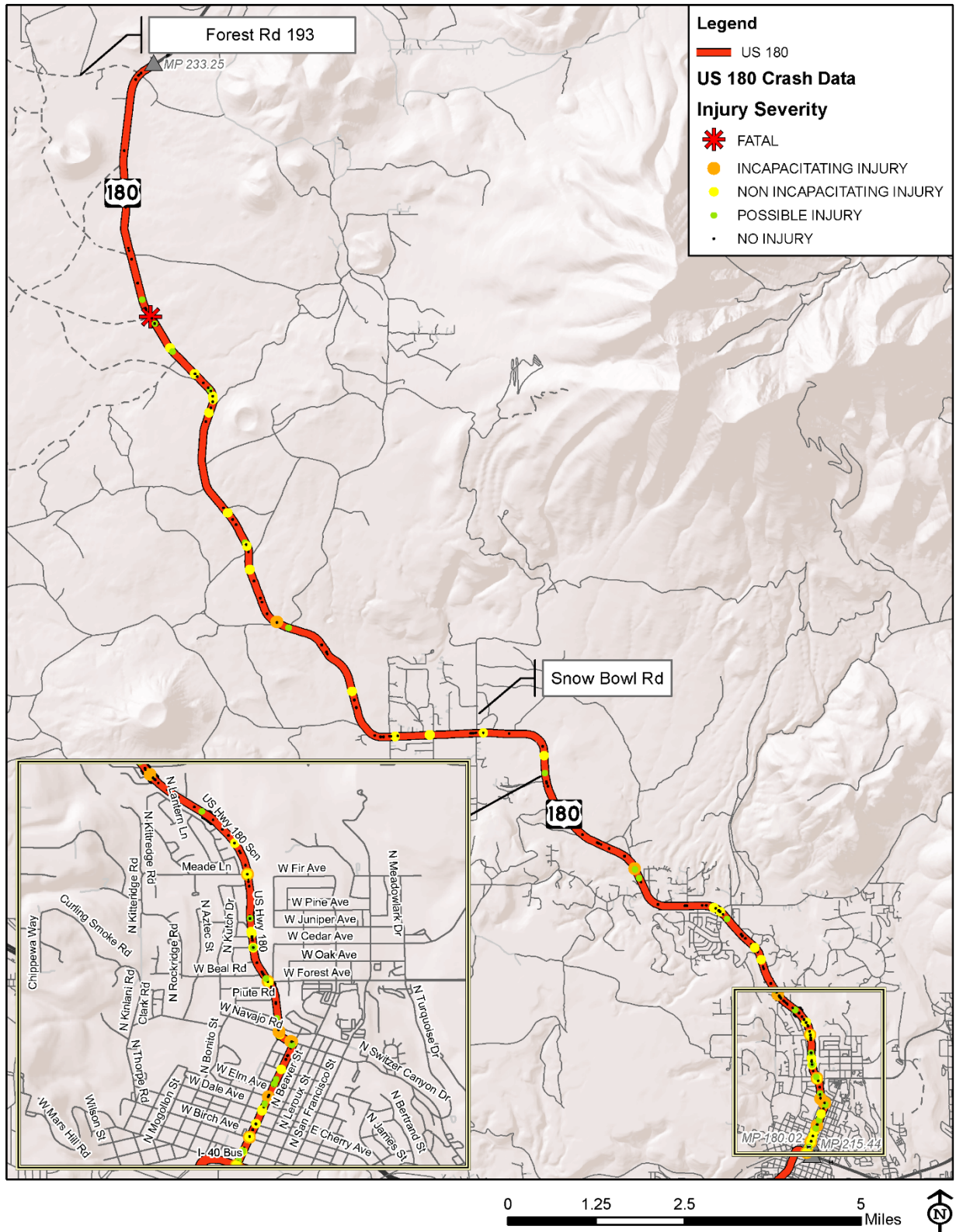


Figure 2-14: US 180 All Crashes by Injury Severity Map (January 2012 – December 2016)



2.4 Future Vehicular Traffic Considerations

The primary purpose of forecasting future traffic volumes is to estimate the additional vehicular travel demand added to existing roadways and to forecast congestion levels due to projected growth in population and employment. The culmination of the following inputs was utilized to develop a sophisticated traffic model which could compare traffic impacts of a 2040 *Base-Build Condition* to all alternatives evaluated. Inputs from ADOT, MetroPlan, the City of Flagstaff, and Mountain Line were utilized to develop the Base-Build Condition for the 2040 design year. To enhance modeling accuracy, any roadway funded construction project within or adjacent to the Milton Road corridor study limits was included in the Base-Build Condition of the traffic model. To be included, the project had to have been identified in an approved Capital Improvement Program (CIP) or Transportation Improvement Program (TIP). This supplemental modeling methodology, analysis and results are also described and elaborated on in *Working Paper #2 – Alternative Analysis* (view on project [website](#)). This model only includes considerations for vehicular traffic (including buses), multimodal transportation was not included. One consistent model was utilized to evaluate both the Milton Road and US 180 corridors.

2.4a Future Roadway Network

The following list of approved Capital Improvement Program (CIP) or Transportation Improvement Program (TIP) projects were included in the Base-Build Condition of the US 180 CMP traffic model at the time of the traffic modeling analysis:

- Humphreys Street and Route 66 – southbound to westbound add 2nd right turn lane.

Additional improvements included within the traffic model along the Milton corridor include:

- Milton Road and Plaza Way – southbound to westbound right turn lane;
- Milton Road and University Avenue – convert to right-in/right-out only intersection;
- Milton Road and University Drive – connect University Drive west through to University Avenue;
- Beulah Boulevard extension north from Forest Meadows to Yale Drive with new roundabout intersection and University Drive/Avenue realignment (Appendix E); and
- Lone Tree Road overpass – volume distribution effects due to the Lone Tree Road overpass.

The Mill Town development is an 18-acre mixed-use development in the southwest quadrant of Milton Road and University Drive that is currently undergoing final design. The development includes commercial space and a rooming and boarding facility. Transportation improvements proposed as part of this development include the Beulah Boulevard extension to University Ave, roundabout at Beulah Boulevard and University Ave, and realignment of University Ave to the signal at Milton Road and University Boulevard, as mentioned above.

2.4b Design Year 2040 Traffic Volumes

For the purposes of this analysis, year 2040 is considered as the design year. Additional volume development efforts were undertaken between Working Paper #1 and #2 to support the microsimulation analysis of the corridor undertaken for Working Paper #2. Peak hour turning movement volumes for the intersections along the US 180 study corridor were developed in cooperation with the Mountain Line Bus Rapid Transit Study and in cooperation with Metro Plan’s (formerly FMPO) Travel Demand Model, and then provided to the team as a prepared future year no build Vissim model. Traffic redistribution resulting from the CIP Lone Tree Overpass and Mill Town transportation improvements were included in the FMPO travel demand model and volume set used in developing future year traffic volumes. The volume development effort was summarized in a memo to Mountain Line and can be found in Appendix F.

Data collected and used in this analysis is limited to the data that was available during the development of the microsimulation model to meet the needs and scope of this analysis. Final design should consider updating traffic data by collecting and analyzing current traffic counts.

Peak Seasonal Traffic Volumes

US 180 is the primary route to access winter season recreational destinations, such as the Arizona Snowbowl snow sports resort. As a result, US 180 experiences an increase in traffic during the winter season. To accommodate for this condition within the existing microsimulation model, traffic was added to the model to simulate winter season peak snow-play traffic conditions for the US 180 analysis. During the AM peak, traffic was added that originated from the southern limits of the model and was destined for Arizona Snowbowl. During the PM peak, traffic was added that originated from Arizona Snowbowl and was destined for the southern limits of the model.

To obtain the added traffic during winter season peaks, traffic data was gathered from the ADOT Transportation Management System (TDMS). Counts were gathered from continuous traffic counter number 102189 on US 180, south of W Forest Avenue. Data was taken for the second Wednesday of each month from February to December of 2017 and 2018, which represented non-peak winter season traffic, and also for the second Saturday of January of 2017 and 2018, which represented peak winter season snow-play traffic. Using an AM peak of 8:00 to 9:00 AM and PM peak of 4:00 to 5:00 PM, those volumes were then averaged together for each respective peak period for the date ranges described above.

Since model volumes are for a future year 2040, the winter season peak snow-play traffic volumes were adjusted to the future year. This was done by calculating the ratio of the future year model volume to the weekday average volume between 2017 and 2018. That ratio was then applied to the peak winter season snow-play traffic to calculate a future year peak winter season snow-play traffic volume. Those calculation steps are shown in **Table 2-10**.

Table 2-10. Snow-Play Added Traffic Volume Calculations

Description		WB US 180 AM Peak	EB US 180 PM Peak	Calculation
Microsimulation Model Volume	A	560	770	
Average Weekday Volume	B	492	545	
Future Year Adjustment Factor	C	1.14	1.41	= A / B
Average Winter Snow-Play Peak Volume	D	742	912	
Winter Snow-Play Peak Adjusted	E	844	1288	= C x D
Added Snow-Play Volume	F	284	518	= E – A

Future No-Build Vissim Intersection Operational Analysis

The operational analysis for the No-Build was conducted utilizing the projected turning movement volumes with existing and programmed roadway geometry improvements and existing traffic control. **Figure 2-16** shows the intersection control and lane geometry for the year 2040 along the US 180 study corridor. The operational analysis was performed using the microsimulation software PTV Vissim, version 10-8. Trafficware Synchro version 10 was used to develop optimized signal timings for the microsimulation model.

2.4c Design Year 2040 LOS

Level of Service (LOS) for the study area intersections along the US 180 study corridor was analyzed for the year 2040 with the AM and PM peak hour traffic volumes. The LOS for the signalized and unsignalized study area intersections are described in **Table 2-14**. Future 2040 peak hour traffic volumes, shown in **Figure 2-15**, and future intersection control and lane geometry, shown in **Figure 2-16**, were utilized to determine the future 2040 peak hour LOS at the study area intersections.

Table 2-14 shows approach delay and overall intersection delay taken as an average for ten simulation runs from the microsimulation model study intersections. That delay was then cross-referenced with HCM 6th Ed. LOS thresholds for signalized and two-way stop-control (TWSC) intersections, as shown below in **Table 2-11**. Overall intersection LOS for TWSC intersections is reported as the worst movement, in accordance with current industry practices.

Table 2-11. HCM 6th Ed. LOS Thresholds for Interrupted Flow

LOS	Signalized LOS Thresholds		TWSC LOS Thresholds	
	Lower	Upper	Lower	Upper
A	0	10	0	10
B	10	20	10	15
C	20	35	15	25
D	35	55	25	35
E	55	80	35	50
F	80	--	50	--

Microsimulation Travel Time and Network Delay Results

Model travel times were captured for US 180 beginning at W. Historic Route 66 and ending at Mile Post (MP) 233 and are shown in **Table 2-12**. The posted speed limit on US 180 varies from

- 25 mph between W Historic Route 66 and Columbus Avenue;
- 35 mph between Columbus Avenue and N Creekside Drive;
- 45 mph between N Creekside Drive and Forest Hills Drive (approximate); and
- 55 mph between Forest Hills Drive and west beyond the study limits

Travel times and speeds in **Table 2-12** generally correspond with the posted speed limits. Moving westward, speeds increase. Speeds between W Historic Route 66 and Columbus Avenue appear much lower than the posted speed limit, however this segment has several traffic signals and high access point density. Moving westward, access point densities and flow interruptions are decreasing.

Table 2-12. US 180 2040 AM and PM No Build Travel Times

US 180 Westbound		AM		PM	
Segment	Travel Time (min)	Average Speed (mph)	Travel Time (min)	Average Speed (mph)	
W Historic Rte 66 to Columbus Ave	2.8	12	2.2	15	
Columbus Ave to Shultz Pass	4.4	36	4.7	33	
Shultz Pass to Snowball Rd	4.7	48	4.5	50	
Snowball Rd to MP 233	4.5	56	4.5	56	

US 180 Eastbound		AM		PM	
Segment	Travel Time (min)	Average Speed (mph)	Travel Time (min)	Average Speed (mph)	
MP 233 to Snowball Rd	4.5	56	4.6	55	
Snowball Rd to Shultz Pass	4.7	51	4.8	50	
Shultz Pass to Columbus Ave	4.4	35	5.0	31	
Columbus Ave to W Historic Rte 66	2.1	17	2.5	14	

Moving westward, US 180 is better characterized as a two-lane highway with intermittent, localized obstructions. The LOS of a two-lane highway is controlled by speed and determined by roadway features such as the presence of a passing lane, horizontal and vertical curvature, percent heavy vehicles, etc. There are several localized flow obstructions, such as the signals at W. Forest Avenue and Shultz Pass Road/Fremont Boulevard, the school zone at Sechrist Elementary School, and presence of access points along US 180 where the context is more suburban. While these obstructions can affect flow locally, they do not generally control it.

Network delay and latent delay capture the delay for all vehicles in the model. This metric is most useful in capturing the overall performance of an alternative as compared to the No Build. Network and latent delay results are presented in **Table 2-13**.

Network delay represents the delay of vehicles in the model. Latent delay represents delay for vehicles which are beyond the model boundaries but are trying to enter the model. For example, latent delay can occur on a short link where a signal or flow interruption is causing queue to build up to and past the total link length.

A review of the network delay results indicates that the PM peak hour appears to experience more delay than the AM. It is noted that the delay is a summation for all vehicles, while the delay may increase, the number of vehicles may also increase, therefore it is not necessarily indicative of poorer overall performance.

Table 2-13. 2040 AM and PM No Build Network Delay

AM Peak Hour			PM Peak Hour		
Network Delay (hrs)	Latent Delay (hrs)	Total Delay (hrs)	Network Delay (hrs)	Latent Delay (hrs)	Total Delay (hrs)
762	818	1580	1378	1654	3032

Table 2-14: 2040 Peak Hour LOS at Signalized and Unsignalized Intersections

Intersection	Approach	2040 AM Peak		2040 PM Peak	
		LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)
Milton Rd and Humphreys St	Northbound	-	-	-	-
	Southbound	F	404.9	F	1476.8
	Eastbound	F	572.2	F	263.6
	Westbound	F	622.0	F	152.6
	Overall	F	546.3	F	615.6
Humphreys St and Columbus Ave	Northbound	F	1256.9	F	92.0
	Southbound	D	35.4	D	42.1
	Eastbound	E	67.4	F	1035.9
	Westbound	F	290.2	F	407.2
	Overall	F	648.8	F	540.3
US 180 and Forest Ave	Northbound	A	0.0	A	0.0
	Southbound	A	3.4	A	3.1
	Eastbound	-	-	-	-
	Westbound	F	572.3	F	738.5
	Overall	F*	69.3	F*	135.7
US 180 and Shultz Pass Rd	Northbound	C	20.0	C	20.7
	Southbound	C	20.3	C	20.5
	Eastbound	F	152.4	A	7.5
	Westbound	C	23.4	C	22.7
	Overall	F	95.4	B	19.4

* Vissim output. LOS reported is based on the Average Delay

**See Section 2.4a for items included in analysis as part of CIP/TIP

Figure 2-15: 2040 PM Peak Hour Traffic Volumes

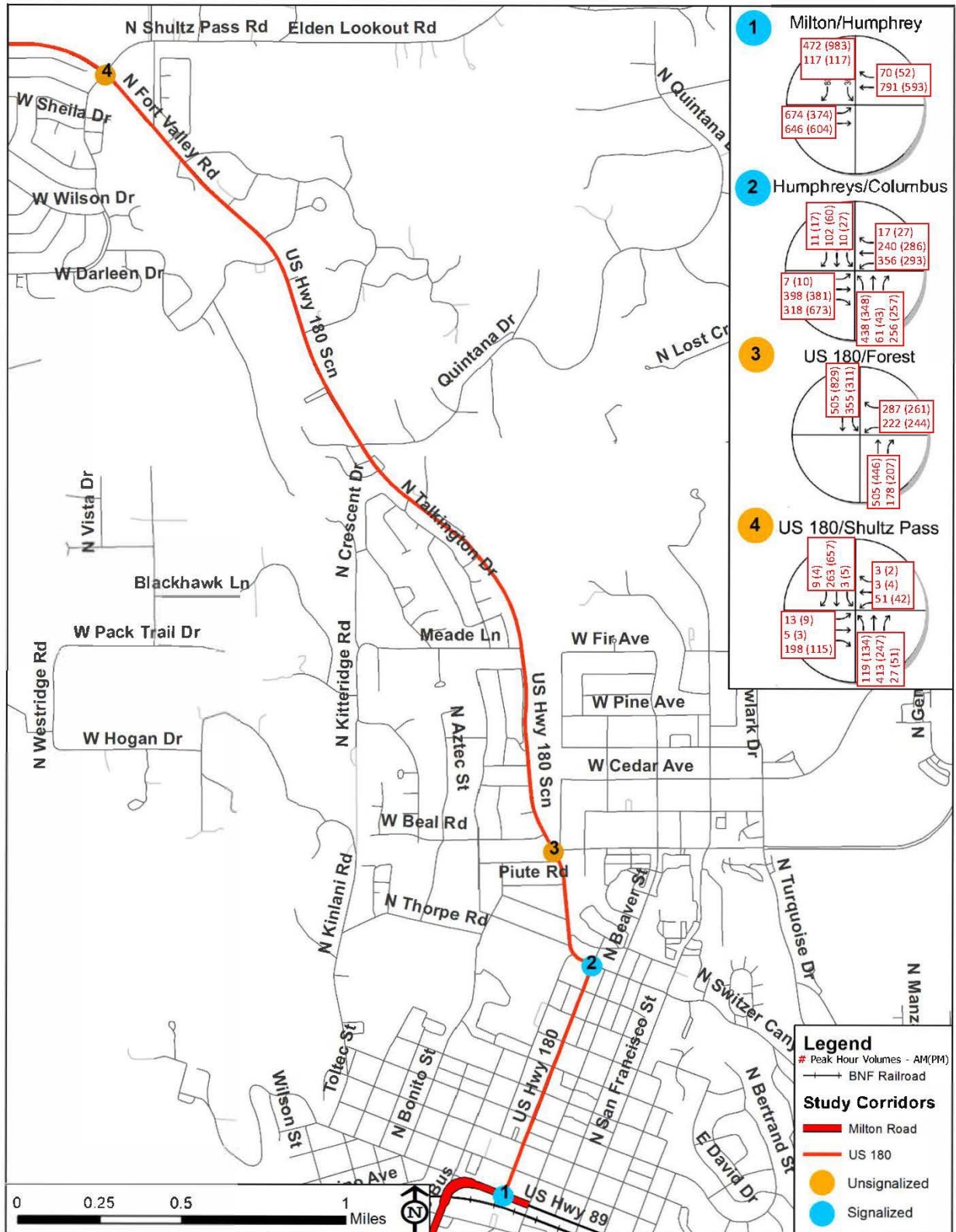
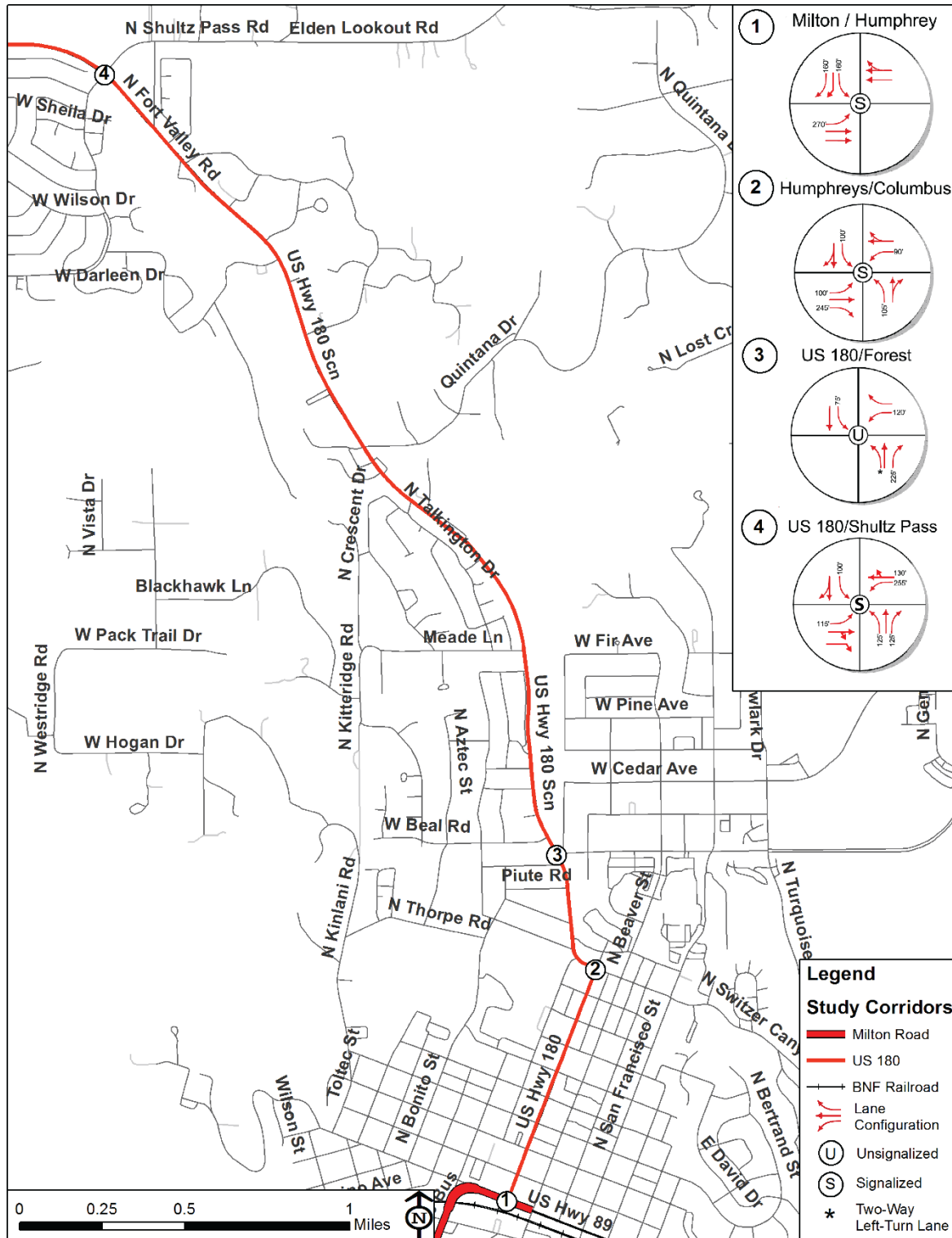


Figure 2-16: 2040 Intersection Control and Lane Geometry

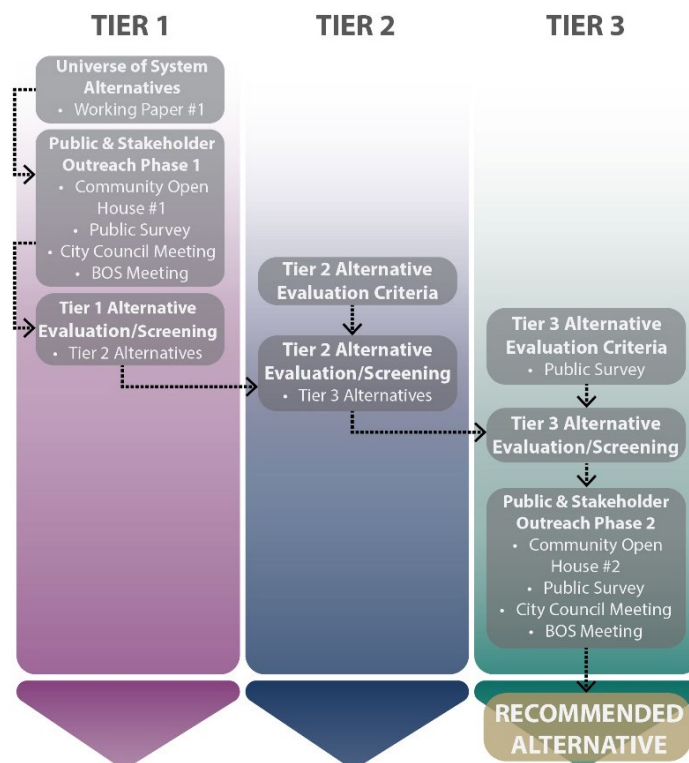


3.0 EVALUATION OF CORRIDOR ALTERNATIVES

The US 180 CMP alternative evaluation and screening process was conducted through a Three Tier approach (Figure 3-1), which is summarized at a high-level in this report, but outlined in greater detail in *Working Paper #2 – Alternatives Analysis* (view on project [website](#)). Each of the Three Tier Alternative Evaluation and Screening processes were conducted under the guidance and direction of the Project Partners with updates and meetings at major milestones during the process. The Three-Tiered approach is described below.

- **Tier 1 Alternative Evaluation** was based on public and stakeholder feedback on the Preliminary System Alternatives developed through the initial phases of the study presented in *Working Paper #1 – Existing & Future Conditions* (view on project [website](#)) for the first screening of alternatives.
- **Tier 2 Alternative Evaluation** focused on the development of qualitative and quantitative evaluation criteria that analyzed and measured the performance of the Milton Road Tier 2 Alternatives.
- **Tier 3 Alternative Evaluation** expanded upon efforts conducted in the Tier 2 Alternative Evaluation phase to further analyze the remaining alternatives through a further refined series of diverse evaluation criteria focusing on quantitative measures to complement traffic modeling outputs that assessed the overall performance of the Tier 3 Alternatives.

Figure 3-1: Three Tier Alternative Evaluation & Screening Process Flow Chart



3.1 Corridor Alternative Evaluation & Results

This section summarizes the results of the Tier 1, Tier 2, and Tier 3 Alternative Evaluation processes. For more detailed results of the Three-Tiered Alternatives Evaluation and screening process, please refer to Working Paper #2 – Alternatives Analysis (view on project [website](#)).

3.1a Tier 1 Corridor Alternatives Evaluation & Results

The foundation of Tier 1 Alternative Evaluation results was based on public and stakeholder feedback on the Preliminary System Alternatives presented in *Working Paper #1 – Existing & Future Conditions* (view on project [website](#)). Most the feedback was received at Public Open House Meeting #1, and further enhanced by the Project Partners. Additional input and guidance on the Tier 1 Alternative evaluation process was received from a series of Project Partner meetings and from City of Flagstaff City Council and Coconino County Board of Supervisors briefings.

Table 3-1 shows and summarizes the results of the sticky-dot voting and prioritization exercise conducted by the members of the public at the Public Open House Meeting #, and ultimately, which of the Tier 1 Preliminary System Alternatives were elected to move forward into Tier 2 Alternative Evaluation by the Project Partners. It is worth noting here that the Tier 1 System Alternatives included a series of; 1) two alternatives within the existing US 180 right-of-way, 2) four alternatives that contemplated expanded US 180 right-of-way scenario and, 3) a series of twelve (12) total alternate routes to US 180 (five of which were direct bypasses from US 180 to I-40 utilizing primarily US Forest service roads). All eighteen (18) alternatives were presented to the public and reviewed by the Project Partners as part of the Tier 1 Alternative Evaluation process.

Following Public Open House Meeting #1, the Project Partners deliberated over a series of meetings to discuss and select which of the Tier 1 US 180 alternatives would proceed into Tier 2 Alternative Evaluation. The Project Partners agreed to move forward with the following Preliminary System Alternatives for Tier 2 consideration:

- Preliminary System Alternative 1: No-Build (Maintain as Is);
- Preliminary System Alternative 2: Humphreys St Southbound PM Peak Managed Lane;
- Preliminary System Alternative 3: Four General Purpose Lanes, Center Median, Bike Lanes and Shoulders on both Sides;
- Preliminary System Alternative 4: US 180 AM and PM Peak Managed Lane from Meade Street south to Downtown;
- Preliminary System Alternative 5: Humphreys Street One Way Northbound for AM Peak & One Way Southbound for PM Peak, and right turn capacity at Beaver Street and Columbus, and Humphreys Street and SR 40B;
- Preliminary System Alternative 6: Dynamic Southbound Shoulder;
- Preliminary System Alternative 7: Columbus Avenue to Switzer Canyon Drive to Route 66;
- Preliminary System Alternative 12: Lone Tree Road;
- Preliminary System Alternative 17: Wing Mountain Road to FS Road 222b to FS Road 171; and
- Preliminary System Alternative 18: Hidden Hollow Road to FS 506 to I-40.

Table 3-1: Tier 1 Alternative Evaluation & Screening Results

Tier 1 Preliminary System Alternatives	Public Open House Meeting #1 Voting Results		
	Move Forward for Further Study	Be Eliminated from Further Study	Move Forward for Further Study with Adjustment
System Alternatives Utilizing Existing Right-of-Way			
Preliminary System Alternative 1: No-Build (Maintain as Is)	Not Applicable		
Preliminary System Alternative 2: Humphreys St Southbound PM Peak Managed Lane	45	35	0
System Alternatives that May Require Expanded Right-of-Way			
Preliminary System Alternative 3: Four General Purpose Lanes, Center Median, Bike Lanes and Shoulders on both Sides	51	52	0
Preliminary System Alternative 4: US 180 AM and PM Peak Managed Lane from Meade Street south to Downtown	48	36	0
Preliminary System Alternative 5: Humphreys Street One Way Northbound for AM Peak & One Way Southbound for PM Peak, and right turn capacity at Beaver Street and Columbus, and Humphreys Street and SR 40B	17	69	1
Preliminary System Alternative 6: Dynamic Southbound Shoulder	50	28	1
Alternative Routes to Milton Road			
Preliminary System Alternative 7: Columbus Avenue to Switzer Canyon Drive to Route 66	23	36	0
Preliminary System Alternative 8: Columbus Avenue to Beaver Street to Butler Avenue (Southbound One Way) & Butler Avenue to San Francisco Street to Columbus Drive	4	48	0
Preliminary System Alternative 9: Forest Ave to Turquoise Dr to Switzer Canyon Dr to Rte 66	8	43	0
Preliminary System Alternative 10: Cable Propelled Gondola	Previously Removed by Project Partners		
Preliminary System Alternative 11: Milton Road to West Route 66 to Flagstaff Ranch Rd to I-40	4	48	0
Preliminary System Alternative 12: Lone Tree Road	65	19	0
Preliminary System Alternative 13: Mike's Pike St/Future Overpass/Humphrey's St one way NB & Kendrick Street/Sitgreaves Street/existing underpass to Milton Road SB	10	65	0
Preliminary System Alternative 14: Milton Road to West Route 66 to Woodland's Village Boulevard to Beulah Boulevard to John Wesley Powell Boulevard to I-17 South	10	36	0
Preliminary System Alternative 15: Bader Road to FS 518 to A-1 Mountain Road to I-40	67	92	0
Preliminary System Alternative 16: Snow Bowl Road to A-1 Mountain Road to I-40	56	78	0
Preliminary System Alternative 17: Wing Mountain Road to FS Road 222b to FS Road 171	113	28	0

Notes:

Alternatives displayed with a strikethrough were eliminated from further study and not included in the Tier 2 Alternative Evaluation process.

3.1b Tier 2 Corridor Alternatives Evaluation & Results

This section describes the Tier 2 Alternative Evaluation process and results. At this point in the study process, the former Tier 1 alternatives no longer were classified as “preliminary,” and became to be known as “alternatives.” Once the initial selection of the Tier 2 Alternatives were refined and established, another series of Project Partner meetings determined, through group consensus, that the Tier 2 Alternatives needed refinement before the evaluation could begin.

Refinement of Tier 2 Alternatives

It was recognized by the Project Partners that the Preliminary System Alternatives from Tier 1 that were selected for Tier 2 analysis generally captured the range and functionality of the preferred and desired facility. However, the Preliminary System Alternatives from Tier 1 were preliminary in nature, designed to initially gauge public support or not on broader concepts, primarily developed from previous studies, and did not include detailed specifications such as individual facility widths. The Project Partners desired greater definition on the individual roadway facility components/widths needed to be defined prior to the commencement of the formal Tier 2 evaluation. In addition, the Project Partners felt some other potential alternatives were desired to reflect the possibility of what modernized improvements, particularly for multiple modes of travel, would look like for the “build alternative” types. Four stages of refinement took place prior to evaluation which are described below:

A set of Controlling Design Criteria was collectively developed by the Project Partners to guide Tier 2 Alternative refinement of the roadway features for the Tier 2 Alternatives. The Controlling Design Criteria were created to identify and compare adopted FHWA and ADOT standards/specification with Project Partner agency standards/specifications for the various roadway features. This process helped acknowledge and document the minimum ADOT/FHWA standards in comparison to Project Partner agency current and preferred standard(s) to consider for inclusion in any refined Tier 2 Alternatives. The Controlling Design Criteria also document any variances or design exceptions that would require FHWA approval.

1. Over the course of several meetings, the Project Partners discussed and confirmed the series of Controlling Design Criteria that guided the refinement of the widths of certain roadway facility types. The Controlling Design Criteria exercise also helped recognize which facility improvements ADOT would/could contribute towards construction funding versus those roadway feature types above and beyond the ADOT standards that other agencies would be required to contribute towards construction cost (should the need arise). The final Controlling Design Criteria can be found in Appendix G.
2. The refinement of Alternative 4 – To allow for a full range of alternatives for public consideration, Alternative 4 was refined to consist of a managed transit-only lane utilizing the center two-way left turn lane (TWTL) during AM and PM peak time periods, which included an effort of maintaining a diversity of public transit alternatives and allow for a full range of possibilities for traffic operation analysis. The result of this discussion and analysis yielded two hybrid alternatives for Tier 2 Alternative Evaluation: Alternative 4a – TWTL AM/PM Managed lane for general traffic, and Alternative 4b – TWTL AM/PM Managed lane for transit only.

3. Conversion of Alternative 12 - No-Build with the Lone Tree Road Widening Design Concept, into the No-Build alternative. This was a direct result of the Lone Tree Overpass project being approved by Flagstaff voters via Proposition 419 – coupled with fact that – Alternative 12 already closely resembled the No-Build option and was determined redundant and ultimately eliminated from the analysis and the overpass and widening of Lone Tree Road was incorporated as part of the No-Build option.

Refer to Section 4.2 of *Working Paper #2 – Alternatives Analysis* on the project [website](#) for more detailed information pertaining to the refinement of the Tier 2 Alternatives.

Alternative Packaging

Recognizing that the Tier 2 Alternatives were initially developed for specific segments of the US 180 Corridor, a process of “packaging,” or grouping the alternatives was necessary in order to create a complete and seamless corridor for traffic modeling purposes. The packaging process then included a merging and matching of each Alternative together with the varying character changes and intersection geometry of each roadway segment type (rural/suburban/urban). As depicted in **Table 3-2** and **Figure 3-2**, The US 180 corridor is split into four segments relative to the varying roadway and land character of each segment of US 180. The following three segments were derived through Project Partner discussion:

1. **Urban:** Humphreys Street from Route 66 to Columbus Avenue
2. **Suburban:** Fort Valley Road from Columbus Avenue to Peak View Street
3. **Rural Fringe:** Fort Valley Road from Peak View Street to Snowbowl Road
4. **Rural:** Fort Valley Road from Snow Bowl Road to MP 233.25

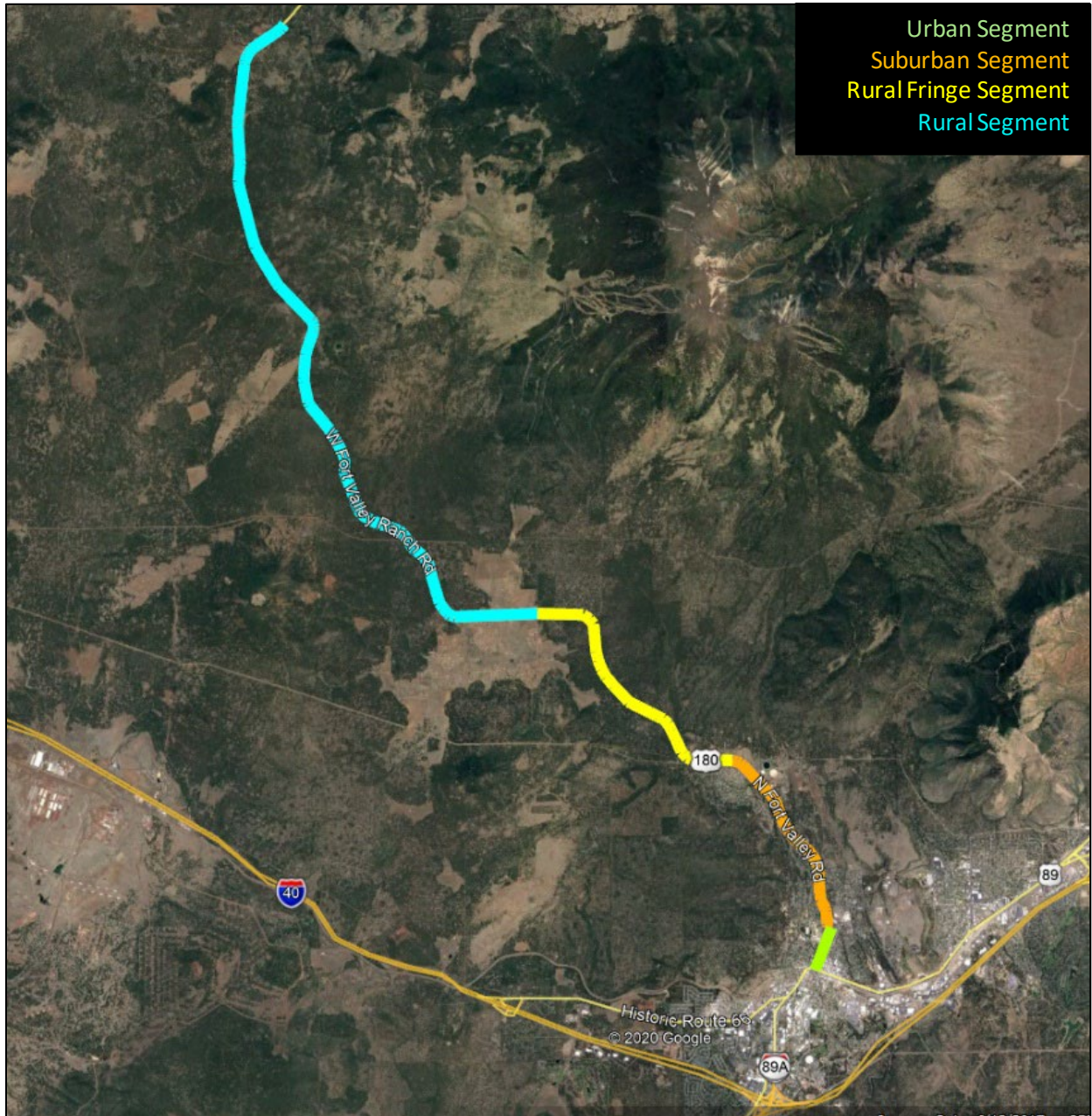
Table 3-2: US 180 Tier 2 Alternative Packaging

Segment		Alternative Packages					
		No-Build				E*	F*
1	Urban	A	B	C	D	Alt 17 Wing Mountain Bypass	Alt 18 Hidden Hollow Bypass
2	Suburban	Alt 2	Alt 2	Alt 2	Alt 2		
3	Rural Fringe	Alt 3 Suburban	Alt 4a	Alt 4b	Alt 6		
4	Rural	Alt 3 Rural	Alt 6	Alt 6	Alt 6		
		Alt 3 Rural	No-Build	No-Build	No-Build		

**The US 180 is considered under the No-Build condition under Alternative Package E and Alternative Package F*

The following pages provide graphical representation of the six alternative packages.

Figure 3-2: US 180 Study Corridor Segmentation

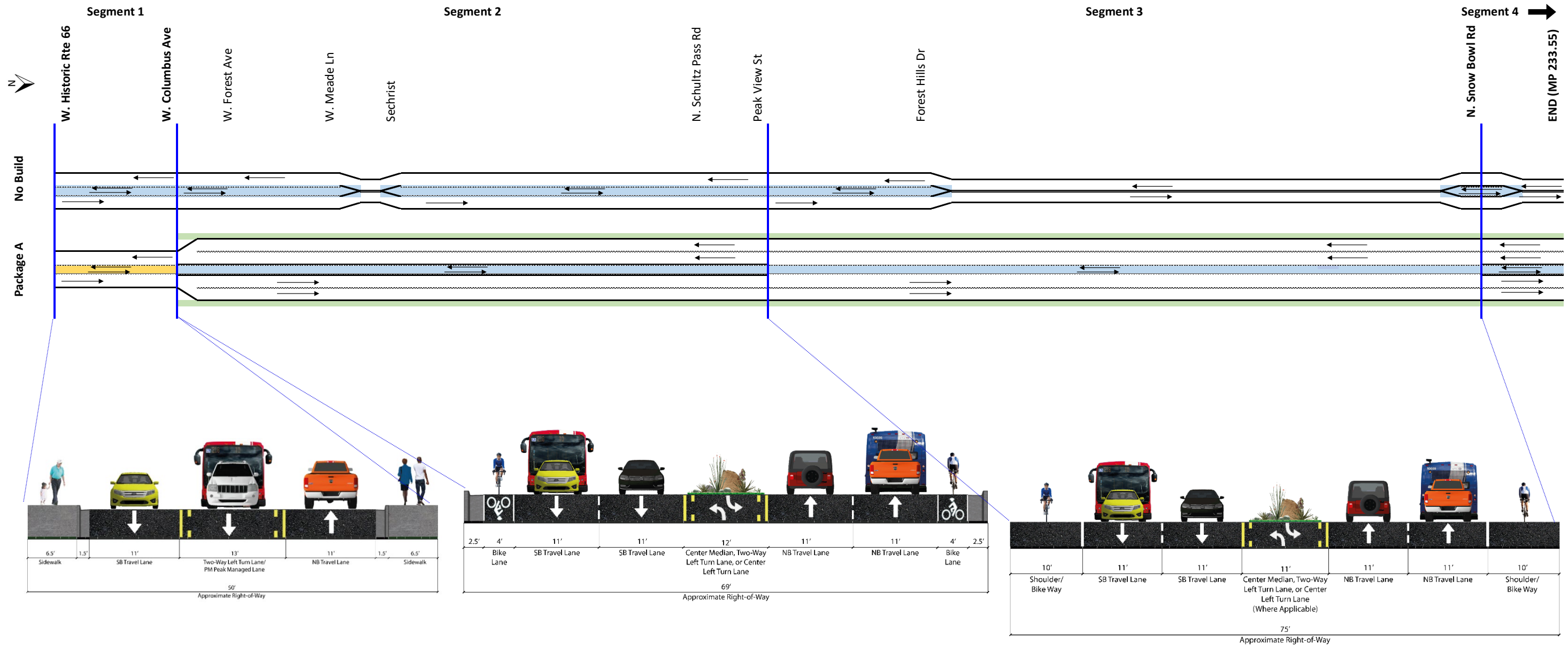


Alternative Package A

LEGEND

- = General Purpose Lane
- = Bike Lane/Bikeway
- = Dynamic Shoulder
- = Two-way Left Turn Lane (TWLTL)
- = TWLTL or Peak Hour Managed Lane - All Traffic
- = TWLTL or Peak Hour Managed Lane - Transit Only

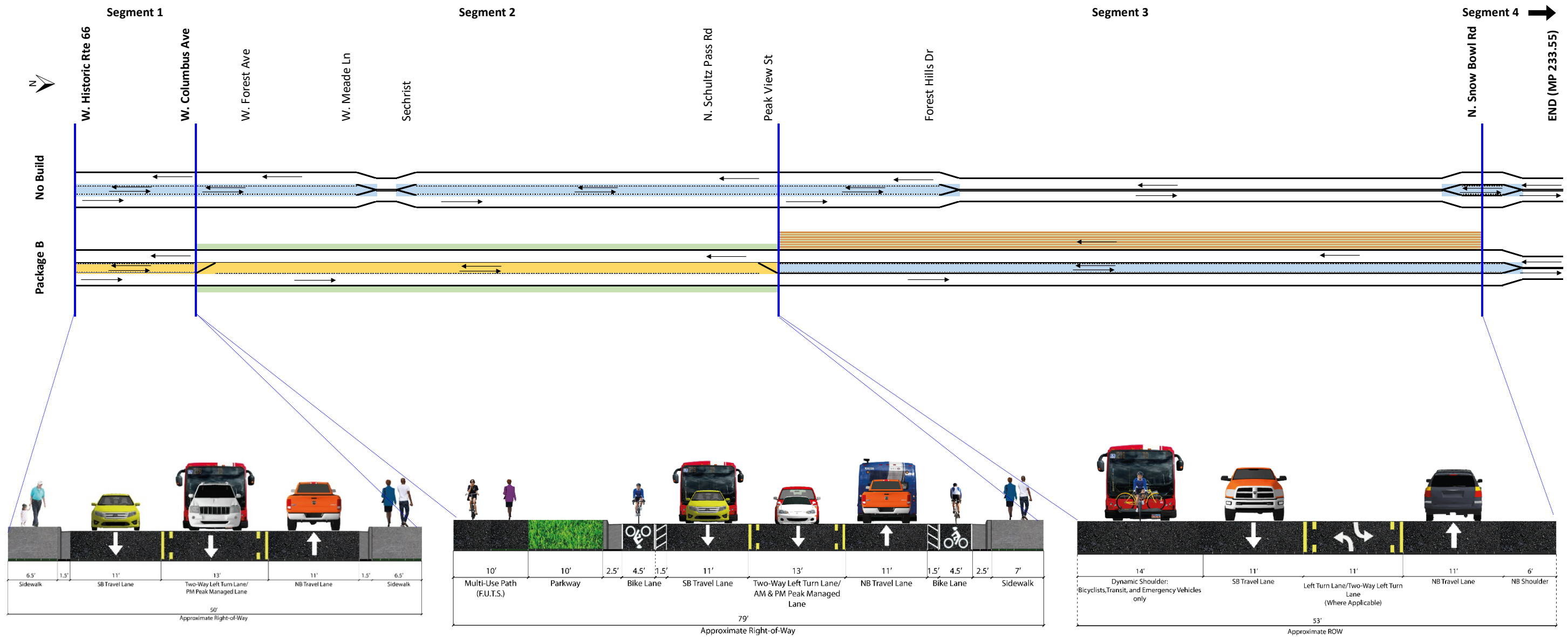
Segment	Description	Alternative Package					
		A	B	C	D	E (Alt 17 - Wing Mtn Rd)	F (Alt 18 - Hidden Hollow)
1	Route 66 to Columbus (Urban)	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	No Build	No Build
2	Columbus to Peak View (Suburban)	Alt 3 Suburban	Alt 4A - AM managed lane NB - PM managed lane SB	Alt 4B (Transit) - AM Bus NB - PM Bus SB	Alt 6 (Transit) - SB bus lane	No Build	No Build
3	Peak View to Snowbowl Rd (Rural)	Alt 3 Rural	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	No Build	No Build
4	Snowbowl Rd to MP 233.55 (Rural)	Alt 3 Rural	No Build	No Build	No Build	No Build	No Build



Alternative Package B

- = Two-way Left Turn Lane (TWLTL)
- = TWLTL or Peak Hour Managed Lane - All Traffic
- = TWLTL or Peak Hour Managed Lane - Transit Only

Segment		No Build	Alternative Package					
			A	B	C	D	E (Alt 17 - Wing Mtn Rd)	F (Alt 18 - Hidden Hollow)
1	Route 66 to Columbus (Urban)	No Build	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	No Build	No Build
2	Columbus to Peak View (Suburban)		Alt 3 Suburban	Alt 4A - AM managed lane NB - PM managed lane SB	Alt 4B (Transit) - AM Bus NB - PM Bus SB	Alt 6 (Transit) - SB bus lane	No Build	No Build
3	Peak View to Snowbowl Rd (Rural)		Alt 3 Rural	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	No Build	No Build
4	Snowbowl Rd to MP 233.55 (Rural)		Alt 3 Rural	No Build	No Build	No Build	No Build	No Build

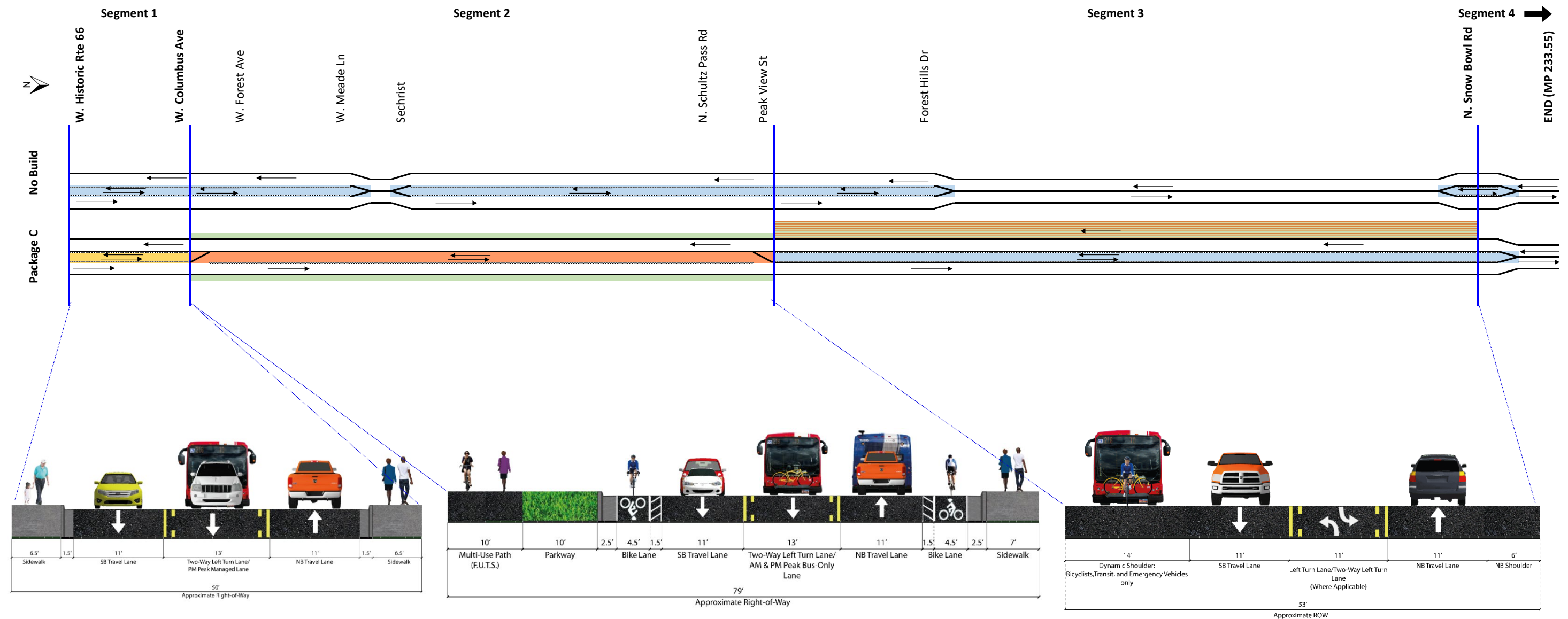


Alternative Package C

LEGEND

- = General Purpose Lane
- = Two-way Left Turn Lane (TWLTL)
- = Bike Lane/Bikeway
- = TWLTL or Peak Hour Managed Lane - All Traffic
- = TWLTL or Peak Hour Managed Lane - Transit Only
- = Dynamic Shoulder

Segment	Description	No Build	Alternative Package					
			A	B	C	D	E (Alt 17 - Wing Mtn Rd)	F (Alt 18 - Hidden Hollow)
1	Route 66 to Columbus (Urban)	No Build	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	No Build	No Build
2	Columbus to Peak View (Suburban)		Alt 3 Suburban	Alt 4A - AM managed lane NB - PM managed lane SB	Alt 4B (Transit) - AM Bus NB - PM Bus SB	Alt 6 (Transit) - SB bus lane	No Build	No Build
3	Peak View to Snowbowl Rd (Rural)		Alt 3 Rural	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	No Build	No Build
4	Snowbowl Rd to MP 233.55 (Rural)		Alt 3 Rural	No Build	No Build	No Build	No Build	No Build

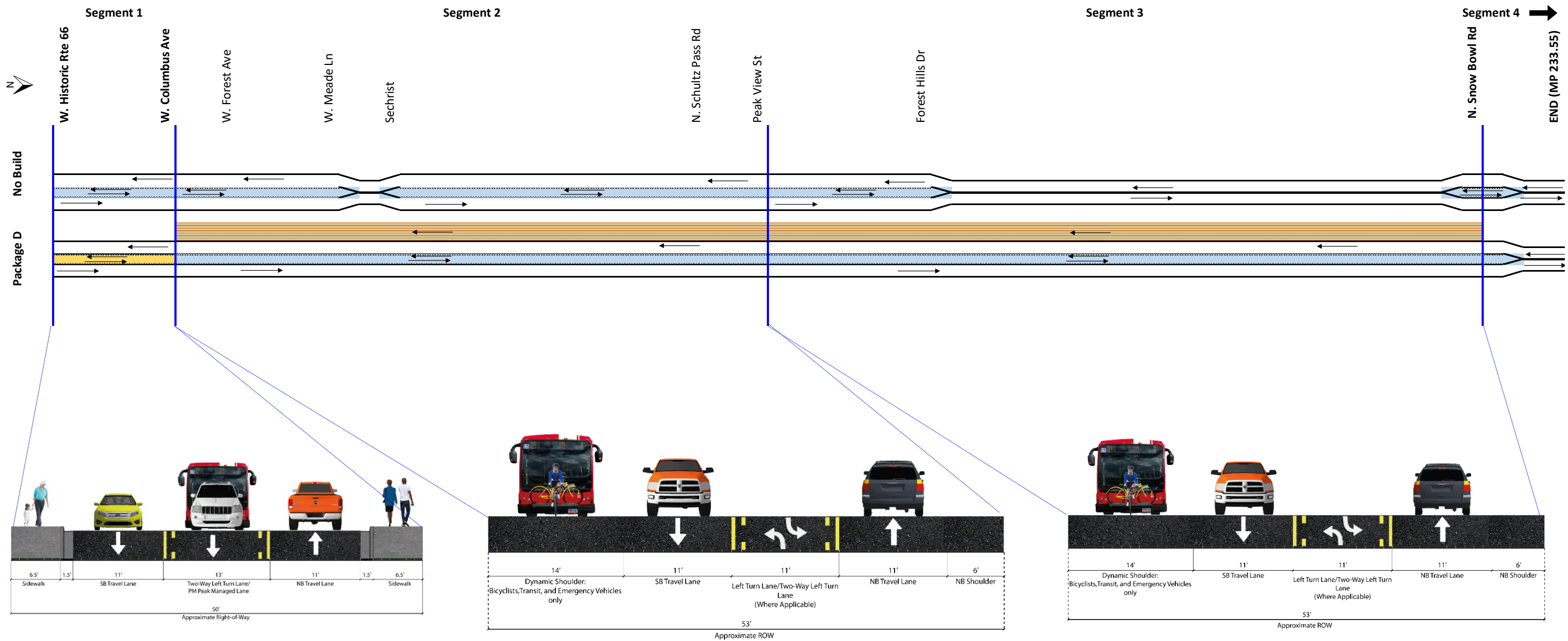


Alternative Package D

LEGEND

- = General Purpose Lane
- = Two-way Left Turn Lane (TWLTL)
- = Bike Lane/Bikeway
- = TWLTL or Peak Hour Managed Lane - All Traffic
- = TWLTL or Peak Hour Managed Lane - Transit Only
- = Dynamic Shoulder

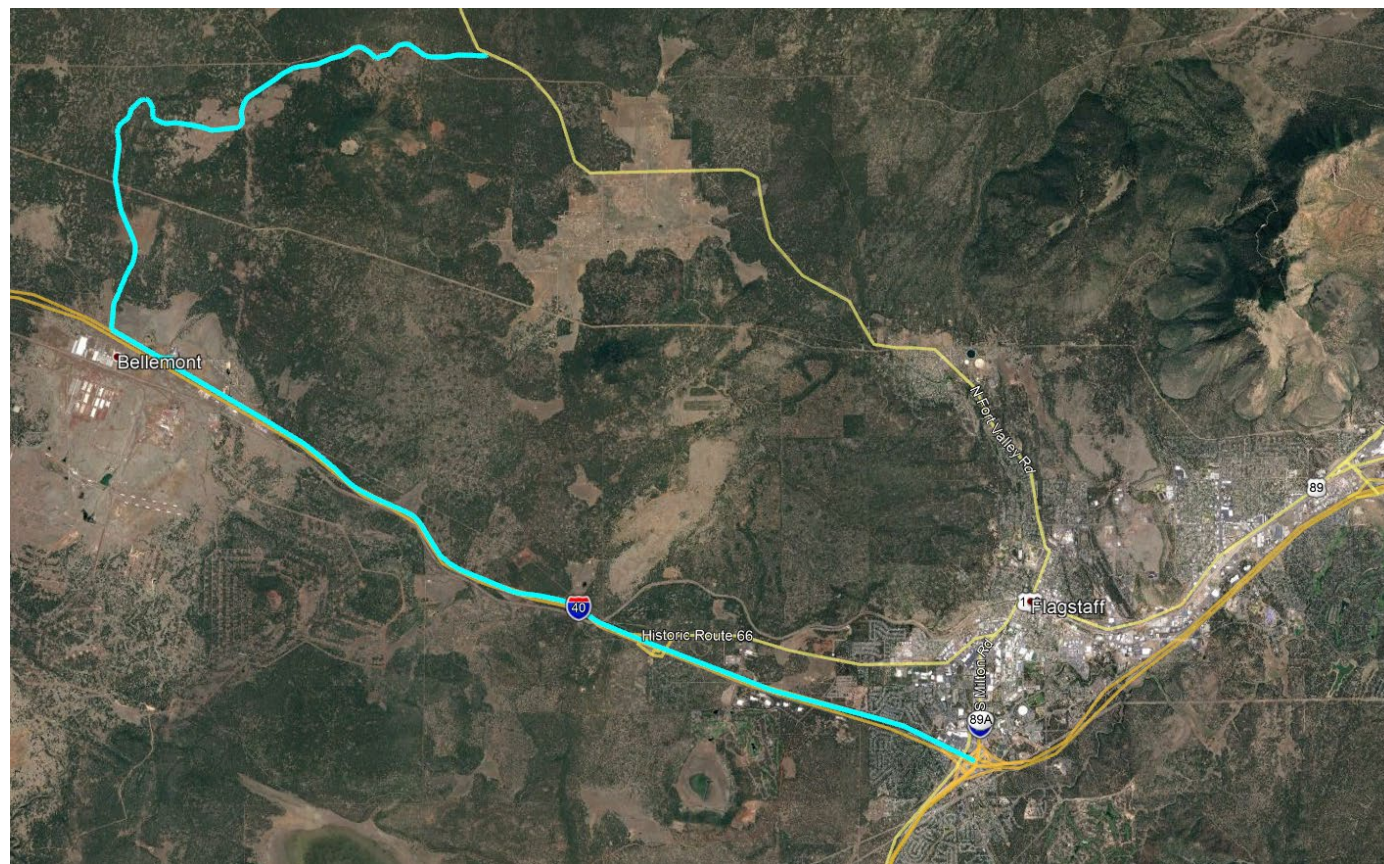
Segment		Alternative Package					
		A	B	C	D	E (Alt 17 - Wing Mtn Rd)	F (Alt 18 - Hidden Hollow)
1	Route 66 to Columbus (Urban)	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	Alt 2 - AM no change - PM SB managed lane	No Build	No Build
2	Columbus to Peak View (Suburban)	Alt 3 Suburban	Alt 4A - AM managed lane NB - PM managed lane SB	Alt 4B (Transit) - AM Bus NB - PM Bus SB	Alt 6 (Transit) - SB bus lane	No Build	No Build
3	Peak View to Snowbowl Rd (Rural)	Alt 3 Rural	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	No Build	No Build
4	Snowbowl Rd to MP 233.55 (Rural)	Alt 3 Rural	No Build	No Build	No Build	No Build	No Build



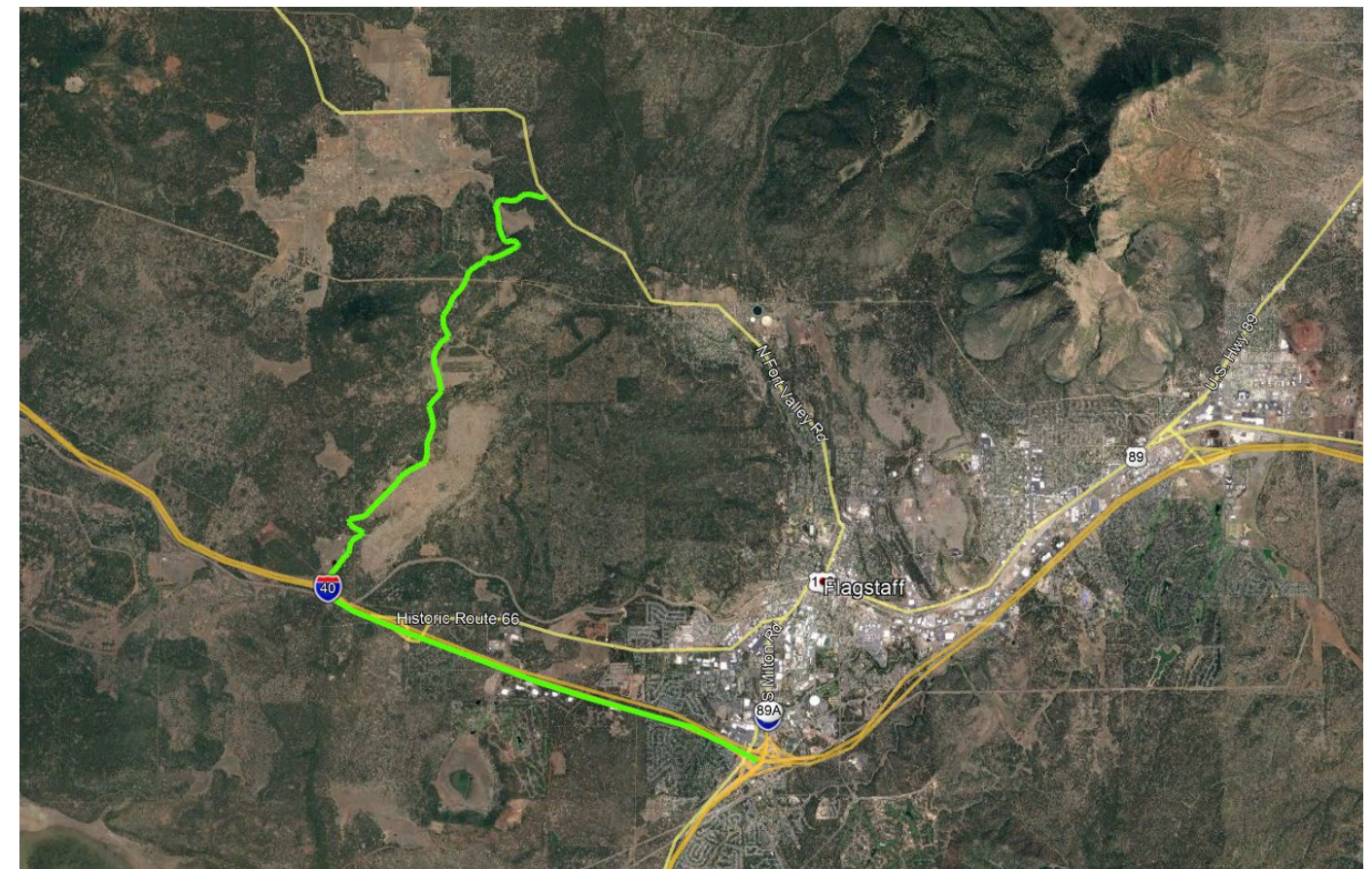
Alternative Routes

Segment		No Build	Alternative Package					
			A	B	C	D	E (Alt 17 - Wing Mtn Rd)	F (Alt 18 - Hidden Hollow)
1	Route 66 to Columbus (Urban)	No Build	Alt 2 - AM no change - PMSB managed lane	Alt 2 - AM no change - PMSB managed lane	Alt 2 - AM no change - PMSB managed lane	Alt 2 - AM no change - PMSB managed lane	No Build	No Build
2	Columbus to Peak View (Suburban)		Alt 3 Suburban	Alt 4A - AM managed lane NB - PM managed lane SB	Alt 4B (Transit) - AM Bus NB - PM Bus SB	Alt 6 (Transit) - SB bus lane	No Build	No Build
3	Peak View to Snowbowl Rd (Rural)		Alt 3 Rural	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	Alt 6 (Transit) - SB bus lane	No Build	No Build
4	Snowbowl Rd to MP 233.55 (Rural)		Alt 3 Rural	No Build	No Build	No Build	No Build	No Build

Alternative Package E Wing Mountain Road Route



Alternative Package F Hidden Hollow Road Route



Tier 2 Alternative Evaluation Criteria

A series of Tier 2 evaluation criteria and weightings were developed to evaluate and measure the performance of the seven Tier 2 Alternatives. The Tier 2 evaluation criteria were crafted to be diverse in nature through the combination of quantitative and qualitative measurements specific to features of each Tier 2 Alternative.

The first step in developing the evaluation criteria was to identify general categories of roadway performance to measure the operational and environmental qualities of the corridor. The Consultant Team worked with the Project Partners and agreed to use the following categories – in no particular order of importance – on to measure and compare the Tier 2 Alternatives:

- Traffic Operations;
- Safety;
- Expand Travel Mode Choices;
- Public Acceptance;
- Construction/Implementation;
- Project Economics; and
- Environmental Impacts.

Once the categories were selected, the Consultant Team and the Project Partners created a preliminary list of evaluation criteria metrics for each category. The process included researching regulatory mandates across the state and with ADOT; understanding what issues were of highest importance for the ADOT Districts; communicating with ADOT and the Project Partners to understand strategic safety initiatives of the highest value within the various organizations and agencies; investigating measures to evaluate the level of difficulty of implementation through assessment of the costs and right-of-way impacts; and the public acceptance of each alternative.

As a result, 14 different evaluation criteria were developed over the seven categories to use in Tier 2 Alternative Evaluation process. Refer to Section 4.6 of *Working Paper #2 – Alternatives Analysis* (view on project [website](#)) for more detailed information about the development of the Tier 2 Alternative Evaluation Criteria, and the specific measures and methodologies used to calculate the results of the Tier 2 Alternative Evaluation.

Tier 2 Evaluation Criteria Results & Analysis Findings

This section describes a brief summary of the results for the Tier 2 Alternative Evaluation process of the seven Tier 2 Alternatives through the application of the Tier 2 Evaluation Criteria. Refer to Section 4.8 of *Working Paper #2 – Alternative Analysis* (view on project [website](#)) for more detailed results and a systematic synopsis for each of the Tier 2 Evaluation Criteria.

The US 180 CMP Tier 2 Alternatives range in performance rating based on the score of the Tier 2 Alternative Evaluation Criteria. The highest performing alternative received a score of 58.42 points while the lowest performing alternative received a score of 27.50 points – over a 30-point difference. **Table 3-3** ranks the alternatives from highest scoring to lowest scoring alternative.

Table 3-3: Tier 2 Alternative Rankings Based on Tier 2 Evaluation Criteria Result

Rank	Tier 2 Alternative	Tier 2 Score
1	Alternative A	58.42
2	Alternative D	41.38
3	No-Build	34.06
4	Alternative B	30.67
5	Alternative C	30.19
6	Alternative F	27.51
7	Alternative E	27.50

As demonstrated in **Table 3-3**, Alternative A received the highest score of 58.42 points followed by Alternative D with 41.38 points, No-Build with 34.06 points, Alternative B with 30.67 points, Alternative C with 30.19 points, Alternative F with 27.51 points, and Alternative E with 27.50 points.

The results of the Tier 2 Alternative Evaluation process appeared to be aligned with the visual representation of the benefits and trade-offs associated with each of the alternatives. For instance, Alternative A intuitively could be expected to be the best performing alternative because the alternative includes a benefit for all modes of transportation by increasing vehicular capacity through the addition of two travel lanes and improving the corridor for bicyclist.

Conversely, Alternative F and Alternative E (alternative routes) did not perform as well as the other alternatives because these two alternatives do not significantly improve travel times and/or other vehicular operations of the US 180 corridor in an impactful manner. These two alternatives also have the significantly higher costs and right-of-way impacts compared to the other alternatives.

The reason why the No-Build option ranked third of all seven Tier 2 Alternatives could be primarily due to the zero cost and right-of-way impact, but also correlated with the fact that the No-Build condition performs operationally at a relatively high enough level when compared to the lower scoring alternatives across the other evaluation criteria. In theory, the No-Build option ranking third could provide a baseline for a hypothetical cost-benefit ratio where the alternatives that ranked below the No-Build have a cost/impacts that outweigh the overall benefits, while the alternatives that ranked above the No-Build have overall benefits that outweigh to the cost/impacts.

Over two pages, **Table 3-4** and **Table 3-5** provide a summary of the results for Tier 2 Alternative Evaluation process.

Table 3-4: Tier 2 Alternative Rankings Summary by Tier 2 Evaluation Criteria Categories

Evaluation Criteria				Weight	No Build		Package A		Package B		Package C		Package D		Package E (Alt 17)		Package F (Alt 18)	
Category	Criteria / Measure	Threshold / Formula	Modifier		Result	Weighted Score	Result	Weighted Score	Result	Weighted Score	Result	Weighted Score	Result	Weighted Score	Result	Weighted Score	Result	Weighted Score
Reduction in Vehicular Congestion	Improves Congestion (Average of existing and future volumes)	Formula = (Best Result / Alternative Result) * Weight * 100 Ex - Pkg C: (6.23/9.09) * 5.25% * 100 = 3.60	N/A	5.25%	9.23	3.54	6.23	5.25	8.88	3.68	9.09	3.60	9.09	3.60	8.05	4.06	7.75	4.22
	Travel Speed as % of Base Free Flow Speed	Formula = ((Alternative Result * 100) / Best Result) * Weight * 100 / 2 Ex - Pkg C: ((74.5%*100)/84.9)* 3.32% * 100 / 2 = 1.46	N/A	3.32%														
	AM			(1.66%)	84.8%	1.61	87.4%	1.66	82.4%	1.57	84.4%	1.60	82.6%	1.57	86.9%	1.65	86.0%	1.63
	PM			(1.66%)	83.4%	1.63	84.9%	1.66	76.6%	1.50	74.5%	1.46	75.3%	1.47	84.7%	1.66	84.9%	1.66
	Improved Intersection LOS	Formula = (Best Result / Alternative Result) * Weight * 100 / 2 Ex - Pkg C: (6/6) * 6.04% * 100 / 2 = 3.02	N/A	6.04%														
	AM			(3.02%)	6	3.02	6	3.02	6	3.02	6	3.02	6	3.02	6	3.02	6	3.02
	PM			(3.02%)	7	2.59	7	2.59	6	3.02	6	3.02	6	3.02	7	2.59	7	2.59
	Signal/Stop Control Delay	Formula = (Best Result / Alternative Result) * Weight * 100 / 2 Ex - Pkg C: (71.2/222.3) * 3.29% * 100 / 2 = 0.53	N/A	3.29%														
	AM			(1.645%)	164.8	0.71	162	0.72	195.6	0.60	222.3	0.53	290.5	0.40	71.2	1.65	80.2	1.46
	PM			(1.645%)	85.3	0.92	47.5	1.65	63.8	1.23	63.1	1.24	55.5	1.41	63.2	1.24	55.1	1.42
Travel Time:	Formula = (Best Result / Alternative Result) * Weight * 100 / 2 Ex - Pkg C: (931/965) * 4.79% * 100 / 2 = 2.31	N/A	4.79%															
AM			(2.395%)	959	2.33	931	2.40	986	2.26	965	2.31	987	2.26	935	2.39	945	2.36	
PM			(2.395%)	984	2.33	958	2.39	1073	2.14	1105	2.08	1092	2.10	959	2.39	957	2.40	
Safety	Reduction in Total Crashes	Formula = (Alternative Result / Best Result) * Weight * 100 Ex - Pkg C: (11.55/37.13) * 7.13% * 100 = 2.22	N/A	7.13%	0	0*	37.13	7.12	11.55	2.22	11.55	2.22	25.60	4.91	0	0*	0	0*
	Reduced Injury Crashes	Formula = (Alternative Result / Best Result) * Weight * 100 Ex - Pkg C: (11.50/46.12) * 8.18% * 100 = 2.04	N/A	8.18%	0	0*	46.41	8.18	14.63	2.58	11.50	2.03	23.75	4.18	0	0*	0	0*
	Reduced Bicycle Crashes	Formula = (Alternative Result / Best Result) * Weight * 100 Ex - Pkg C: (-5.31/3.5) * 7.10% * 100 = -10.78	N/A	7.10%	0	0*	3.50	7.10	-5.31	-7.10	-5.31	-7.10	0	0*	0	0*	0	0*
Expand Travel Mode Choices	Pedestrian	Meets or Exceeds both ADOT's minimum standard and the City/FMPO/NAIPTA's (PP) preferred standards	1															
		Meets or Exceeds ADOT's minimum standard OR the City/FMPO/NAIPTA's (PP) preferred standards, but not both	0.5	7.12%	-	0.00	Varies	3.56	Varies	3.56	Varies	3.56	Varies	3.56	-	0.00	-	0.00
		Maintains Existing Condition	0															
	Bicycle	Meets or Exceeds both ADOT's minimum standard and the City/FMPO/NAIPTA's preferred standards	1															
		Meets or Exceeds ADOT's minimum standard OR the City/FMPO/NAIPTA's preferred standards, but not both	0.5	7.48%	-	0.00	Varies	4.68	Varies	2.81	Varies	2.81	Varies	1.87	-	0.00	-	0.00
		Maintains Existing Condition	0															
Transit	Formula = (Best Result / Alternative Result) * Weight * 100 / 2 Ex - Pkg C: (755/893) * 6.27% * 100 / 2 = 2.65	N/A	6.27%															
AM			(3.135%)	834	2.84	862	2.74	895	2.64	893	2.65	1075	2.20	755	3.13	790	3.00	
PM			(3.135%)	894	2.90	866	3.00	1031	2.52	949	2.74	964	2.70	829	3.13	873	2.98	

Table 3-5: Tier 2 Alternative Rankings Summary by Tier 2 Evaluation Criteria Categories (continued)

Evaluation Criteria		Weight	No Build	Package A	Package B	Package C	Package D	Package E (Alt 17)	Package F (Alt 18)
Public Acceptance	Public Support	N/A	0	0	0	0	0	0	0
Construction/Implementation	Project Cost ^{#+-}	Formula = (Best Result / (Alternative Result/10M)) * Weight * 100 Ex - Pkg C: (1/(24.576M/10M)) * 4.68% * 100	\$0.00	\$87,291,544	\$24,576,648	\$24,576,648	\$20,652,488	\$80,265,491	\$62,352,890
	ROW Impact ⁺⁻⁻ (Square Feet)	Formula = (Best Result / (Alternative Result/10K)) * Weight * 100 Ex - Pkg C: (1/(91.728/10K)) * 4.98% * 100	0	303,909	91,728	91,728	58,968	2,557,843	1,993,306
Aggregate Score			34.06	58.42	30.67	30.19	41.38	27.50	27.51
Rank			3	1	4	5	2	7	6

Notes:
 *If no bicycle lane is recommended as a component of the alternative (Alt. 2,3 rural, and 6) bicycle crash modification factors are not provided by the Clearinghouse, resulting in a score of zero. # Project Costs for managed lane alternatives do not include costs for permanent or variable message signing.
 +A common denominator has been added to the formula to normalize the relationship between the best result and the other results due to the large disparity between the two. --ROW impact/cost does not include any costs that may be associated with a potential impact to an existing building.
 Project Economics and Environmental Impacts criterion will be included in Tier 3 Alternative Evaluation Analysis.

Tier 2 Alternatives Recommended for Tier 3 Analysis

Based on the Tier 2 Modeling results and Evaluation Criteria results, the Project Partners agreed to eliminate Alternative Packages E (aka Alternative 17 - Wing Mountain bypass) and F (aka Alternative 18 - Hidden Hollow bypass) from further analysis in Tier 3, however, the group agreed that the alternative routes were being eliminated for Tier 3 analysis, but may still want to use the alternate route modeling findings to compare/contrast future US 180 alternative findings and that the future public presentation on US 180 alternatives needs to include the rationale as to why these alternatives were eliminated. Ultimately, the Project Partners felt that the significantly higher construction costs of the alternate bypass routes could not be supported/justified by the minimal/negligible improvements to traffic operations on US 180.

Without improvements to Milton Road or the application of select spot improvements, the US 180 Alternative Packages provide a negligible improvement to vehicle travel time, transit travel times, or signal LOS/delay. As a result, the Project Partners decided Alternative Packages A, B, C, and D require further discussion with the following two options to consider moving forward:

- **Option 1-** Delay US 180 Tier 3 analysis until a Recommended Alternative is identified on Milton Road. Then, add the Milton Recommended Alternative plus Spot Improvements to model and re-run together with US 180 Alternative Packages.
- **Option 2:** Eliminate poor-performing US 180 Alternative Packages from further analysis.

The Project Partners also agreed to add a No Build Plus Spot Improvements alternative (No-Build Plus) for Tier 3 analysis.

No-Build Plus Spot Improvements – AKA “No-Build Plus”

As previously introduced, one component that separates the Tier 3 Alternative Evaluation process from the Tier 2 Alternative Evaluation process is the inclusion of spot improvements, and the introduction of the No-Build Plus – which essentially is the prior No-Build option, plus the addition of the spot improvements.

Through a progression of meetings between the Consultant Team and the Project Partners, a series of spot improvements were developed to be integrated into all the Tier 3 Alternatives, except the No-Build alternative. Spot improvements were recognized by the Project Partners as being desired to potentially inventory which type of low investment (compared to the Build Alternatives) enhancements could/should be included as part of the No-Build Plus alternative (newly introduced to the Tier 3 process), but also recognize the desire and value of incorporating (or not) of other desired enhancements such as pedestrian, bicycle, transit, safety and traffic operations along the US 180 corridor.

The spot improvements are concentrated at intersections since the alternative’s cross section address the mid-block applications. Spot improvements were also characterized in one of the following categories:

- Roadway Geometry;
- Roadway Operations;
- Vehicular Safety;
- Access Management;
- Pedestrian;
- Bicycle; and
- Transit.

Once the spot improvement inventory was completed, the Project Partners collaborated and recognized the variation in the spot improvement applications and identified the need to assign specific improvements to certain Tier 3 Alternatives. Spot improvements are assigned to the Tier 3 Alternatives by one of the three applications:

- No Build + Alternative Only;
- Build Alternatives Only; or
- All Alternatives.

Refer Section 5.1a of *Working Paper #2 – Alternatives Analysis* on the project [website](#) for the complete inventory of spot improvements.

Tier 3 Analysis & No-Build Plus Alternative Recommendation

Following the confirmation of the Tier 3 Evaluation Criteria, the Project Partners met on August 25, 2020 to review the US 180 CMP Tier 3 modeling results and discuss the correlation of the Milton Road CMP Tier 3 results to the US 180 CMP Tier 2 Evaluation Criteria results and the Tier 3 Alternative Evaluation and Screening process. Refer to Appendix H for the US 180 model results and meeting summary.

As noted in *Section 4.9e– Working Paper #2 – Alternatives Analysis* on the project [website](#), the increase in travel time and poor performance of the operational metrics of the various US 180 Tier 2 alternative packages had a significant correlation to the operations on Milton Road – particularly in the southbound direction. Thus, since there are no significant travel time improvements on Milton Road resulting from the Milton Road Tier 3 Alternative Evaluation process, the opportunity or likelihood for operational improvements on US 180 is nearly non-existent. Refer to Appendix H for more information on how this conclusion was reached through ongoing Project Partner correspondence.

In other words, Milton Road operations are a significant influence on the impacts to operations on US 180 (particularly for southbound PM movements) and US 180 travel performance cannot be improved without first addressing the congestion issues on Milton Road. It was also noted that Mountain Line completed a US 180 Implementation Plan in 2018, finding that winter weekend congestion delays were typically in the 25- to 30-minute range. Specifically, peak travel time analyzed during the winter season from 2014-2018 showed that for 58% of the winter days, drivers experienced delay of 15 minutes or less, 19% of the winter days drivers experienced delays of 16-20 minutes, 10% of the winter days had delay of 21-30 minutes, and 13% of the days drivers experienced delays longer than 30 minutes. Recent enhancements such as increased transit headways, the enforcement of no parking along the US 180 roadway, and snow play area closures (Wing Mountain) have contributed to overall improvements on US 180 during winter weekends.

Recognizing the combination of these multiple factors, the Project Partners discussed the following approach to the US 180 Tier 3 Alternative Evaluation Process:

1. Identify the No-Build Plus as the recommended alternative for US 180; and
2. If the public agrees, the other US 180 Tier 3 Alternates would not go through the Tier 3 Alternative Evaluation and Screening process.

The No-Build Plus alternative on US 180 offers improvements without expanding the right-of-way including bike, pedestrian, wildlife, and intersection safety improvements on US 180 per the previously identified spot improvement inventory in *Section 5.1a -Working Paper #2 – Alternatives Analysis* on the project [website](#).

The Project Partners noted that not all bicycle and pedestrian infrastructure gaps were addressed within the existing defined spot improvement inventory and expressed shared interest in adding additional spot improvements to the No-Build Plus alternative. The refined No-Build Plus would expand to also include a select number of additional spot improvements, such as closing sidewalk gaps (not requiring additional right-of-way) that were not previously identified in the former No-Build Plus alternative. Since the Project Partners were comfortable supporting the No-Build Plus as the Recommended Alternative to the public, the remaining alternatives did not undergo the Tier 3 Alternative Evaluation process.

3.1c Recommended Alternative Selection Process

The Project Partners continued to work and select a refined set of spot improvements for US 180 once the Milton Road preferred alternative - the No Build Hybrid - was identified. This exercise, in essence, created and further defined the new No-Build Plus Recommended Alternative for the US 180 corridor

After reaching the final results of the Tier 2 Alternative Evaluation and determining the Project Partners decision to recommend the No-Build Plus as the US 180 Recommended Alternative, the next step in the US 180 CMP process was to present the Tier 2 Alternative Evaluation results and the proposed recommendation to the public to gauge their feedback and acceptance. This step was a systematic and collaborative process, including the utilization of the public/stakeholder survey inputs as well as feedback received from the project briefing of the City of Flagstaff City Council.

On Wednesday, November 19, 2021, the second public open house meeting (Public Open House Meeting #2) was held virtually due to the COVID-19 Pandemic. The purpose of Public Open House Meeting #2 was to present the detailed three-tier Alternative Analyses results and solicit public and stakeholder input on the Tier 2/Tier3 Alternatives, and ultimately share the Project Partner recommendation of the No-Build Plus as the Recommended Alternative for the US 180 CMP. Public Open House Meeting #2 began with a brief presentation to explain the three-tier alternative evaluation process, provide an overview of the Tier 3 Alternative Evaluation analysis, metrics and results, and notified the participants of the online community survey.

The online community survey included a series of 24 targeted questions. A total of 104 survey responses were received. In addition to feedback received from the community survey, there was also a Live Question and Answer (Q&A) session to allow meeting participants the opportunity to

ask questions about the alternatives, alternatives evaluation process, and the CMP process as a whole to project representatives in a live format. The Live Q&A session was one hour long with 74 participants and a total of 41 questions recorded and answered.

In addition, and prior to the Public Open House Meeting #2, a project briefing was provided to the City of Flagstaff City Council on the status of the US 180 CMP focusing on the results of the Tier 2 Alternative Analysis, Evaluation Criteria results, and the desire to move forward with the No-Build Hybrid as the Recommended Alternative.

A brief synopsis of the public and stakeholder feedback on Tier 2 Alternatives as part of the Recommended Alternative selection process is provided in the following section. However, for more detailed information regarding the process and findings of Public Open House Meeting #2, please refer to Appendix C which includes the Public Open House Meeting #2 Meeting Summary Report. This summary report includes the virtual website used to conduct the meeting, the PowerPoint presentation, the results of the Live Q&A, the Tier 2 Alternative Evaluation display boards, and the detailed results of the online community survey.

Summary of Public/Stakeholder Feedback Received and Considered as Part of the Selection of the No Build Plus Recommended Alternative

Based on the feedback received from the online community survey and the Live Q&A session from the Public Open House Meeting #2, the following observations and considerations were made to aid the Project Partners in selecting a Recommended Alternative.

The public open house meeting #2 and the community survey enabled the consultant team to incorporate those findings to complete the “Public Acceptance” criteria and finalize the entire Tier 2 evaluation criteria analysis.

A series of questions in the online community survey asked participants, using a numeric scale, how much they would “support” or “oppose” each of the Tier 2 Alternatives, potential spot improvements as well as questions designed to gauge the public’s appetite (or not) for acquisition of private property or impacts to private property (parking/buildings) that may be needed to widen the existing roadway. The public feedback received displayed no clear support or opposition for any of the Tier 2 Alternatives. However the results were mixed, and in the application of the Tier 2 evaluation criteria, only the No-Build Plus yielded a slightly positive score. All other alternatives yielded negative scores.

The public survey findings expressed significant opposition to additional right-of-way acquisition and the potential negative impacts to private properties along the US 180 frontage. Many written comments, primarily provided from residents in the area, voiced concern regarding the potential widening of US 180. While some of the public feedback and survey findings are conflicting, the Project Partners discussed and ultimately achieved consensus that the broader interpretation of the collective survey results suggested that the survey findings provided evidence that the public did not wish to see the widening of US 180. Moreover, the fact that each of the “build alternatives” yielded negative travel time impacts in the Tier 2 traffic modeling results as compared to the No-Build and No-Build Plus alternatives; coupled US 180 travel performance cannot be improved without first addressing the congestion issues on Milton Road, proved

difficult for the Project Partners to justify or recommend a costly build alternative that did not provide a benefit to travel time in the US 180 corridor.

With and through the Project Partner deliberations on the Tier 2 evaluation criteria findings and public feedback received, Project Partner consensus was achieved to select the “No-Build Plus” as the Recommended Alternative for the US 180 Road CMP.

4.0 RECOMMENDED ALTERNATIVE

Once the No-build Plus was selected as the Recommended Alternative, the Project Partners assembled over the course of multiple Project Partner meetings to develop and define specific facility enhancements for the corridor that aligned with US 180 CMP goals, Project Partner desired facilities, and within the scope of the No-Build Plus. A series of Spot Improvements were selected to be included for implementation and consideration of the No-Build Plus alternative.

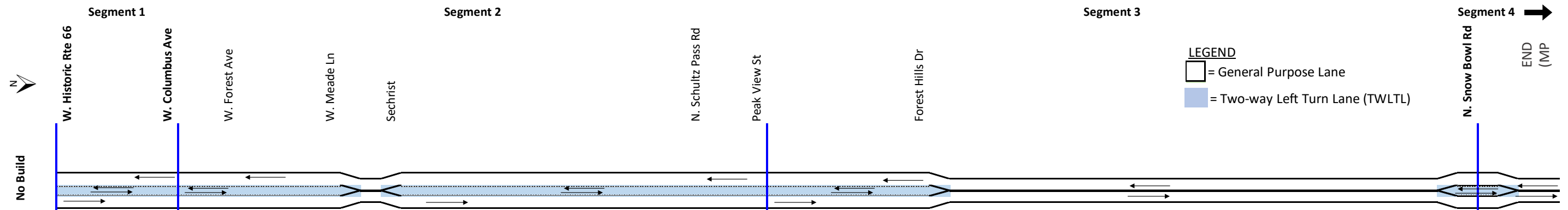
As a result, the No-Build Plus is considered the Recommended Alternative which includes numerous multimodal improvements on US 180, but not adding lanes. The No-Build Plus alternative on US 180 still offers bicycle, pedestrian, bus user, wildlife, and intersection (safety) recommendations through the application of various spot improvements along the US 180 corridor.

Table 4-1 provides a list of the final inventory of Spot Improvements included with the No-Build Plus Recommended Alternative.

In developing transportation projects, there is sometimes a tradeoff between safety, capacity, convenience, and/or comfort of mode based on transportation controls and design that result in impacts to travel times. These tradeoffs must be carefully considered in a future analysis that goes beyond the scope of a planning document. Select at-grade crossing requests did not receive Project Partner concurrence and as a result were evaluated and resolved during an escalation ladder process. The resulting conclusion and supporting language is captured in the below paragraph.

Some intersection and/or mid-block crossing locations that are identified as future opportunities in the US 180 Corridor Master Plan may not be implemented as proposed after being analyzed through the planning process and evaluation criteria agreed upon by partners. However, these opportunities could present themselves as we move into the future. Approval to build such crossings requires a technical evaluation process which may not support the implementation of the improvements or may require additional enhancements such as intersection improvements, median refuges, grade separations or location adjustments. If the intersection and segment level of service or other potential negative impacts improve or can be mitigated from the predicted level of service identified in the study at the horizon year, then the additional pedestrian crossings could be considered if warranted in the future. Even though this is a 20-year plan, potential changes from real to projection may be checked on a five-year basis.

Table 4-1: US 180 No-Build Plus Recommended Spot Improvements



Spot Improvements					
Humphreys Street	Columbus Street	Forest Avenue	Sechrist Elementary School	Schultz Pass Drive	Snow Bowl Road
<ul style="list-style-type: none"> Restrict U-Turns Ladder/High-Visibility Cross walks ADA-compliant curbs ramps Pedestrian crossing improvements Transit signal prioritization[#] Add NB dual left turn lanes at Humphreys Street and Route 66 and additional NB receiving lane to Cherry Avenue as ROW becomes available** 	<ul style="list-style-type: none"> Ladder/High-Visibility Cross walks ADA-compliant curbs ramps Bicycle signal detection and actuation Transit signal prioritization[#] increase pedestrian staging area 	<ul style="list-style-type: none"> Two raised medians in existing south leg turn lane. Keep the raised medians for the pedestrian refuge and for the center running lane alts, the center lane will have to merge into the other lane at these segments Pedestrian crossing hybrid beacon* ADA-compliant curbs ramps Sidewalk widening Combined Bike Lane/Right Turn Lane for WB Forest Ave. to NB US 180 with bicycle shared-lane markings 	<ul style="list-style-type: none"> NB right turn lane extension Pedestrian crossing hybrid beacon* ADA-compliant curbs ramps Advanced pedestrian warning signage Existing bus stop on the NB side (east side) Enhanced lighting at pedestrian crossing 	<ul style="list-style-type: none"> ADA-compliant curbs ramps Bicycle signal detection and actuation Transit signal prioritization[#] 	<ul style="list-style-type: none"> Additional left turn lane (SB Snow Bowl Rd) Enhance pavement striping of existing pavement section to create an additional NB receiving lane on Snow Bowl Road Ladder/High-Visibility Cross walks Pedestrian crossing hybrid beacon* Roundabout (pending further consideration)
Additional Spot Improvements					
<ul style="list-style-type: none"> DMS Signage Rumble strips in non-residential areas Safety edges Delineators Guard rails Turn lane extensions Speed feedback signage (temporary applications only) Wildlife crossing at MP 224.8, MP 228.8, and MP 218 Add sidewalk where not present within City of Flagstaff limits 			<ul style="list-style-type: none"> Shoulder widening between Magdalena Rd (MP 219.16) and Hidden Hollow Rd (MP 219.65) Restrict U-Turns Right turn restrictions Enhanced crosswalks Pedestrian scale lighting (FUTS) Pedestrian warning signage Pedestrian hybrid beacon crossing at Humphreys St and Fine St. and on US 180 at Meade St, Anderson St, near the Museum, and Blue Willow St* Bicycle signage Enhanced Transit Shelters Planned bus stop on the NB side of Anderson Road (east side) 		
<p>*ADOT requires ped crossing and new signals to meet ADOT warrants prior to installing them on Milton and US 180. The project partners would like for monitored test crossings to be allowed, where appropriate. ADOT has warranting criteria for these features and believes the warrants should meet prior installing the features.</p> <p>[#]Proposed transit signal priority is for future consideration only, and will be considered for implementation upon meeting ADOT warrant and/or TIA that concludes no negative impacts to vehicular operations.</p> <p>**The NB dual left turn lane at Humphreys Street and Route 66 and receiving lane to Birch Street are intended to be implemented as part of redevelopment. The location of where the NB receiving lane drops (Birch St) should be reevaluated during design.</p>					

4.1 Implementation

The Vision and Spot Improvements of the Recommended Alternative may be implemented in a manner which would not negatively impact businesses or homes, while offering multimodal improvements. Because of this, it is recommended that all Project Partners work together to implement the recommended improvements as soon as funding becomes available, using whatever funding is attainable. The construction cost estimate is \$2,824,000.

The preliminary construction cost estimate for the study corridor was developed using Fiscal Year 2020/21 unit costs. A detailed Cost Estimate can be referenced in Appendix I. The detailed planning-level cost estimate includes estimate spreadsheets, spot improvement cost estimates, construction costs, and factor percentages. All costs and factors rates were either provided by or reviewed and approved by ADOT.

It is anticipated that ADOT would fund the improvements of this plan over time as funding becomes available via ADOT’s performance-based Planning to Programming (P2P) process, ADOT’s Highway Safety Improvement Program (HSIP), or other funding that may become available to the state. All ADOT-funded programs are competitive, so funding is not guaranteed.

Any recommended improvements that exceed ADOT’s standards are anticipated to be funded by Project Partners as funding becomes available via their respective programming processes. Should ADOT’s Project Partners desire to offer funding and partner on any improvement implementation, they should contact the ADOT District Engineer. Should ADOT’s Project Partners desire to apply for grants to implement any improvements, they should contact ADOT’s Grant Coordinator, Kohinoor Kar, (kkar@azdot.gov or 602-712-8239) prior to applying.

APPENDICES

- Appendix A - Project Charter
- Appendix B - Public Involvement Plan (PIP)
- Appendix C - Public Meeting Summary Reports
- Appendix D – Existing Traffic Volume Synchro Input/Output Results
- Appendix E – Beulah Boulevard Extension & University Avenue Extension Design Plans
- Appendix F - Bus Rapid Transit Traffic Analysis & Model Results Memo
- Appendix G - Controlling Design Criteria
- Appendix H - Tier 3 Evaluation Criteria Task Force Notes & Outcomes
- Appendix I – Detailed Planning-Level Cost Estimate

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