ADOT

Milton Road Corridor Master Plan

Working Paper #1:
Existing & Future Conditions

April 2018

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INTERNATIONAL

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EXECUTIVE SUMMARY

To be provided with future Work Task 8: Draft Final Report.

CHAPTER 1: STUDY INTRODUCTION & OVERVIEW

Milton Road Corridor Master Plan Purpose & Need

The purpose of the Milton Road Corridor Master Plan (CMP) is to identify a 20-year vision for the Milton Road corridor that addresses current safety and traffic congestion issues by evaluating a mixture of previously recommended and newly introduced System Alternatives. These System Alternatives include a mix of alternatives that utilize and maintain the existing Milton Road right-of-way, alternatives that would require an expanded right-of-way, and alternative routes separate and in addition to the Milton Road corridor itself.

The System Alternatives are also complemented by a series of Base Build Spot Improvements – which constitute targeted, near term, low investment mitigation measures that support mid-term and long-term System Alternatives. Chapter 9 of this report describes the System Alternatives and Base Build Spot Improvements in greater detail.

The Milton Road CMP process will include an extensive public and stakeholder involvement process that consists a thorough and community-vetted, quantitative evaluation criteria exercise for the evaluation of the System Alternatives to ultimately reach a set of preferred System Alternative(s) and achieve an informed consensus by the Project Partners, stakeholders and citizens.

Project Partner Goals &Objectives

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

- Arizona Department of Transportation (ADOT)
- Flagstaff Metropolitan Planning Organization (FMPO)
- Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA)
- City of Flagstaff
- Coconino County
- US Forest Service (USFS)
- Federal Highways Administration (FHWA)
- Northern Arizona University (NAU)
- Burlington Northern Santa Fe Railroad (BNSF)

The Project Partners are established to guide the success of the Milton Road CMP planning process by maintaining a positive and supportive working relationship with all partnering agencies, hold regular communication, and stay committed to the project's core values. The Project Partners met early in the planning process to agree upon and create a Charter (Appendix X) to establish a set of fundamental principles for the Partners to abide by. The Project Partners also established the following seven goals for the Milton Road CMP which are not prioritized in any particular order:

1. **Address year-round congestion and safety on Milton Road**
2. **Identify the long-term (20-year) vision of the corridor**
3. **Obtain public and stakeholder input on alternatives, including multimodal alternatives**
4. **Scope out and further implement previous and new strategies, consistent with the long-term vision**
5. **Prioritize implementation projects for design.**
6. **Assist NAIPTA in completing its Bus Rapid/Transit/High Capacity Transit system design.**
7. **Follow the Planning and Environmental Linkages (PEL) process to carry forward decisions into the design and NEPA.**

Milton Road Corridor Overview

The nature and function of Milton Road has changed over the years with the evolution and growth of the City of Flagstaff. Historically, Milton Road primarily served residents and visitors as a connection between Interstate 17 (I-17) to downtown Flagstaff, Historic Route 66 and Interstate 40 (I-40), and US Highway 180 (US 180). Although Milton Road continues to serve in that capacity today, the roadway is now a formidable commercial corridor for NAU students and residents throughout Coconino County. Milton Road is home to a considerable portion of the destination commercial retail growth south of downtown. Illustrated in **Figure 1-1**, the Milton Road Corridor Master Plan study corridor consists of a 1.8-mile segment from West Forest Meadows Street (Mile Post 402.16) to Beaver Street (MP 180.20).

Milton Road 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. There is an extensive list of issues within the study corridor, including severe traffic congestion caused by the combination of local traffic and visitors, especially during the winter snow play season. The frequency and close proximity of driveways and intersections causes access management conflicts, and Milton Road's adjacency to Northern Arizona University brings multimodal challenges facing bicyclists, pedestrian and transit users.

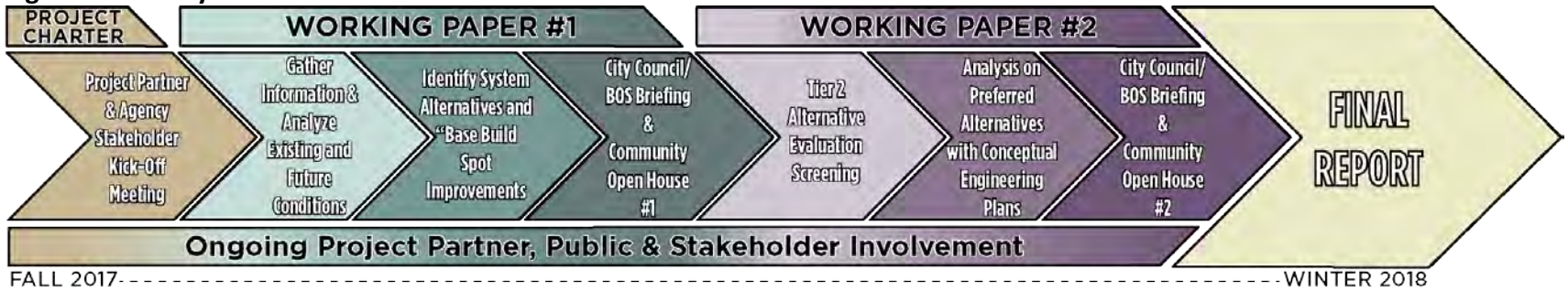
Chapter 5: *Existing Roadway and Corridor Conditions,* offers a more comprehensive examination of the existing travel and operational characteristics of Milton Road.

Figure 1-1: Milton Road CMP Study Corridor

Study Process

The Milton Road CMP study process will consist of the review of existing and future conditions, an understanding of previous relevant studies, extensive community and stakeholder input, and a quantitative evaluation process. The Project Partners will meet with the Study Team to provide guidance and oversight throughout the planning process. The extensive public and stakeholder involvement process will include meetings the with the Coconino County Board of Supervisors, the Flagstaff City Council and two Public Open House meetings at key project milestones. As illustrated in **Figure 1-2**, the entire Milton Road CMP process will occur over an approximate 14-month timeframe from the Fall of 2017 to the winter of 2018.

Figure 1-2: Study Process



Working Paper #1 Objectives

Working Paper #1 is the first of two working papers for the Milton Road CMP. The objectives of Working Paper #1 include:

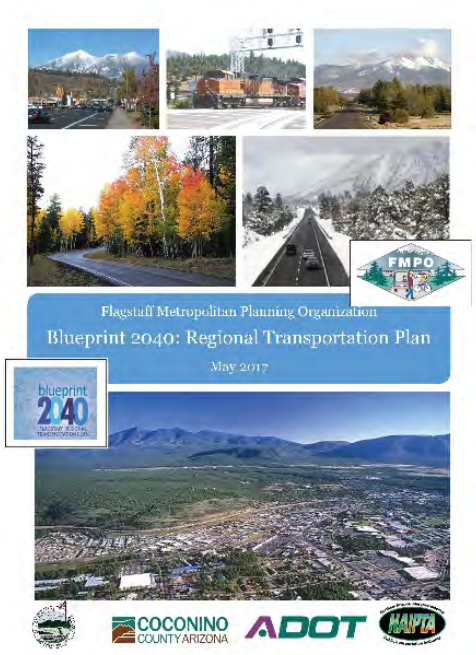
1. Review and summarize pertinent information from previously adopted relevant plans, studies and reports.
2. Collect and analyze existing and future conditions relating to traffic and level of service characteristics, population and growth projections.
3. Provide an environmental overview of the Milton Road corridor.
4. Identify, describe and depict the System Alternatives developed from existing studies and newly introduced concepts.
5. Identify a preliminary set of near term Base Build Spot Improvements that will complement and support the longer-term System Alternatives. The Base Build Spot Improvements will evolve and expand as Preferred Alternatives are identified and analyzed as a future task in the study process.

CHAPTER 2: PREVIOUS & ONGOING STUDIES, PLANS & REPORTS

This chapter offers a review and synopsis of existing studies, plans or reports that may influence the planning process of the Milton Road CMP. These studies and reports offer insights into the existing transportation issues and potential recommendations that may be associated with the Milton Road corridor.

FMPO Blueprint 2040: Regional Transportation Plan (FMPO, City of Flagstaff, NAIPTA, ADOT, Coconino County) 2017

This extensive plan and process culminated in May of 2017. "Blueprint 2040" sets transportation direction and priorities for Flagstaff and the surrounding Coconino County region. *Blueprint 2040* meets the Flagstaff Metropolitan Planning Organization's (FMPO) federal mandate for regional transportation planning and the ideas presented in the RTP define the vision of the region and guide the transportation system infrastructure and investment choices that will serve the area best.
The RTP assumes that a continuation of the voter-approved Transportation Sales Tax (.00426) will extend for another 20 years beyond its current June 30, 2020 expiration date. The RTP notes that an extension of this sales tax would generate an estimated $195 million over the 20-year period. These revenues would be used to fund (and/or partner with other state and federal agencies) transportation infrastructure projects identified in the RTP.



Key concepts or themes that the RTP addresses include:

Renewed commitment to Connectivity

- People Matter – an efficient system recognizes that time is valuable
- Smart and Connected Matters – connectivity provides choice, redundancy and shorter distances
- Environment Matters – a more efficient system for all modes is better for the planet

Renewed commitment to Multimodalism

- People Matter – health, safety and affordability benefits are gained from alternate modes
- Place Matters–human-scaled environments for walking and biking make places welcoming
- Prosperity Matters –walking, biking and transit allow for vibrant social engagement that energizes activity centers
- Environment Matters – non-motorized travel choices and efficient, well-designed motorized systems protect the natural beauty and health of the region

Renewed commitment to Partnership

- Cooperation Matters – government-to-government relations will be vital to achieve the system, project design and funding envisioned in *Blueprint 2040*
- Trust and Transparency Matter – *Transportation Decision 2000,* a series of dedicated sales tax propositions, started regional investments in transportation on an unprecedented scale. Dozens of projects have been promised and built, garnering public trust. *Blueprint 2040* is the next step in a trust-building dialogue between regional decision makers and the public.

The RTP plan and process was an extensive undertaking. A Steering Committee of 11 community leaders met over seven months to provide input on priorities. More than 600 people actively participated online and tens of thousands more were made aware through three *Cityscape* articles and numerous newspaper editorials and stories.

The RTP reviewed local and national trends and conditions, evaluated and ranked numerous project types with a series of performance measures for transit systems, roads and streets, pedestrian and bicycle facilities, and freight. A funding analysis was conducted over the various priority projects and ultimately a set of project priorities and program alternatives were recommended.

Figure 2-1 identifies the roads and streets build out plan from the RTP. This includes road projects in the multimodal program recommended to be delivered in the next 20 years. Nearly $280,000,000 in sales tax funds, grants and other revenues are projected to be available to deliver the projects in the RTP.

Figure 2-1: Roads & Streets Build Out Plan

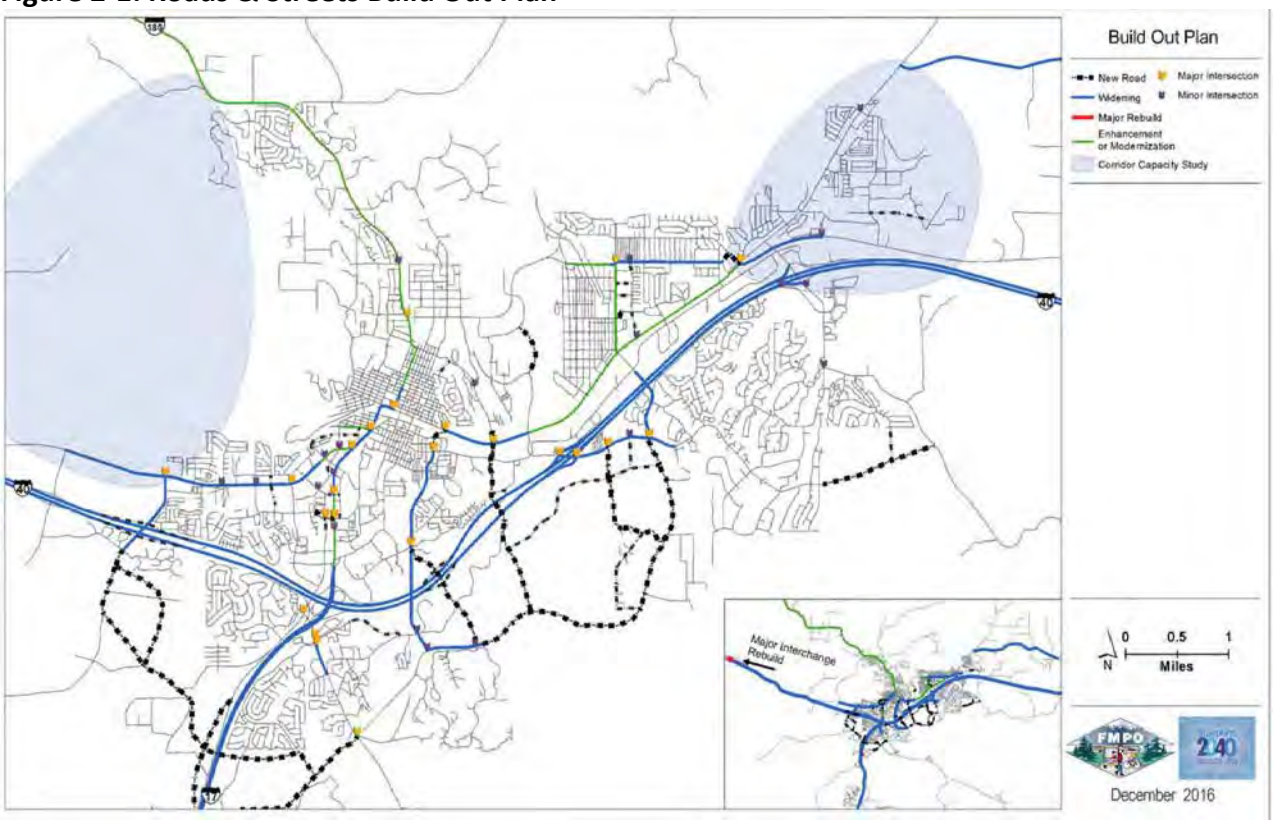


Figure 2-2 below provides a detailed listing of each project by type, project/community rank, estimated cost and funding source. What is noteworthy for this Milton Road CMP is that Milton Road widening

ranked #1 amongst all project types, and is noted to be a "project of opportunity" in that additional project partners such as ADOT or others would be needed to successfully fund and construct.

Figure 2-2: 20-Year Program Summary

Project ID	Project Name	Rank	Years of Construction		Cost (2013 $)	Finance
BRT	Bus Rapid Transit	26	2021		$46,870,000	Loan/Grants
	Bus Rapid Transit - Operating		Annual $1,250,000		$25,000,000	Cash/Grants
LTR_43	Lone Tree Road widening South	8	2025		$13,825,046	Bond
FOU_22	Fourth Street Bridge	15	2023		$7,296,878	Bond
HCT_27	High Country Trail Extension	99	2036-2040		$2,708,541	Cash
FOU_23	Fourth Street Widening	30	2025		$6,004,460	Bond
	Soliere to Butler					
JWP_37	J.W. Powell (Airport)	12	2031-2035		$11,494,668	Bond
LTR_42	Lone Tree Road widening North	6	2030		$9,164,054	Bond
BUT_6	Butler Avenue Widening	9	2028		$13,322,891	Bond
SW_Short	Short term sidewalks (100% draft ATMP** recommendation)	90	2021	2022	$2,589,413	Cash
SW_Mid_1	Mid-term sidewalks (50% draft ATMP** recommendation)	91	2022	2026	$5,888,332	Cash
X_Med	Crossings/Grade Separations	74	2022	2036-2040	$12,100,000	Cash
MIL_54	Milton Road Widening*	1	Phased		$36,559,211	Cash
Reserve	Projects of Opportunity*/Partnering		Annual $1,250,000 balance after Projects of Opportunity*		$4,000,000	Cash
Programs	TDM/ITS/etc.**		Annual $600,000		$12,000,000	Cash
Coconino	Unspecified County Project(s)		Varies		$12,000,000	Cash
Subtotal					**$220,823,494**	
	Inflation & Debt Financing***				$59,176,506	
Total					**$280,000,000**	

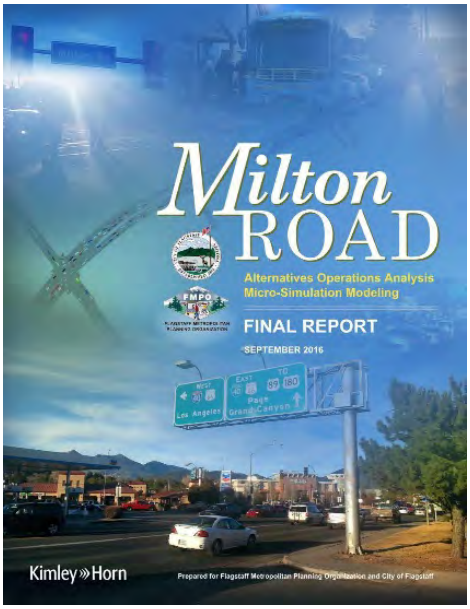
* Milton widening is assumed to be the project of opportunity for this program. Reserve funds would be applied to project costs. Project scope may be reduced or require more ADOT participation

** ATMP is Active Transportation Master Plan, TDM is Travel Demand Management, ITS is Intelligent Transportation Systems

*** Inflation and debt financing costs are presumed to be the balance of available funds

Source: FMPO Blueprint 2040: Regional Transportation Plan, 2017

Milton Road Alternatives Operations Analysis Micro-Simulation Modeling Final Report (FMPO and City of Flagstaff) 2016



Completed in September of 2016, the purpose of this study was to assess the operational effectiveness of alternative mobility treatments for the Milton Road/Route 66/Business Route 40 corridor (including cross-streets) between Forest Meadows Street and San Francisco Street.

As Milton Road's function and purpose has evolved over time, once serving as a state highway primarily serving regional transportation needs, urbanization of Flagstaff, continued growth of NAU's student population and general growth in the region, Milton Road has evolved into a roadway that is used by vehicles, transit, bicyclists, and pedestrians. Congestion is a significant community concern.

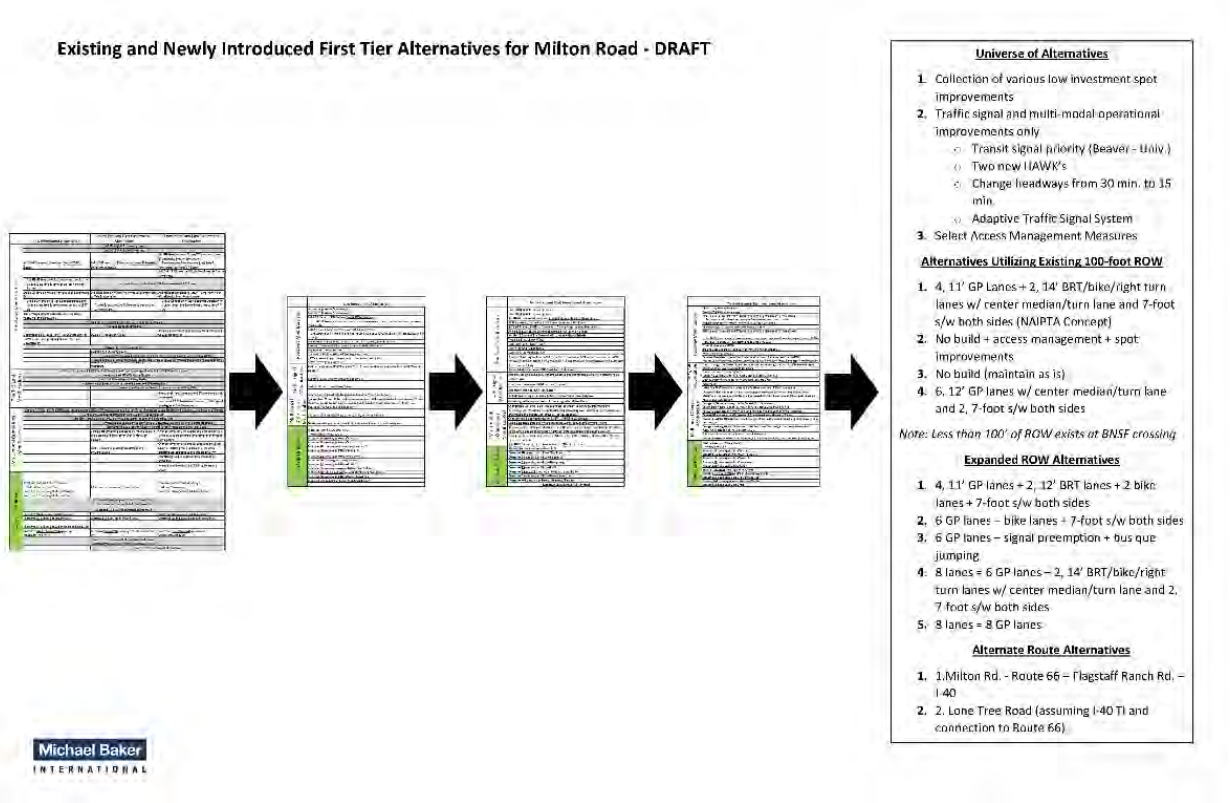
As the study notes, inherent in a multi-functional roadway are competing priorities, be it regional traffic mobility vs. local access or vehicular capacity vs. multimodal accommodations. These competing priorities, combined with existing corridor constraints, have resulted in operational and safety issues on Milton Road that were evaluated in this study. This study conducted a more technical evaluation using micro-simulation models. This project also did not include extensive stakeholder and public involvement as the goal is to determine the operational effectiveness of alternative mobility treatments for a technical audience.

The study performed analysis for existing baseline conditions and a future growth condition that consisted of an assumed 20 % growth rate in traffic volumes across three alternative types; "low investment alternatives", "auto focused high investment alternatives", and "transit-focused high investment alternatives".

Review of video output from the study suggests the model input did not have traffic utilize the Beulah Boulevard backage road as much as expected

The matrix in **Figure 2-3** provides a summary of the various projects evaluated across the three alternatives:

Figure 2-3: Matrix of Alternatives



Based on a review of the micro-simulation analysis findings, the following recommendations were recommended for the Milton Road CMP:

1. The findings from the micro-simulation analysis should be incorporated into the planned corridor study for Milton Road and other ongoing or planned studies that affect the Milton Road corridor.
2. The Low Investment Alternative proposed improvements should be considered for near term implementation (Base Build Spot Improvements) as funding and right-of-way availability allow because they are relatively low-cost/low-impact yet significantly improve travel conditions.
3. Improving multimodal (bus, bike, pedestrian) travel should be a priority for the corridor.
4. Future improvements should address not only typical daily traffic issues but also seasonal peak traffic conditions such as on holidays and snow play weekends.
5. Access management should be integrated with improvements, particularly any improvements that widen Milton Road.

Lone Tree Road Corridor Study (City of Flagstaff/FMPO) 2006

The purpose of the *Lone Tree Corridor Study* was to identify and evaluate a potential gateway corridor to the central section of the City of Flagstaff in accordance with the city's Regional Land Use and Transportation Plan. This study focused on a north-south study area generally located in the vicinity of the current Lone Tree Road in order to enhance regional mobility, improve community and local circulation and minimize side friction between adjacent land uses and the corridor. In addition , the Lone Tree Road corridor was intendified as the most suitbale alternative route for Milton Road fore many

destinations and longer trips. The report was to be used as an adopted plan for the preservation of the preferred Lone Tree Road alignment.

The study identifies a Preferred Alternative (**Figure 2-4**) that consists of a 4-lane collector roadway with raised median together with bicycle and pedestrian facilities along both sides of the roadway. The report notes the need to enhance regional connectivity by establishing a traffic interchange to I-40 and a grade separated crossing over the BNSF railway mainline.

Figure 2-4: Lone Tree Corridor Study Preferred Alternative

Source: Lone Tree Corridor Study, DMJM Harris | AECOM 2006

Flagstaff High Occupancy Housing Draft Specific Plan (City of Flagstaff) July 2017

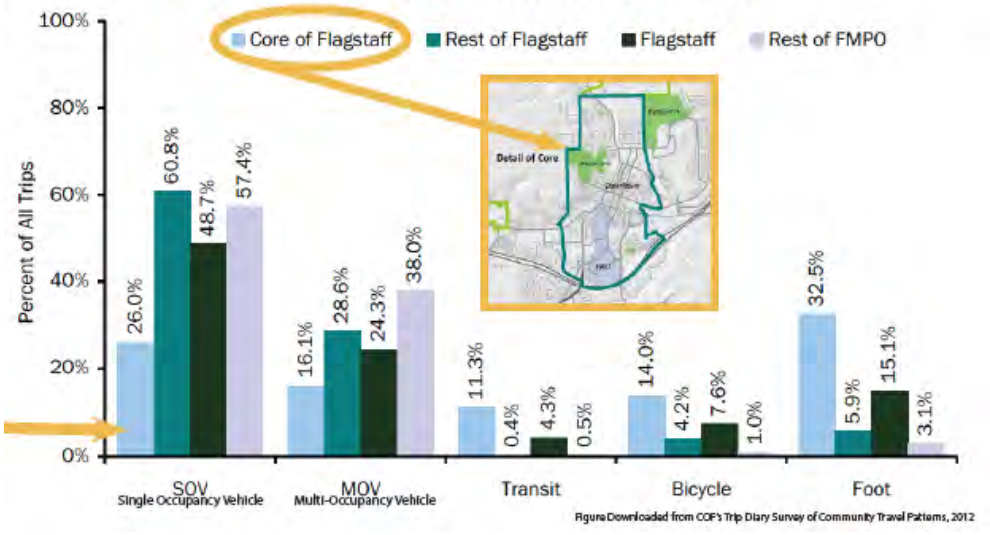
The goal of the *High Occupancy Housing (HOH) Specific Plan* is to produce a new Specific Plan for the City of Flagstaff that defines future urban patterns for High Occupancy Housing (HOH) developments while not neglecting the "active stewardship of the natural and built environment". The HOH Specific Plan has been developed in response to community concerns surrounding some of the larger buildings recently completed or in development stages, particularly associated with the need for additional off campus student housing to accommodate current and future growth of the NAU student population. Leading to increased daily congestion on Milton Road and is projected to get worse complicating peak winter traffic congestion.

The Plan defines HOH as, "a development with at least 30 units or 75 bedrooms per acre in dormitory or apartment-style units". The Plan offers an extensive review of existing HOH developments (such as The Grove, The Standard, Village at Aspen Place, The Hub, etc.), history of the zoning and land use considerations influencing HOH developments, and offers site analysis and design considerations for future HOH opportunities in Flagstaff. The plan concludes with a series of goals, policies and implementation strategies.

Key findings and considerations that influence transportation considerations include:

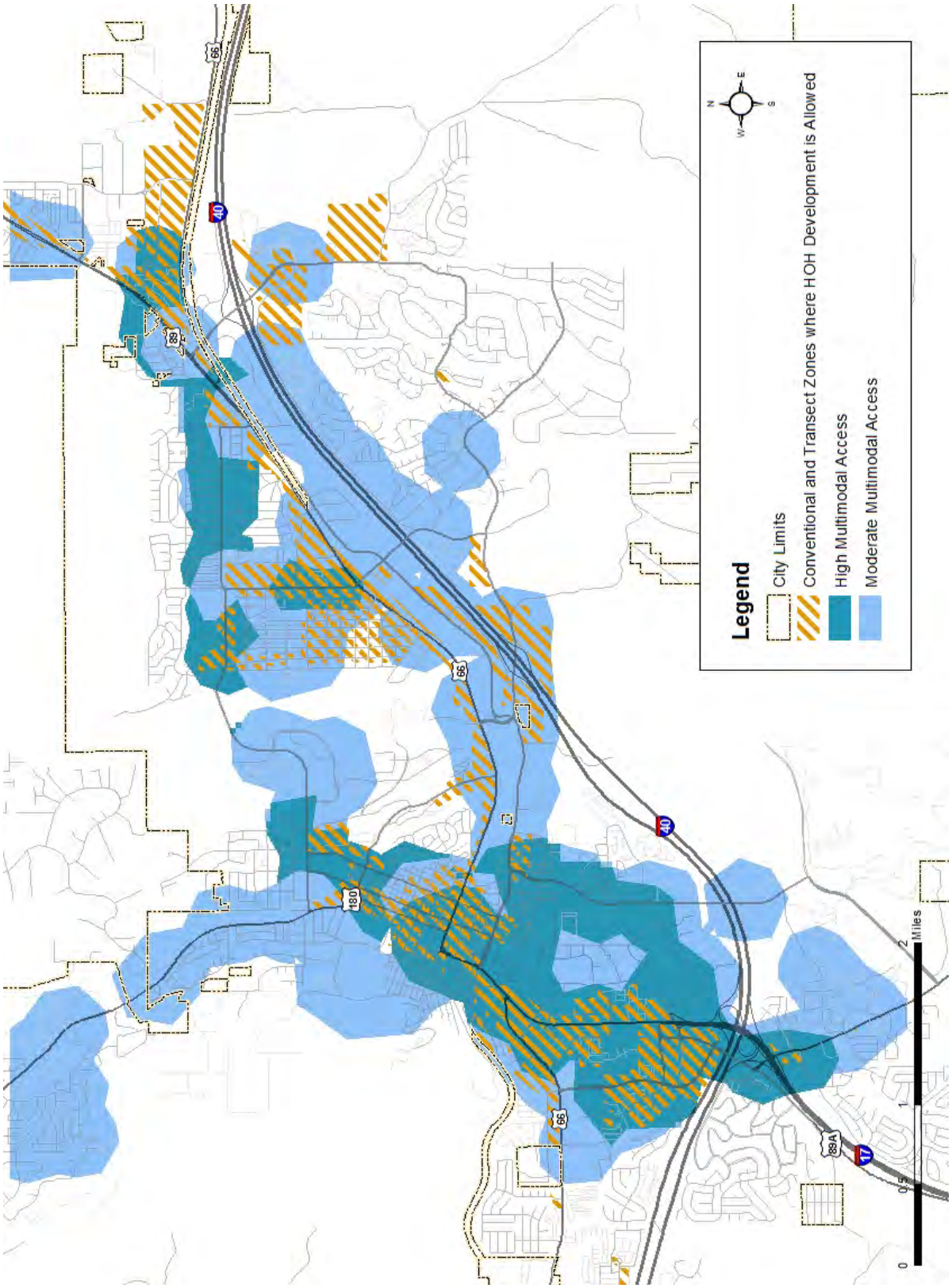
- Key activity center and HOH sites are located along Milton Road
- Description and location map of where HOH opportunities are currently allowed
- In a 2014 survey of pedestrians, no or missing sidewalks or difficult crossings were the top reason that walking in Flagstaff was considered uncomfortable
- Vehicle miles traveled per capita per day has dropped from 21 miles in 2007 to under 17 miles in 2016.
- There is a strong relationship between establishing HOH locations and multimodal mobility necessary to serve future HOH areas

Figure 2-5: Modal Share of All Trips by Area of Residence (2012)



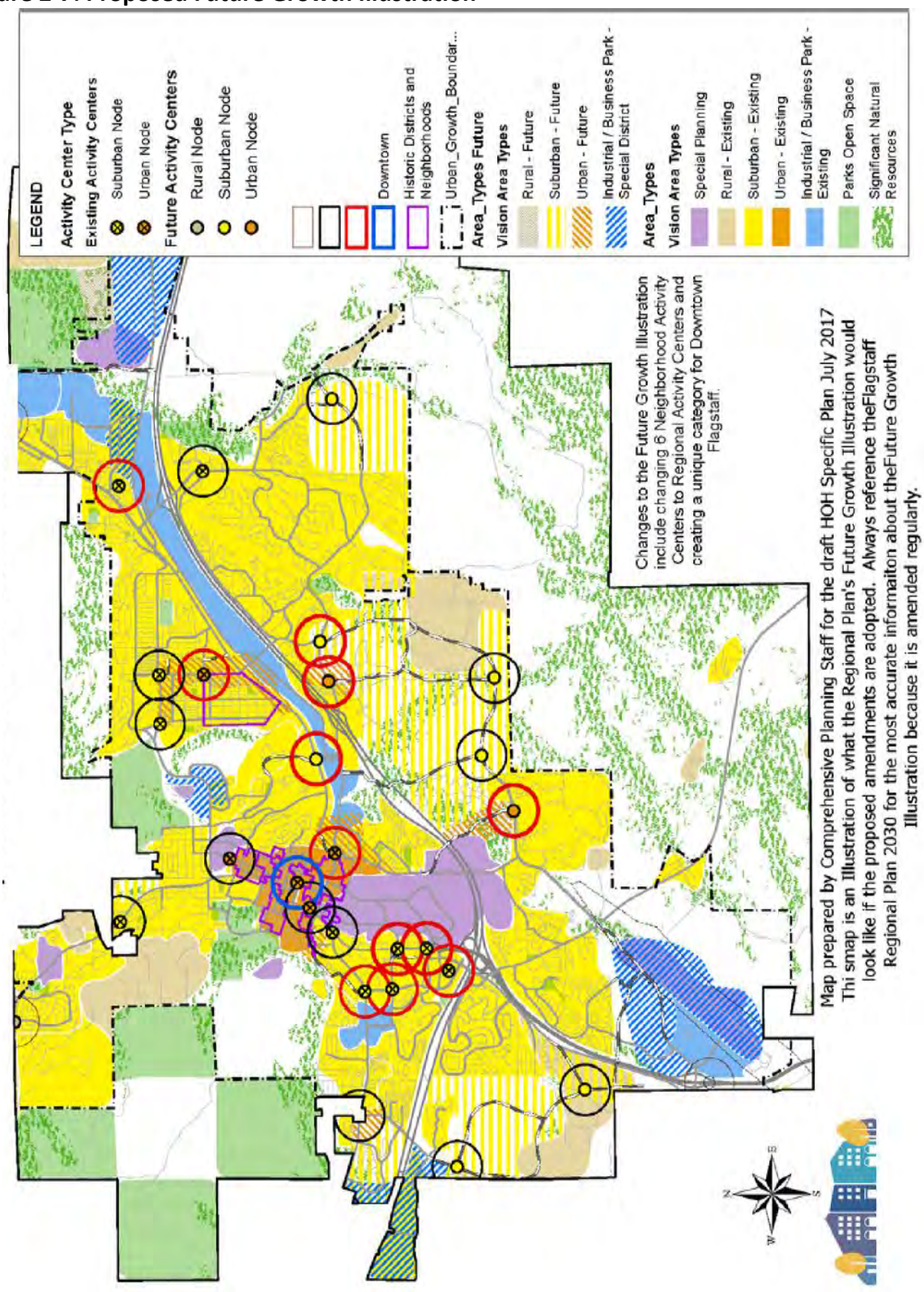
Source: City of Flagstaff High Occupancy Housing Draft Specific Plan

Figure 2-6: Potential HOH Development Zones



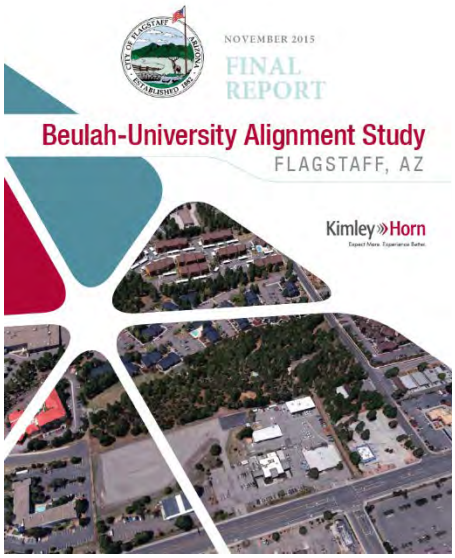
Source: City of Flagstaff High Occupancy Housing Draft Specific Plan

Figure 2-7: Proposed Future Growth Illustration



Source: City of Flagstaff High Occupancy Housing Draft Specific Plan

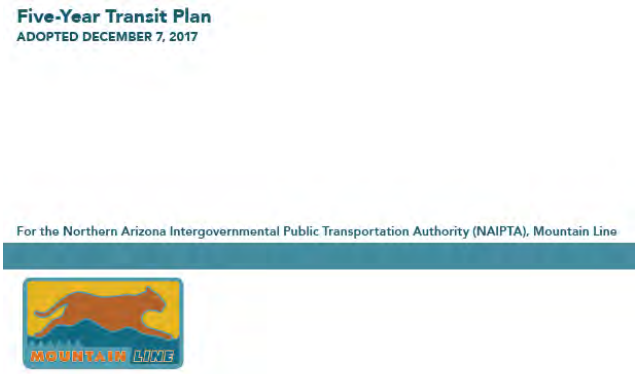
Beulah-University Alignment Study (City of Flagstaff) 2015



The purpose of the *Beulah-University Alignment Study* was undertaken to provide alignment alternatives and roadway cross-sections for Beulah Boulevard and University Avenue/Drive based on an analysis of study area constraints and anticipated traffic impacts of connecting Beulah Boulevard and University Avenue/Drive. The study was conducted in response to a proposed public-private partnership intended to relocate ADOT's current administrative offices at the southwest corner of Milton Road and University Drive in anticipation of commercial and mixed-use development opportunities.

The study conducted a capacity analysis (with growth scenario) and developed a series of conceptual and candidate alternatives that evaluated the advantages and disadvantages of the potential roadway alignment/connection of Beulah Blvd. to University Drive. The report also identifies adjacent site development characteristics/constraints, safety, cost, and multimodal design considerations to inform the public-private partnership process in their evaluation of the development potential of this property.

Five-Year Transit Plan (NAIPTA) 2017



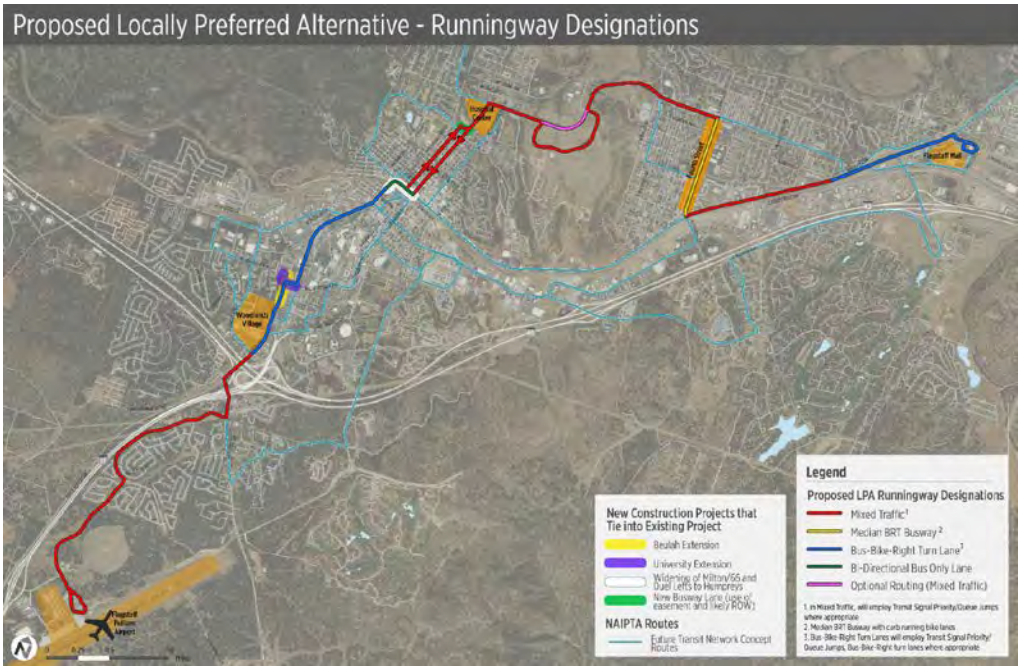
The Five-Year Transit Plan was adopted in December 2017 and was produced for NAIPTA's Mountain Line fixed bus service. The main focal point of the report is how NAIPTA should prioritize future service investments, specifically addressing the trade-offs between higher frequency service, longer spans of daily service, or increased coverage. The plan includes near-term goals through an enhanced short-term network under a budget similar to the existing, as well as a future funding scenario that includes a permeant transit network with greater coverage area and high frequency routes. The plan also includes transit-supportive policies and practices that should be implemented in the next five years. Milton Road is identified as one of the permanent transit routes in the permanent transit network as a north-south corridor connecting downtown with the Beulah Roads. However, Milton Road is also noted as a pedestrian-hostile roadway and notes the Beulah Road extension as a viable transit corridor with more opportunity to develop transit-oriented development. The five year transit plan also suggests relocating The Downtown Connection Center currently located to Phoenix Ave and Milton Road because access for busses and pedestrians is challenging due to the high speeds, congestion, limited turns and long waits associated with Milton Road/Historic Route 66 and the railroad.

NAIPTA Transit Spine Locally Preferred Alternative Final Report (June 2016)

The purpose of this project was to determine a Locally Preferred Alternative (LPA) for the Transit Spine cross-town transit connector. The Transit Spine is envisioned to be a corridor-based Bus Rapid Transit

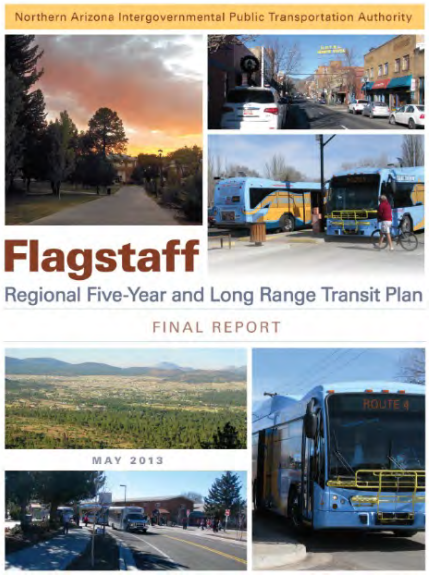
(BRT) service that connects key activity centers, including the airport, downtown and Flagstaff Mall. The Transit Spine will also provide enhanced transit service in Flagstaff, offering more convenient and attractive service than existing transit service and travel options in the area.

The selected LPA, considered to meet a NAIPTA project policy goal, is a corridor-based bus rapid transit service operating between the Flagstaff Mall and Flagstaff Pulliam Airport, on Marketplace Drive/South Mall Way, Route 66/89A, N. 4th Street, Cedar Avenue, Gemini Road, Forest Avenue, a one-way couplet of N. Humphreys Street (NB) and N. Beaver Street (SB), Rt. 66, S. Milton Road, W. University, S Beulah, Lake Mary Road, High Country Trail, and Pulliam to the Flagstaff Pulliam Airport.



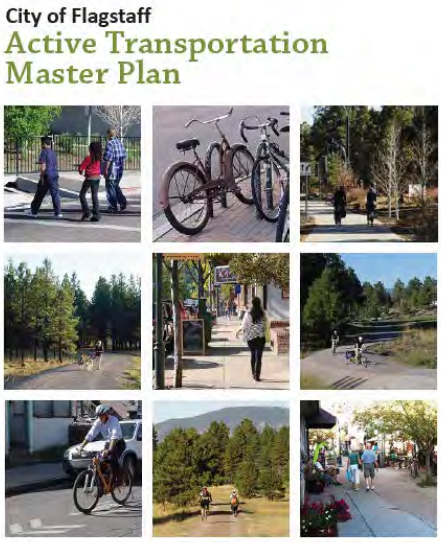
Flagstaff Regional Five Year & Long Range Transit Plan (NAIPTA/ADOT) 2013

The *Flagstaff Regional Five Year & Long Range Transit Plan* proposes a long-term vision for Flagstaff's regional public transportation system and identifies and establishes a short-, mid-, and long-term service plan; funding plan; and implementation plan. Bus transit services were historically operated by Coconino County when in 2006, NAIPTA was formed to provide a regional approach to transit in and around Flagstaff. NAIPTA staff has successfully implemented several of the 2005 Plan recommendations, including implementing Mountain Link rapid bus service in 2011.With the accomplishment of many of the original goals, this Plan identifies a series of goals and objectives and short-term (years 1-5), mid-term (years 6-10) and long term (years 11-20) for transit services in the Flagstaff area.



City of Flagstaff DRAFT Active Transportation Master Plan (City of Flagstaff and FMPO) 2015

The City of Flagstaff and FMPO are currently preparing an Active Transportation Master Plan to serve as a detailed guide to enhance walking, biking, and trails in Flagstaff. The Plan discusses and provides maps for existing and future proposed sidewalks, bike lanes (and bikeway networks), the Flagstaff Urban Trail System (FUTS), at grade and grade separated crossings and neighborhood connectors. This ongoing draft plan has many details, but some of the key findings include:



- There are approximately 300 miles of existing sidewalks in Flagstaff, but there are 60 miles of missing sidewalks along major streets.
- The missing sidewalks have been inventoried and prioritized totaling $37.5 million in sidewalk improvements.
- There are approximately 130 miles of existing bike lanes and shoulders on Flagstaff streets, but there are about 53 miles of missing bike lanes from candidate city streets.
- 22 miles of the 53 miles of missing bike lanes could be completed by providing striping to existing facilities at an estimated cost of $1.84 million.
- 13 miles of additional bike lanes require reconstruction at an estimated cost of $6.72 million.
- The FUTS system is a shared use path that connects neighborhoods, shopping, employment areas, schools, parks and the surrounding National Forest.
- Presently, there are 56 miles in the FUTS system, 75 miles of planned trails for a total of 130 miles planned for the FUTS system.
- There are 1400 existing at-grade pedestrian crossings in Flagstaff. There are 65 new locations where additional at-grade crossings are needed.
- Flagstaff has 21 existing grade separated crossings including 10 bridges/tunnels and 11 roadway overpasses/underpasses. An additional 44 locations for new grade-separated crossings have been identified, including locations on Milton Road.

CHAPTER 3: PUBLIC & STAKEHOLDER ENGAGEMENT

Public and Stakeholder engagement in the Milton Road CMP is imperative to the success of this project.

Public Engagement Goals & Objectives

- Enhance and broaden the awareness of this project.
- Promote an understanding of purpose and need for the Milton Road CMP.
- Provide ample opportunities for residents, business owners and stakeholders of Flagstaff and Coconino County to provide input during the study process, and prior to recommendations being made.

There are a considerable number of individuals, agencies, interested stakeholders and community members that will assist and guide in the preparation and recommendations developed in the Milton CMP.

Project Partners

The ADOT Multi-Modal Planning Division is conducting this study in cooperation with several Project Partnering Agencies committed to preparing a long-term CMP for Milton Road. A Project Partner is a stakeholder who is actively engaged in the leadership of the project by helping develop the project charter that includes a mission statement, values, goals and objectives. Project Partners will meet at least bi-monthly, review deliverables, provide strategic direction, and input through the duration of the CMPs. The Project Partnering Agencies for this project include:

Arizona Department of Transportation (ADOT)

Flagstaff Metropolitan Planning Organization (FMPO)

Coconino County

Northern Arizona Intergovernmental Public Transit Authority (NAIPTA)

Burlington Northern Santa Fe (BNSF)

United States Forest Service (USFS)

City of Flagstaff

Federal Highway Administration (FHWA)

Northern Arizona University (NAU)

Project Stakeholders

Project Stakeholders include representatives from the Partner agencies, but also include an expanded group of representatives from other agencies and organizations. The Project Stakeholders will meet with Project Partners at key milestones to review and provide input on major deliverables. An Agency Stakeholder list will be provided to the Project Partners for review.

The Project Partners and Project Stakeholders are tasked with overseeing the project study team's efforts over the course of the entire process. They will review draft documents, attend meetings at key project milestones and offer feedback and guidance to ensure that the CMP meets desired project goals and objectives. Project Stakeholders will also assist the study team in advertising, communicating and delivering public notices for public open house meetings and scheduled meetings with elected officials to receive project updates at key project milestones.

Project Partner Charter

On August 2, 2017, a Project Partner Charter was developed as a formal expression of the partnership values, mission and goals that the Project Partners are committed to for the duration of this project (**Figure 3-1**). The Charter will continually serve as a guide to ADOT and it's Project Partners to develop, maintain and enhance the partnership for the Milton Road CMP process. The Charter helps create and maintain a plan for project success by;

1) Creating goals, values and structure to a process that may have multiple, varied viewpoints on key project issues.

2) Serving as a conflict prevention tool designed for project partners to be reminded of the project mission, values and goals in the event that future conflict may present themselves.

Figure 3-1: Project Partner Charter

PARTNERSHIP CHARTER
Milton Road & US 180 Corridor Master Plans
August 2, 2017

ADOT
FMPO
NAIPTA
CITY OF FLAGSTAFF
COCONINO COUNTY
USFS
FHWA
NAU

MISSION STATEMENT

AS PROJECT PARTNERS, WE ARE COMMITTED TO FOSTERING AND MAINTAINING A POSITIVE AND SUPPORTIVE WORKING RELATIONSHIP WITH ALL AGENCY PROJECT PARTNERS THROUGHOUT THIS MASTER PLANNING PROCESS. AS PROJECT PARTNERS, WE HOLD COMMUNICATION, THESE COMMITMENTS, AND COOPERATION AS CORE PRINCIPLES FACILITATING THE SUCCESS OF THESE CORRIDOR MASTER PLANS.

PARTNERSHIP VALUES

MUTUAL RESPECT
POSITIVE COMMUNICATION
TRUST IN EACH OTHER
COMMIT TO ATTEND MEETINGS
FOLLOW THROUGH ON ASSIGNMENTS
LISTENING WITH AN OPEN MIND
OPENNESS
LEAD BY EXAMPLE
WILLING TO COMPROMISE
VALUE INNOVATIVE IDEAS
HONESTY
TACT
PERSONAL INTEGRITY
HAVE FUN

PARTNERSHIP CHARTER
Milton Road & US 180 Corridor Master Plans
August 2, 2017

2017 PARTNERSHIP GOALS

TEAMWORK
Develop and maintain a positive partnering relationship by encouraging the support and mutual respect of all project partners and the planning process.

MUTUAL GOALS
Seek to accomplish the mutually beneficial objectives of finalizing the long term vision for Milton Road and US 180 and prioritize future design projects for both corridors.

CONTINUOUS IMPROVEMENT
Evaluating the progress of the partnership and identify opportunities for improvement as needed.

TIMELINESS
Being on time for meetings, promptly following up on requests for information and following up on commitments.

CONFLICT RESOLUTION
Embrace conflicts as opportunities for improvement and be willing to resolve differences in a constructive and timely manner.

PARTNERSHIP CHARTER
Milton Road & US 180 Corridor Master Plans
August 2, 2017

Milton Road Corridor Master Plan Goals

1) Address year round congestion and safety on Milton Rd.
2) Identify the Long-Term (20-year) vision of the corridor.
3) Obtain public and stakeholder input on alternatives, including multimodal alternatives *(answer the question: Are we going to expand Milton Rd?)*
4) Scope out and further implement previous and new strategies, consistent with the Long-Term vision.
5) Prioritize implementation projects for design.
6) Assist NAIPTA in completing its Bus Rapid/High Capacity Transit system design.
7) Follow the "PEL" process to carry forward decisions into Design & NEPA.

PARTNERSHIP CHARTER
Milton Road & US 180 Corridor Master Plans
August 2, 2017

US 180 Corridor Master Plan Goals

1) Address congestion (with special emphasis on winter congestion) and safety on US 180.
2) Identify the Long-Term (20-year) vision of the corridor.
3) Obtain public and stakeholder input on alternatives, including multimodal alternatives *(answer the question: Are we going to expand US 180 or create an Alternate Route?)*
4) Scope out and further implement previous and new strategies, consistent with the Long-Term vision.
5) Prioritize implementation projects for design.
6) Address snow play parking issues on US 180 during winter weekends.
7) Follow the "PEL" process to carry forward decisions into Design & NEPA.

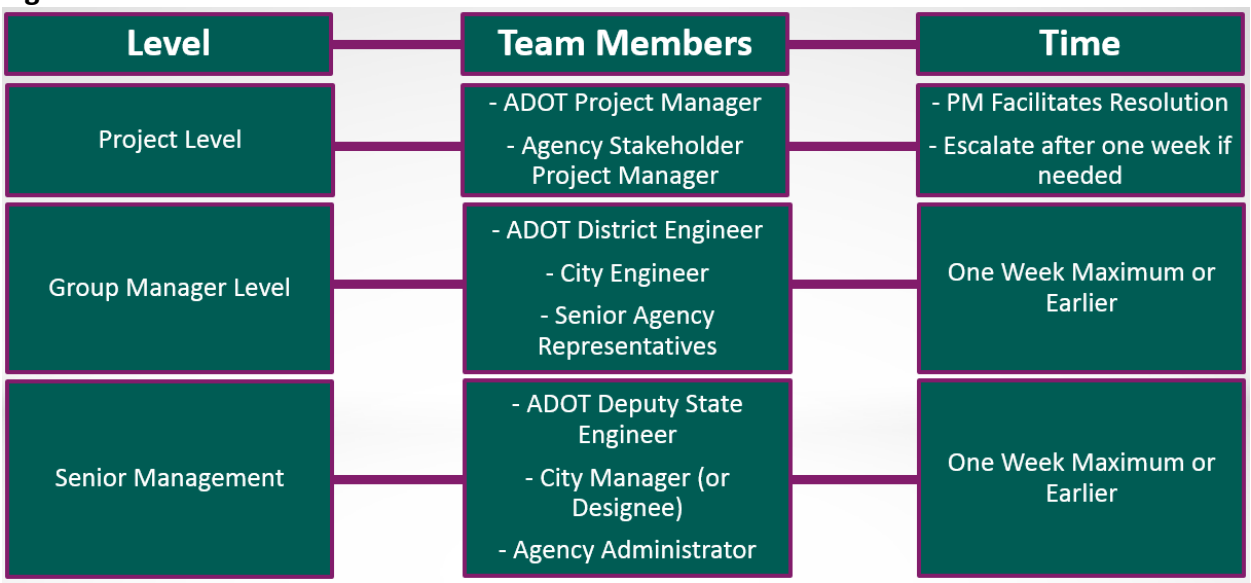
PARTNERSHIP CHARTER
Milton Road & US 180 Corridor Master Plans
August 2, 2017

SIGNED, WEDNESDAY, AUGUST 2nd, 2017

Issue Escalation Ladder

In instances where certain project types can generate multiple points of view or opinions on how to achieve commonly held objectives, issues or disagreements may arise over the course of the project. For several years, ADOT has been utilizing an "issue escalation ladder" that is intended to be utilized for resolving issues when and if they should arise (**Figure 3-2**). Originally developed for use on construction projects, a less rigid but constructive issue escalation ladder is established for the Milton Road CMP

Figure 3-2: Issue Escalation Ladder



Public Involvement Plan

A complete Public Involvement Plan has been prepared as a separate and detailed document to describe the objectives, stakeholder engagement opportunities, key messages and various public outreach tools and methods that will be employed throughout the life of the Milton Road CMP process. The full Public Involvement Plan for the Milton Road CMP can be found in Appendix X. The discussion below represent select excerpts from the Public Involvement Plan.

Public Outreach Methods

The goals and objectives for the Milton Road CMP – alleviating congestion levels have been a source of local community dialogue for quite some time. Due to the nature of this project, it is imperative to obtain an informed consensus and community acceptance for the preferred alternative(s). The goal of any public outreach effort is to educate the public on the study, provide opportunities for public and stakeholder input at key project milestones and build an informed consensus for study recommendations.

In response to these project needs and objectives, a robust public and stakeholder engagement plan has been prepared. The project team will conduct a two-phase approach to obtain public input at key project milestones. Two public open house meetings will be conducted – the first is intended to solicit input and feedback on the System Alternatives and which alternatives are being recommended for

further study. The second public open house meeting will focus on the review and comment of the recommended alternatives.

This study process will also include two Flagstaff City Council and Coconino County Board of Supervisor briefings to obtain their feedback and guidance at key project milestones.

A project website has been established to serve as a hub for all project information. ADOT is hosting the website at:

- www.azdot.gov/MiltonCorridorMasterPlan
- www.azdot.gov/US180CorridorMasterPlan

These project websites will serve as a repository for project documents as well as a virtual notice board for upcoming meetings, surveys, and social media. Other participation tools can be embedded in or linked to from the main project webpage.

This project will utilize several traditional and electronic tools and methods to notify interested stakeholders, business owners and residents of project updates, public open house meetings and other project information at key milestones over the course of the planning process. Press releases and meeting notifications will be coordinated with outlets such as the Arizona Daily Sun, Flagstaff Business News, Greater Flagstaff Chamber of Commerce, ABC 15 and KAFF News to name a few.

Please see Appendix X for a complete copy of the “Public Involvement Plan” for the Milton Road CMP for a more complete description of the public and stakeholder outreach methods.

CHAPTER 4: EXISTING LAND USE, DEMOGRAPHIC & SOCIOECONOMIC CONDITIONS

Land Ownership

Simply put, ownership of land along the Milton Road corridor is almost exclusively held by private interests. As **Figure 4-1** shows, all parcels with frontage on Milton Road are all privately held for the 1.8-mile length of the study corridor. Arizona State parks maintains ownership of the 5-acre Riordan Mansion State Historic Park that borders the NAU campus east of Milton Road and south of Riordan Road. And finally, the State of Arizona/Board of regents maintain ownership of the NAU campus.

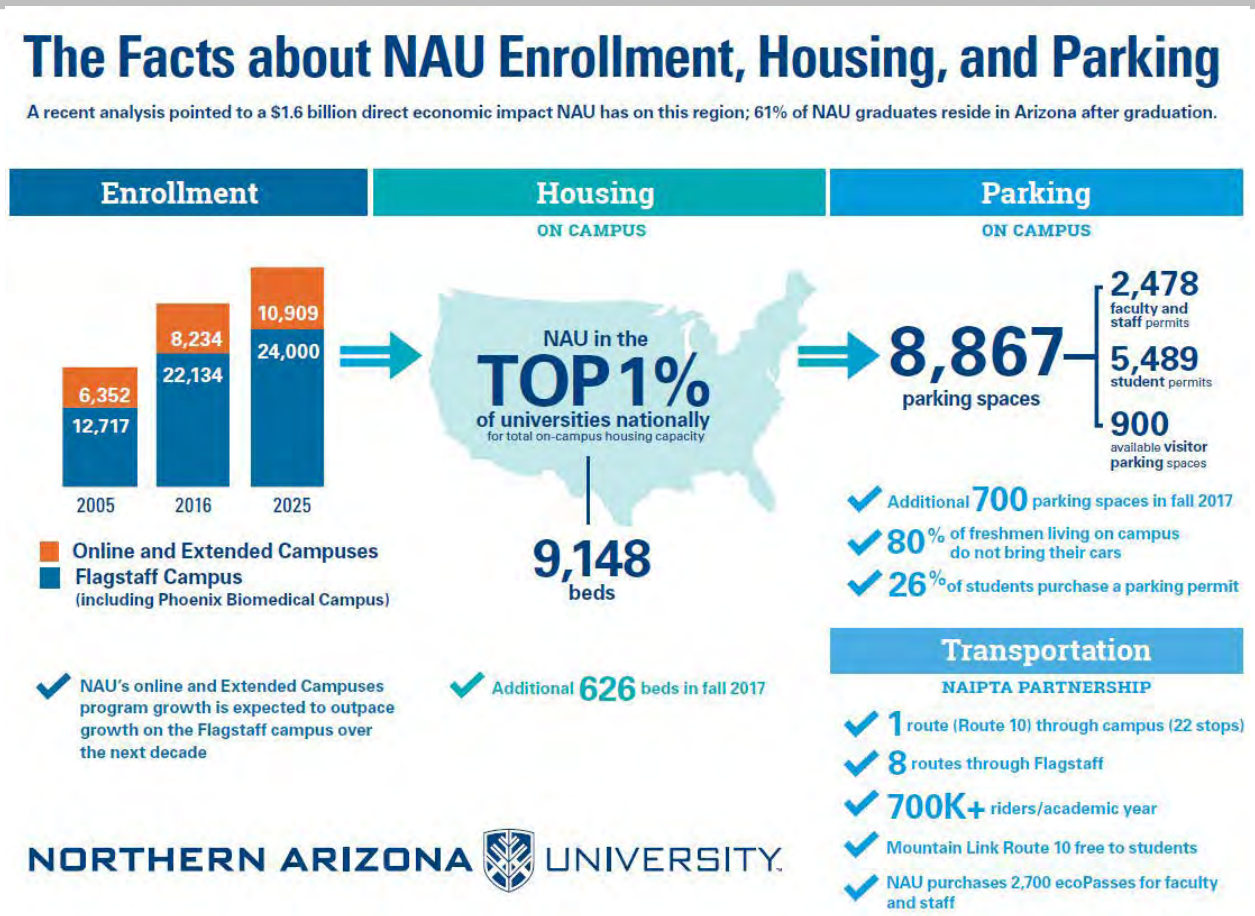
Existing Land Use & Activity Centers

Existing land uses along the Milton Road corridor pr predominantly consist of retail and service commercial land uses for parcels with frontage on Milton Road. The commercial-oriented land uses along Milton Road are generally automobile oriented uses that serve a combination of local, regional and tourist demands.

Describing the corridor from south to north, at Forest Meadows Street, 3 hotels and a variety of retail and convenience commercial services are located. The ADOT District Office is located at 1901 S Milton Drive. This is a strategically positioned parcel with extensive frontage on Milton Road in which ADOT has pursued a public private partnership to relocate their offices at no cost in exchange for additional private sector development on the parcel.

The Target shopping center is located at the northeast corner of Milton Road and University Drive and caters to both local and reginal users and is largely automobile dependent. Continuing north to Plaza Way is a litany of commercial shops and pads that house restaurants, banks and general retail users.

The NAU campus is situated just east of Milton Road and of course is a significant economic engine for the City of Flagstaff. Northern Arizona University's Flagstaff campus had over 22,000 students in 2016. NAU students therefore account for approximately 30 percent of Flagstaff's population. NAU has been experiencing rapid growth in recent years. NAU is planning for a Flagstaff campus population of 24,000 in 2025.



Source: City of Flagstaff High Occupancy Housing Draft Specific Plan, July 28, 2017

The NAU campus has over 740 acres and 9,000 beds and their on-campus housing stock continues to grow. NAU has 626 new beds available in Fall 2017 and another 630 opening in Fall 2018. 41% of NAU's Flagstaff campus students have the opportunity to live on campus.

With the current and future anticipated growth of on campus and off campus housing, and the close proximity to the retail, dining and entertainment opportunities along Milton Road corridor, an exciting and challenging opportunity for multi-modal transportation operations and safety consideration is an important influencing factor for the Milton Road CMP.

Existing Zoning

The entire Milton Road study corridor and parcels in proximity to Milton Road are located within the City of Flagstaff municipal limits. **Figure 4-2** illustrates the City of Flagstaff zoning districts in proximity to the Milton Road corridor.

"Highway Commercial" is the predominant zoning district that exists along the east and west sides of Milton Road for the majority of the 1.8 mile Milton Road CMP study corridor. With the exception of the ADOT Administrative Offices and a portion of the NAU campus (both zoned "Public Facility"), all parcels with frontage onto Milton Road from Forest Meadows Street, north to Butler Avenue are zoned "Highway Commercial".

Per Section 40.30.040 of the Flagstaff, the "Highway Commercial" zoning district is appropriate for a full range of automobile-oriented services. The development of commercial uses in addition to residential uses is encouraged in this zoning district. Diversity in housing choices is encouraged as long as the housing is located above or behind commercial buildings and buffered from Milton Road. The zone allows small setbacks, and a Floor Area Ratio (FAR), which is a measure of intensity of 3.0.

North of Butler Avenue, and west of Milton Road, Highway Commercial zoning exists for the frontage parcels with "single family residential neighborhood" zoning just west for and south of the BNSF rail line. North of Butler Avenue and east of Milton includes a mixture of "Commercial Service", "High Density Residential" and "Community Commercial" zoning districts east to San Francisco Street. The "Commercial Service" zoned parcels are situated north of Phoenix Avenue and south of the railroad tracks. Uses permitted in this district include manufacturing and processing, wholesale and distribution as well as certain retail and residential uses. The Commercial Service zone allows small setbacks, and a Floor Area Ratio of 2.0.

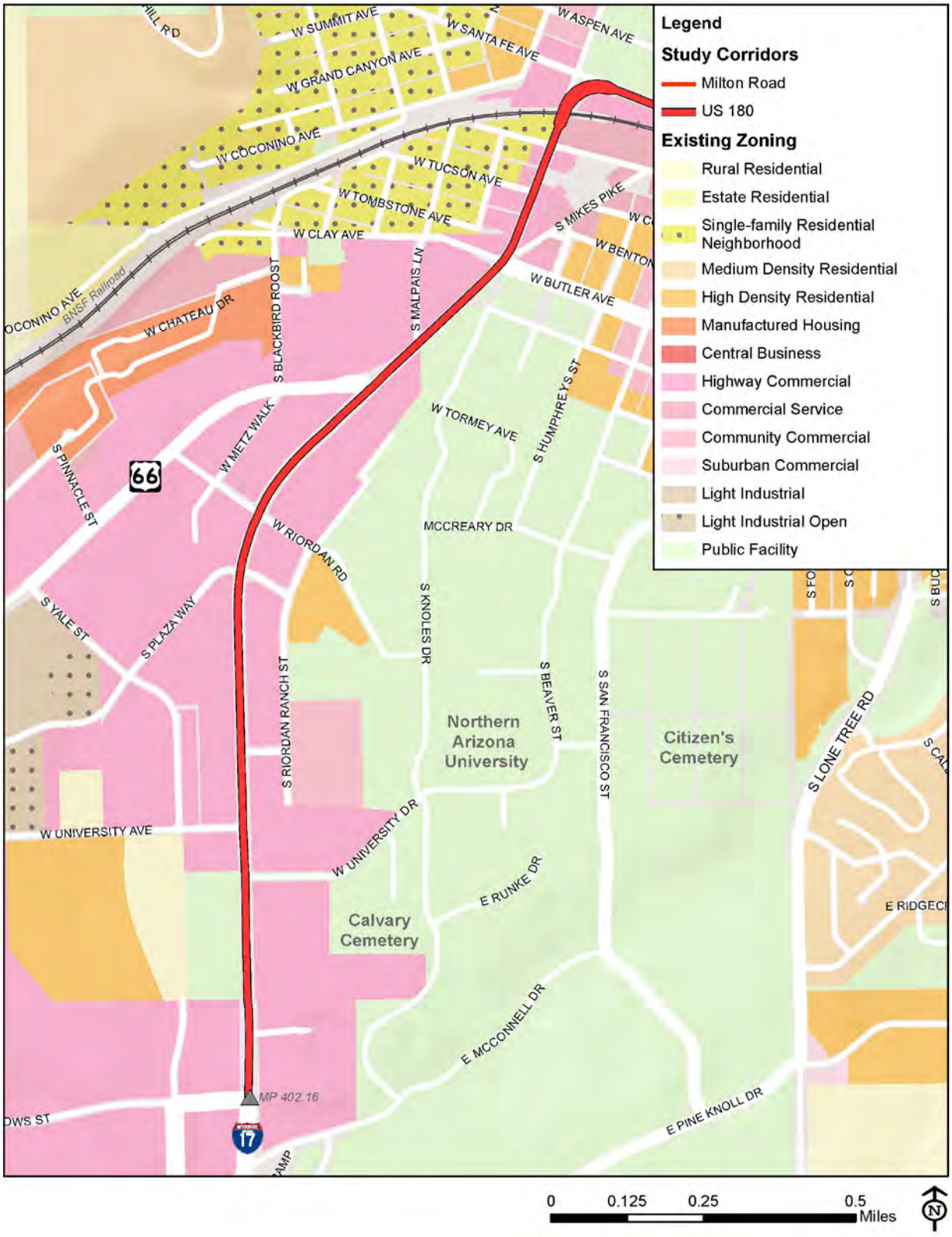
The "Commercial Service" and "High Density Residential" zoning districts east of Mike's Pike include a mixture of single family homes, convenience commercial services and restaurants and higher density housing, primarily serving NAU.

Table 4-1: Existing Zoning of Parcels within 500 feet of the Milton Road Corridor

Zoning Districts	# of Parcels	Total Acreage
Highway Commercial	156	151.68
Community Commercial	5	9.58
Commercial Service	16	11.64
High Density Residential	5	8.53
Public Facility	19	72.34
Single Family Residential Neighborhood	23	4.71
Central Business District	16	4.18
Totals	**240**	**262.65**

Figure 4-1: Land Ownership

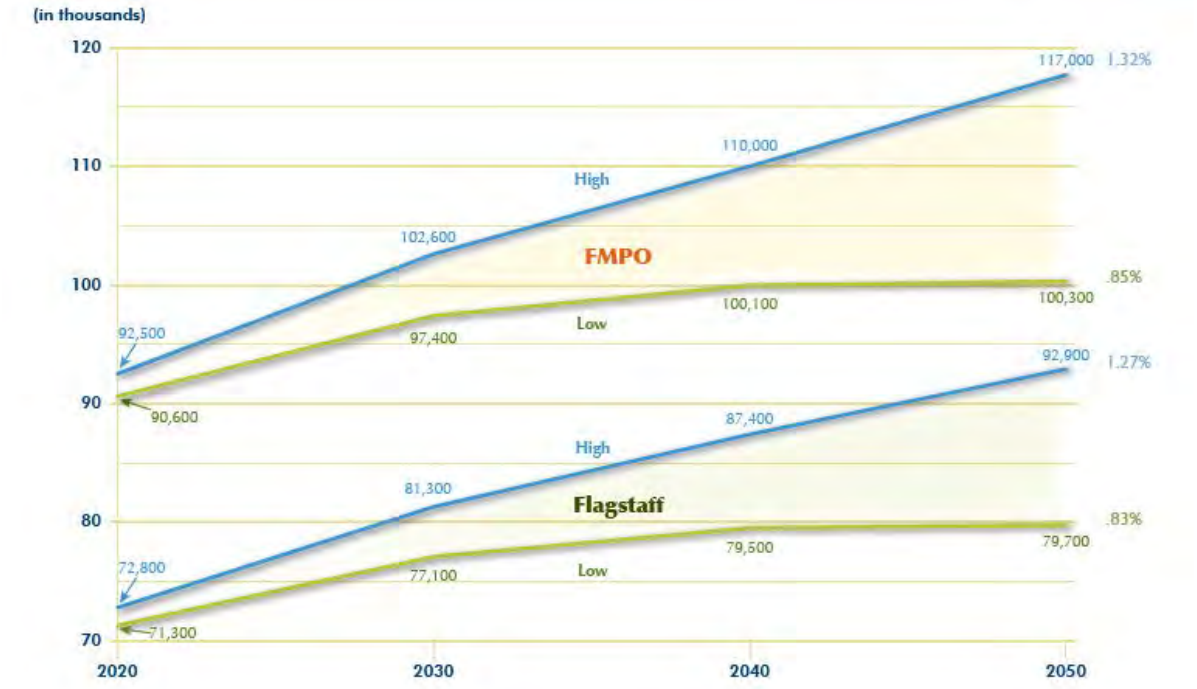
Figure 4-2: Existing Zoning



Existing, Future Growth & Activity Centers

The greater Flagstaff area is home to about 84,000 year round residents, with roughly 66,000 of those located within the Flagstaff City Limits. This number includes more than 17,000 NAU students. The annual growth rate from 2.2 percent in the 1990's and early 2000's to approximately 1.1 percent this decade. Assuming the continued 1.1 percent growth in the years to come, the population of the greater Flagstaff area is expected to grow to 92,500 by 2020 and nearly 103,000 by 2030 (**Figure 4-3**).

Figure 4-3: Future Population Projections



SOURCE: Arizona Department of Administration, Office of Employment and Population Statistics
**Flagstaff and FMPO projected populations based on slowly increasing percent of County population including NAU students*

Geography and the northern Arizona climate greatly influence development. Growth areas in the past 10 years have been primarily single-family subdivisions such as Boulder Pointe, Ponderosa Trails, and Anasazi Ridge. Mixed-use developments with a more compact, walkable urban form, continue to grow in Flagstaff 's historic downtown and more recently around the University campus.

As identified in the Flagstaff Regional Plan 2030 (ratified by voters on May 20, 2014), there currently exists six suburban activity centers and two urban activity centers within close proximity to the Milton Road corridor (**Figure 4-5**). These activity centers generally include the Woodlands Village, the Green Tree Village/Target Shopping Center, the commercial and redevelopment core at the intersection of Milton Road and Route 66 and, of course, historic downtown Flagstaff. **Figure 4-4** outlines the typical characteristics, development patterns, density, land uses types and transportation for regional and neighborhood urban activity centers. As growth policies outlined in the Regional Plan 2030 promote compact urban forms, the access and use of multiple modes of transportation will be increasingly important and is a fundamental aspect influencing the evaluation and recommendation of a preferred System Alternative(s) for this Milton Road CMP.

Figure 4-4: Urban Activity Center Characteristics

URBAN ACTIVITY CENTER CHARACTERISTICS

An area typically located at the intersection of two main thoroughfares. Urban activity centers include mixed-use, mix of housing type, mixed price range, walkable, transit-oriented-design; can include regional commercial or neighborhood commercial.

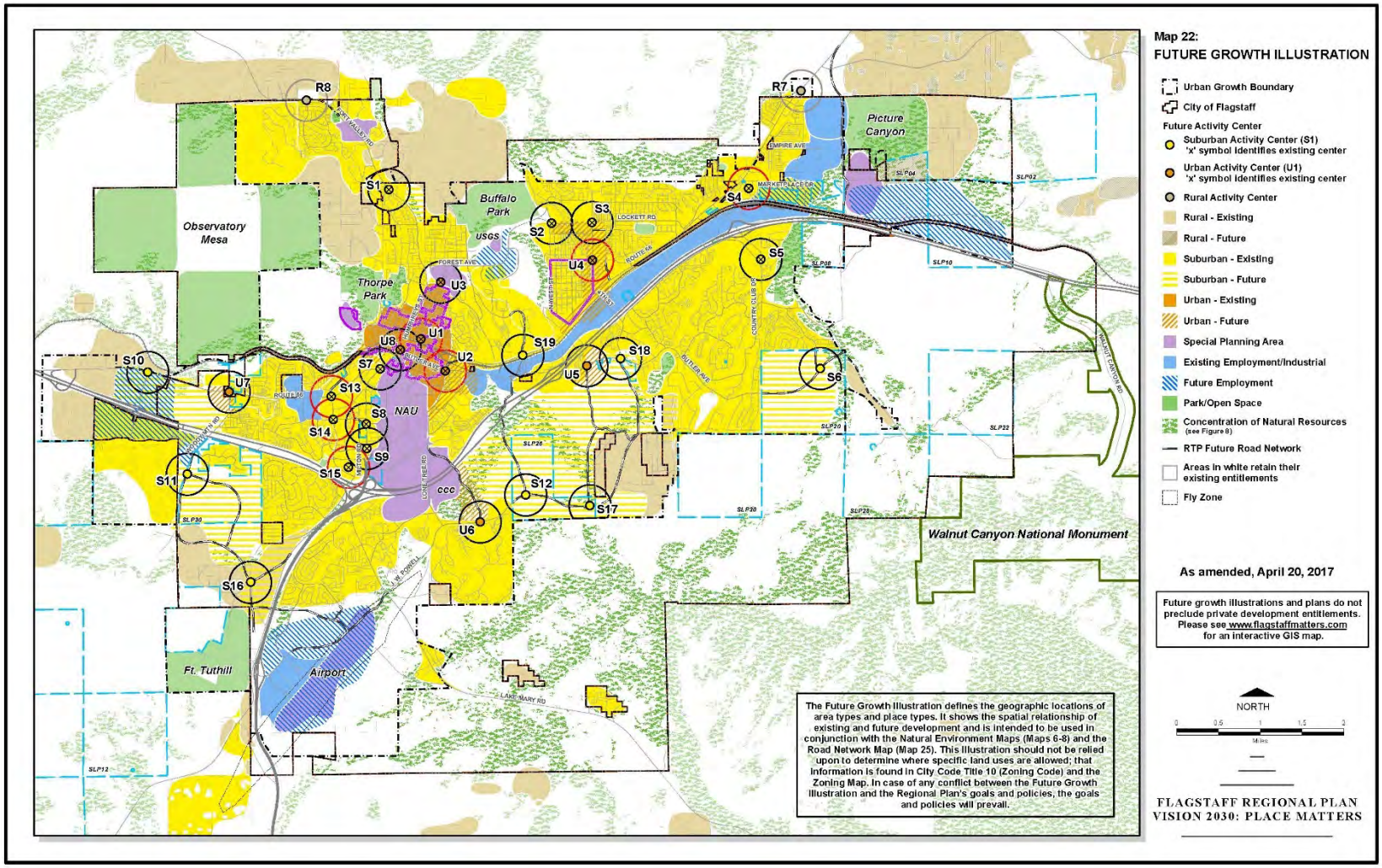
Regional Urban Activity Center - Larger, mixed-use centers at intersections of Regional Travel and Circulation Corridors; with direct access of multiple residential developments; with entertainment and cultural amenities; public spaces; serves regional residents and visitors.

Neighborhood Urban Activity Center – smaller, mixed-use centers at intersections of Circulation Corridors and Access Roads; with access to surrounding neighborhood; with local goods and services, public spaces; serves local residents; transit and FUTS access.

Characteristics	Each Activity Center is unique with contextual and distinctive identities, derived from environmental features, a mix of uses, well-designed public spaces, parks, plazas, and high-quality urban design. They are well-designed for the purpose of maintaining a unique sense of place and to attract the residents/clients desired. *Refer to A Vision for Our Urban Activity Centers on pg. IX-63.*
Desired Pattern	  
Density Range	Residential Only: 13+ units per acre Residential mixed-use: 8+ units per acre
Intensity	Regional scale and design Floor area ratios (FARs) of 1.0+ Neighborhood scale and design Floor area ratios (FARs) of 0.5+
Mix of Uses	**Within commercial core:** Government, services, education, offices, retail, restaurant, and tourism-related. Residential opportunities, residential mixed-use, public spaces, place-making. **Within the pedestrian shed but not in a commercial core:** higher-density residential, live-work units, home-based businesses, educational, greater connectivity to a commercial core.
Transportation	Easy-to-access parking available via garages, shared lots, and on-street parking. Transit stops and routes centrally located. Bicycle access and parking abundant. Pedestrian-oriented design. Very high road and pedestrian infrastructure connectivity. Block sizes are smaller; gridded street networks preferred where not prohibited by topography.

Source: City of Flagstaff Regional Plan 2030, 2015

Figure 4-5: Future Growth Illustration



Source: City of Flagstaff Regional Plan 2030, 2015

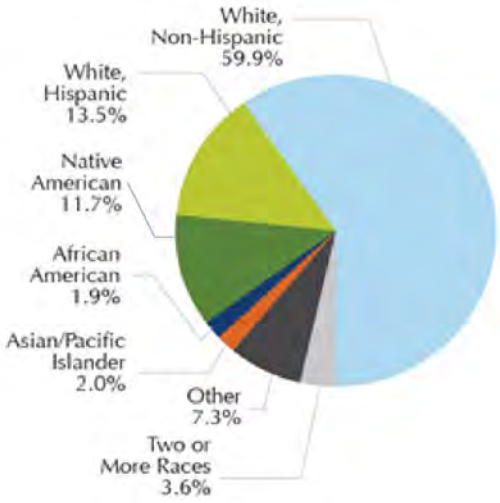
Demographic & Socioeconomic Conditions

City of Flagstaff and Regional General Demographic & Socioeconomic Information

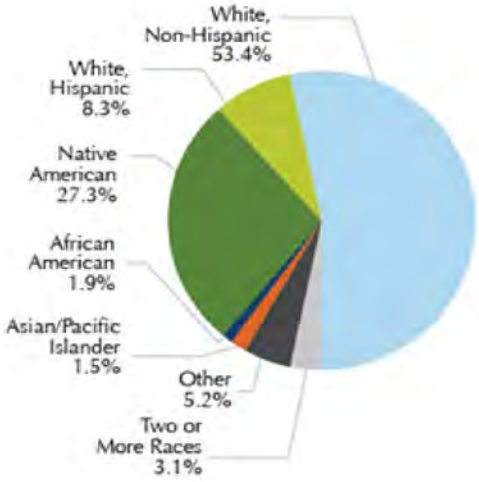
According to the US Census Bureau, the 2016 estimated population of Flagstaff was approximately 66,000 (US Census Bureau, Population Division, 2017). **Figure 4-6** shows that both the city (approximately 40%) as well as Coconino County (46%) are both ethnically diverse with prominent minority populations.

Figure 4-6: Flagstaff and Coconino County Ethnicity

City of Flagstaff



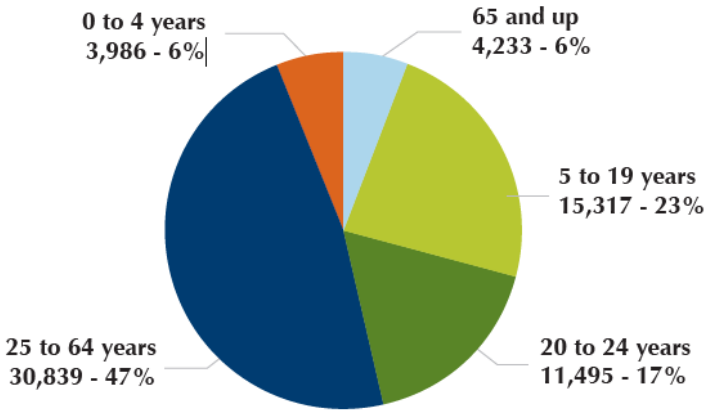
Coconino County



Source: 2010 U.S. Census Bureau, decennial census

The population growth occurring over the last two decades is largely connected to the growth and development of Northern Arizona University which currently has over 21,000 students enrolled (HOH Study). **Figure 4-7** shows that the majority of the population (47%) is between 25 to 64 years old and the median age of approximately 26 years old which is lower than the state of Arizona median age of 36 years old.

Figure 4-7: City of Flagstaff Population Age



Source: 2010 U.S. Census Bureau, decennial census

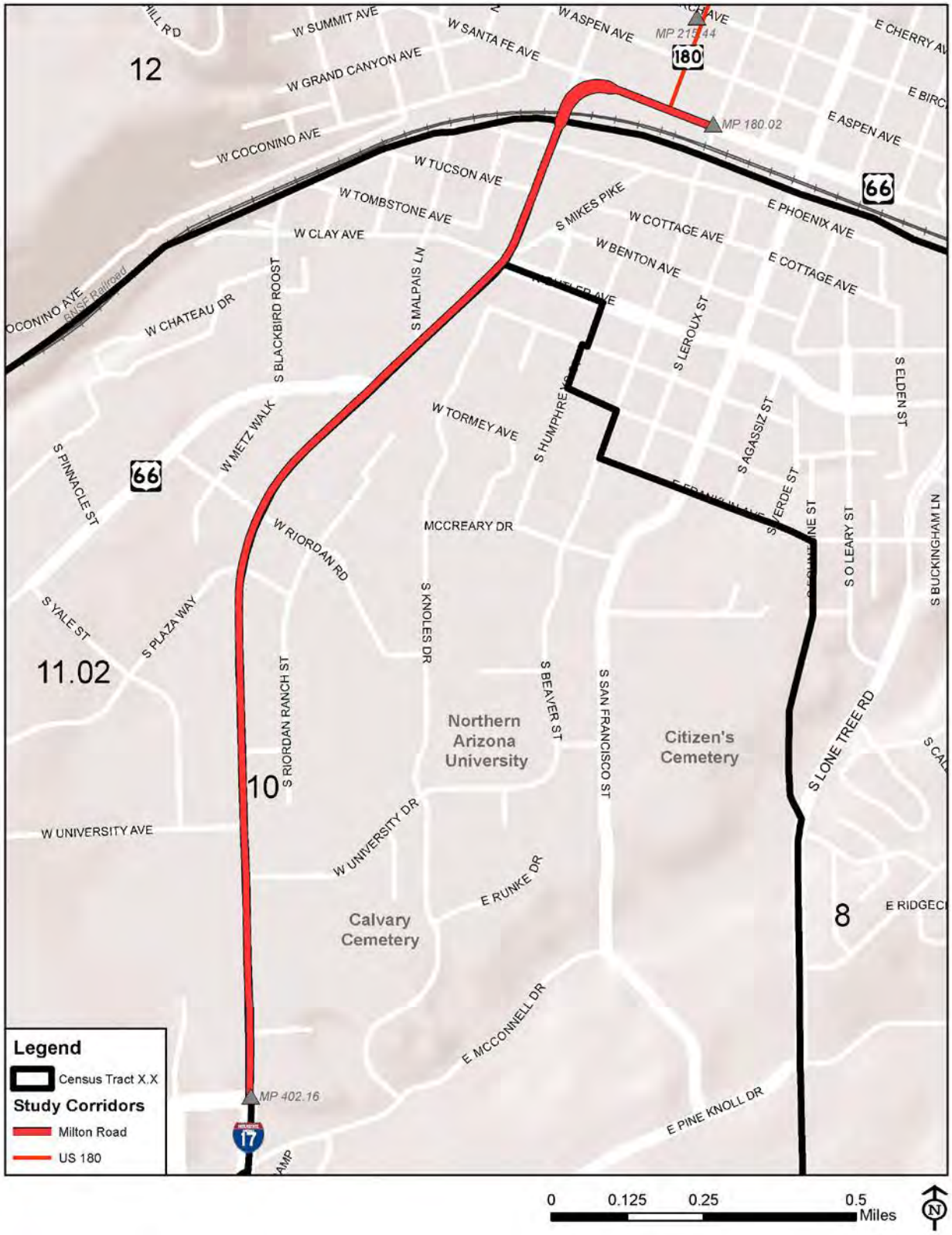
The large student population and generally young community members also effects household size where the city has traditional homes with families as well as a large number of individuals living alone. On the other hand, almost 20% of the housing units within the are non-family households because of the student population. Unlike other communities, the large student and young population is also related to why the majority of the residents have rental homes (55%) whereas only 45% of the homes are owner occupied. The City also has an undersupplied housing market which leads to affordability issues and a high amount of rental properties. The 2016 median housing sale price is $315,500 while the median household income is approximately $49,000 (U.S. Census Bureau). 24% of the Flagstaff population is living in poverty.

Demographic & Socioeconomic Data Adjacent to the Milton Road Corridor

Depicted in **Figure 4-8**, the Milton Road corridor extends through four census tracts which include Census Tract 8, 10, 11.02, and 12. Utilizing data generated from the U.S. Census Bureau, some information connected to transportation issues were pulled to highlight socioeconomic and demographic conditions directly adjacent to the Milton Road Corridor in **Figure 4-9** through **Figure 4-11.**

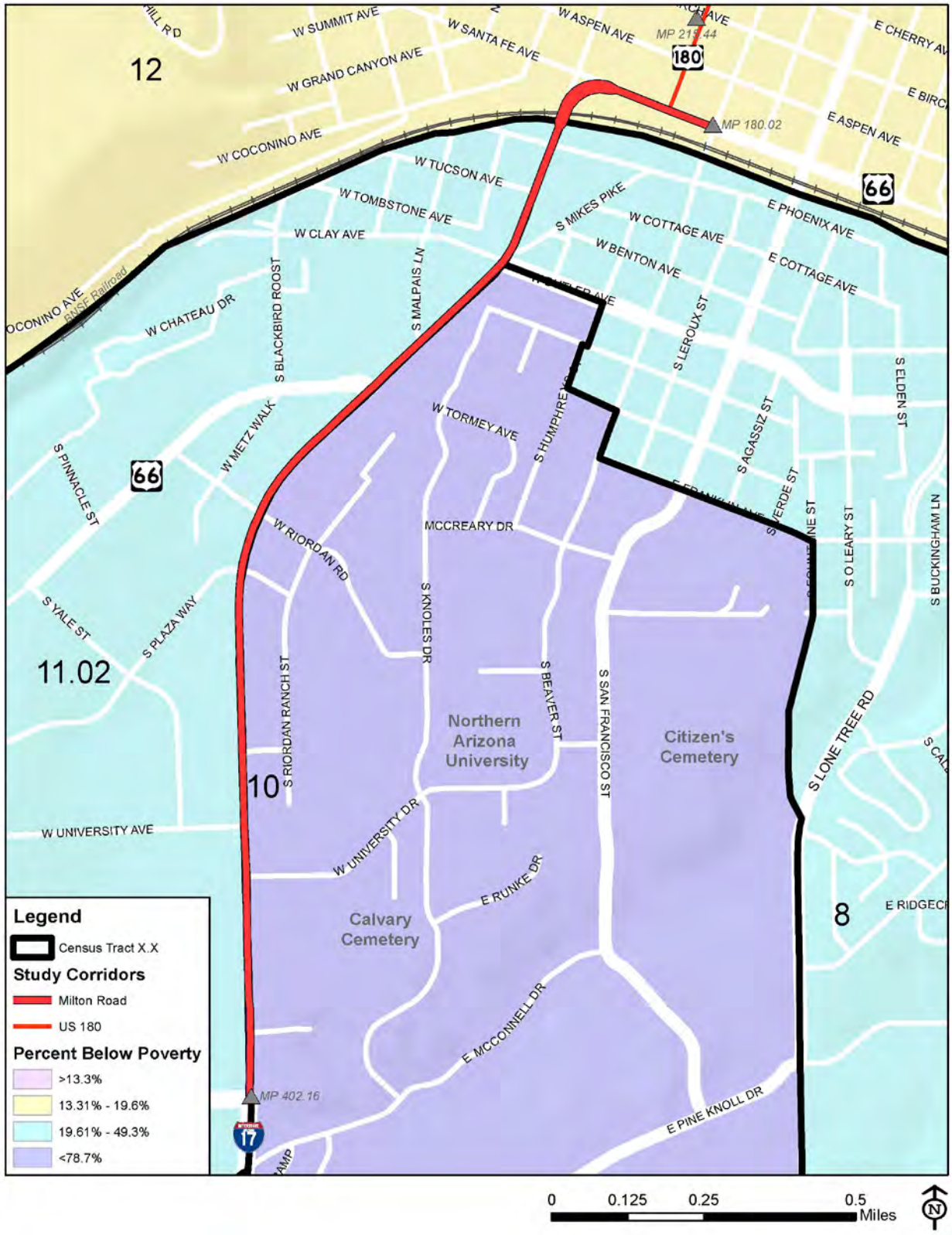
There are a higher number of residents (8,463 to 9,913 residents) along Milton Road south of Butler Avenue within Census Tracts 10 and 11.02. The high number of residents within Census Tract 10 is largely due to NAU and the high-density student housing developments associated with the university. Census Tracts 11.02 and 10 also have a higher percentage of the people living below the poverty line, especially Census Tract 10 which has over 78% living below poverty. Similar to population density, the high number of people living below poverty Census Tract 10 is connected to large number of students living on campus. Also, the area surrounding the Milton Road corridor have a very young population with 0% of the residents living in Census Tract 10 at 65 years of age or older. Census Tracts 11.02 and 8 only have 0.01% to 4.6% and Census Tract 12 has 4.61% to 11.4% of the residents at the age of 65 and older. The high density of people, low income, and a generally young population is a recipe to generate a high volume of trips through alternative modes of transportation, however, the Milton Road Corridor currently does not have adequate infrastructure to support the high demand.

Figure 4-8: Milton Road Corridor Census Tracts



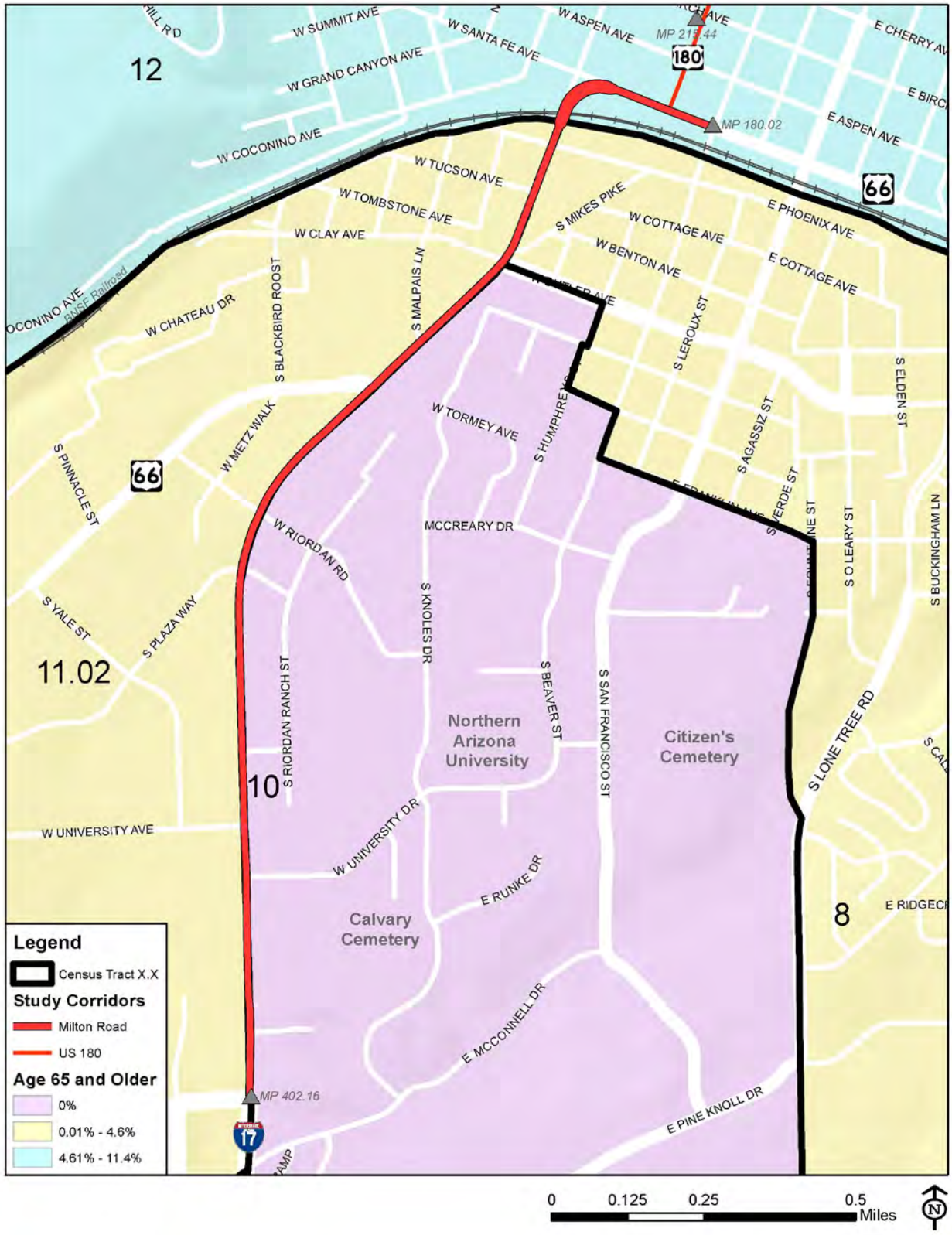
Source: U.S. Census Bureau, 2010

Figure 4-9: Percent Below Poverty



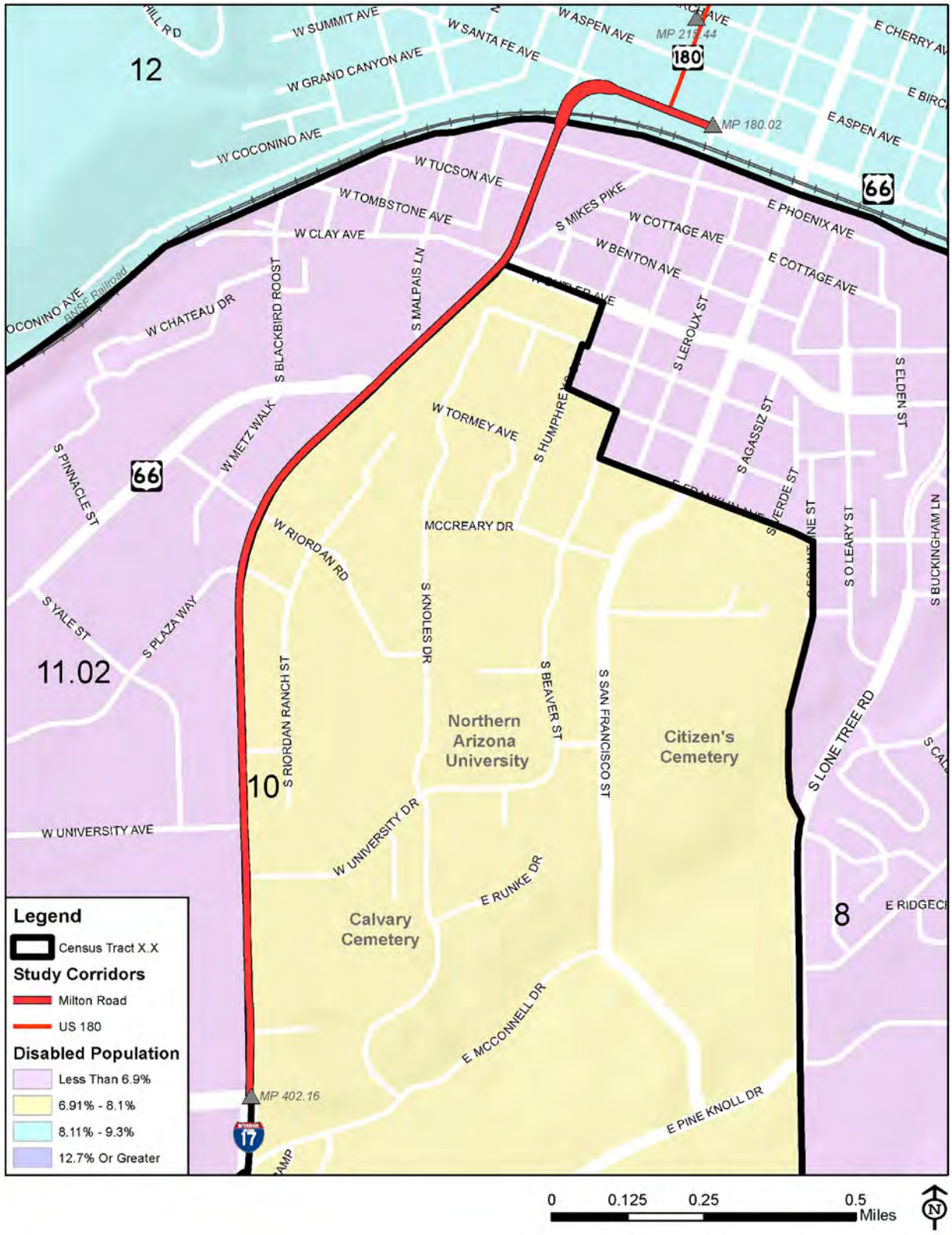
Source: U.S. Census Bureau, 2010

Figure 4-10: Percent 65 years of Age and Older



Source: U.S. Census Bureau, 2010

Figure 4-11: Percent of Disabled Population



Source: U.S. Census Bureau, 2010

CHAPTER 5: EXISTING ROADWAY/CORRIDOR CONDITIONS

The major elements of the existing transportation system are documented in this section and summarizes the status/condition of each element. Major elements include roadway configuration, bridges, pavement conditions, roadway/intersection operation and performance, non-motorized modes of transportation within the study area.

Functional Classification

Functional classification is the grouping of streets and highways into classes according to the character of service in which they are intended to provide. **Figure 5-1** depicts 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. As shown in **Figure 5-1**, Milton Road is classified as a Principal Arterial per the FHWA functional classification. The intersecting streets on Milton Road are classified as local roads, Minor Arterials (Historic Route 66, Butler Avenue and Humphreys Street), and Major Collectors (Forest Meadows Street, University Avenue, Plaza Way, Riordan Road, Malpais Lane and Beaver Street).

Per the City of Flagstaff functional classification, Milton Road along the study corridor is classified as a Major Arterial roadway.

Roadway & Lane Configuration

The Milton Road CMP study corridor is primarily a five-lane corridor with two through lanes in each direction and a center two-way left-turn lane. **Figure 5-2** illustrates the typical cross-section of the corridor. Dedicated left-turn and right-turn lanes exist at many intersecting streets. Curb, gutter and sidewalk exist through the entire corridor. Wider shoulder that can be used as bike lanes exists on both sides of Milton Road between Old Route 66 and Phoenix Avenue and from approximately 290 feet west of Humphreys Street to Beaver Street. **Figure 5-3** depicts the existing lane configurations and left/right-turn lane lengths at the following major intersections with Milton Road and at the intersection of Sitgreaves Street and Santa Fe Avenue and at the intersection of I-17 Off Ramp and McConnell Drive:

- Forest Meadows Street,
- University Drive,
- University Avenue,
- Chambers Drive,
- Plaza Way,
- Riordan Road,
- Old Route 66,
- Malpais Lane,
- Butler Avenue,
- Phoenix Avenue,
- Santa Fe left-turn bay,
- Humphreys Street, and
- Beaver Street.

Posted Speed Limits, Traffic Control and Lighting Conditions

Posted Speed Limit

The posted speed limit is 30 miles per hour throughout the corridor with the exception of the speed limit along the curvature approaching the railroad tracks, where the posted speed limit is 25 mph.

Traffic Control

Figure 5-4 depicts the traffic control for the study area intersections along the Milton Road study corridor. There are eight traffic signals along the study corridor. In addition to the traffic signals, there are several stop controlled intersections along the corridor.

Lighting Conditions

Adequate lighting is essential for the effective operations of a Principal Arterial roadway, particularly to improve intersection sight distance during the night time.

Between Forest Meadows Street and the existing Pizza Hut driveway north of Saunders Drive, roadway lighting exists on the east side of Milton Road. Between the Pizza Hut driveway and University Avenue, roadway lighting exists on the west side of Milton Road. Between University Avenue and Clay/Butler Avenue, roadway lighting exists on both sides of Milton Road. Between Clay/Butler Avenue and Phoenix Avenue, roadway lighting exists on the east side of Milton Road. Between Phoenix Avenue and Beaver Street, roadway lighting exists on both sides of Milton Road. Intersection lighting exists at all the signalized intersections within the Milton Road study corridor.

Figure 5-1: FHWA Functional Classification of Roadways

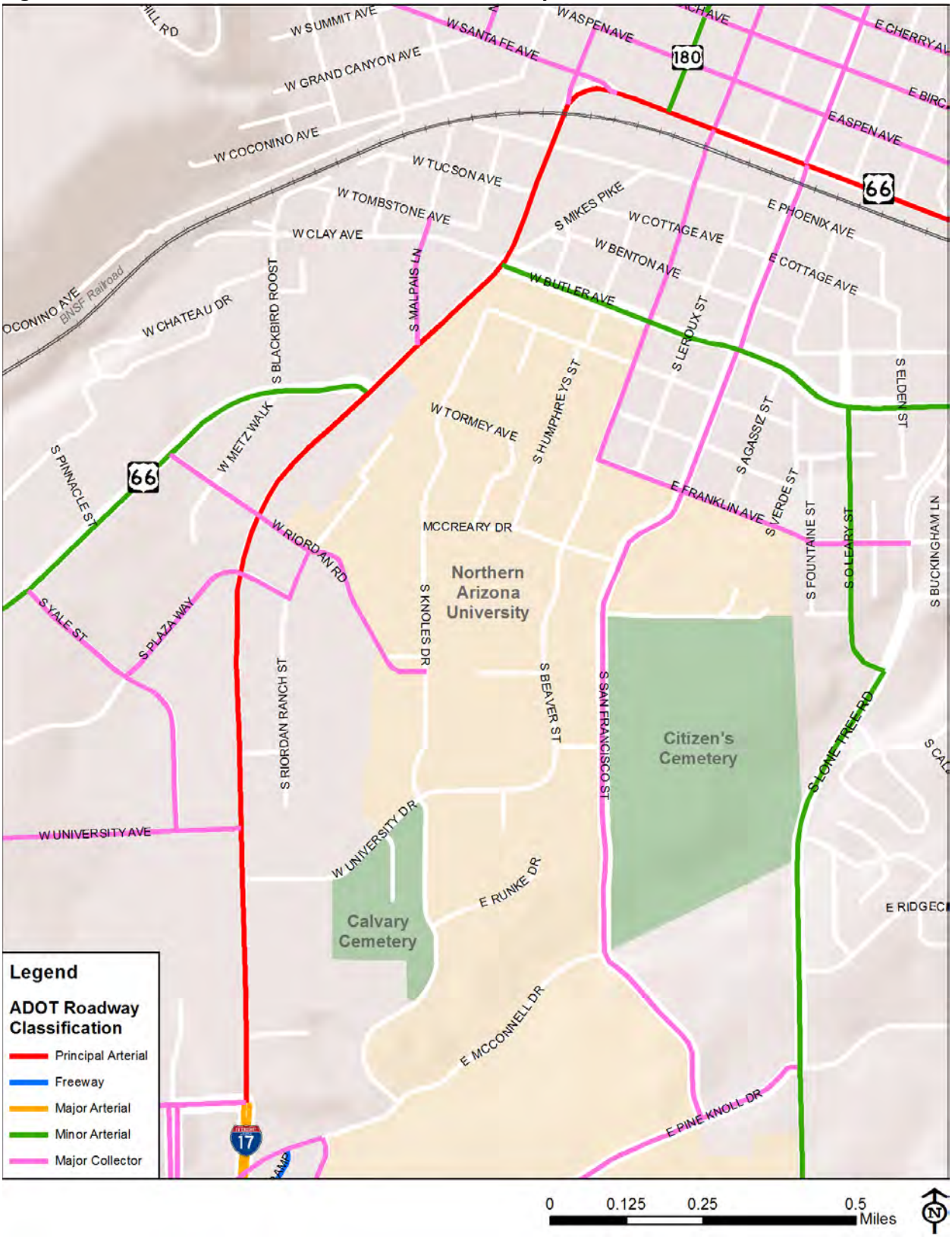


Figure 5-2: Existing Cross-Section of Milton Road

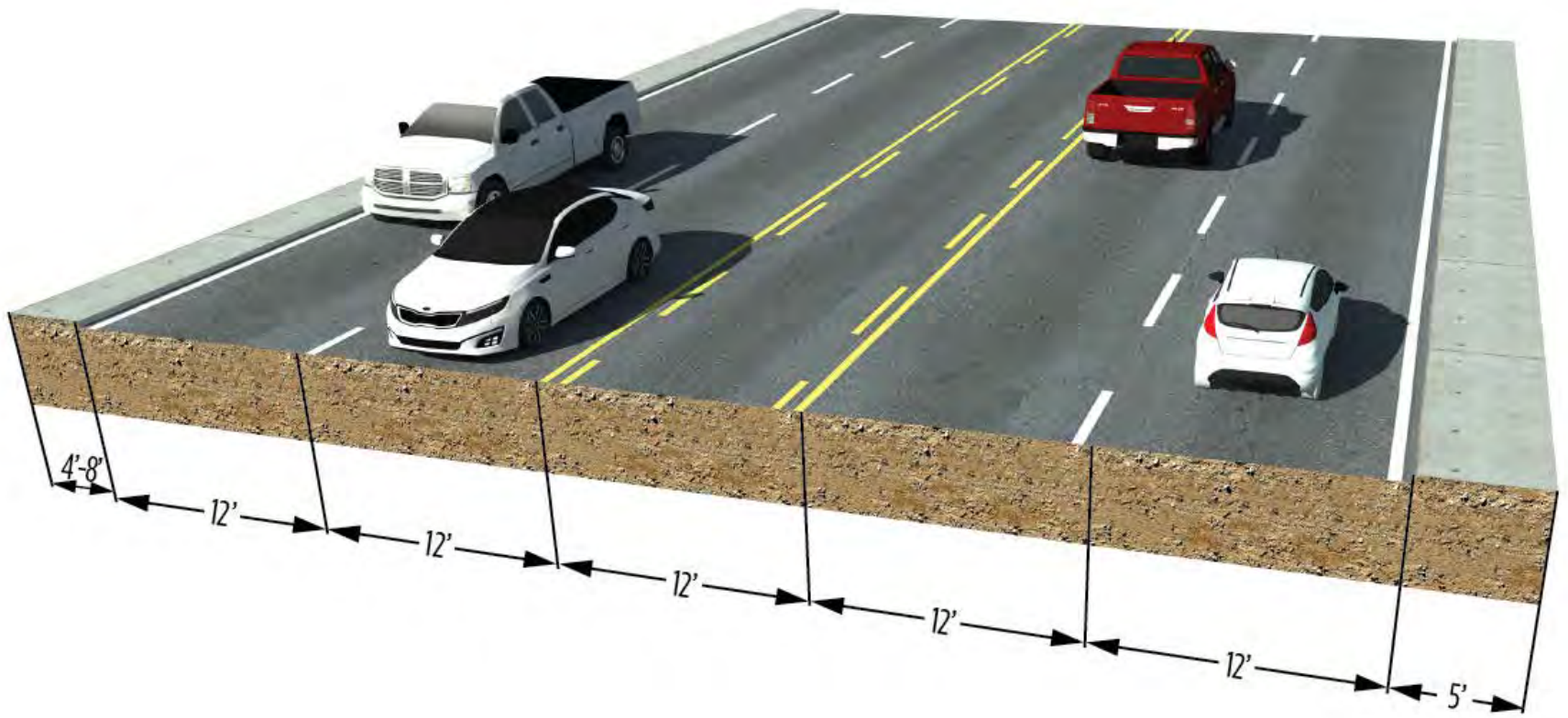


Figure 5-3: Existing 2017 Intersection Control & Lane Geometry

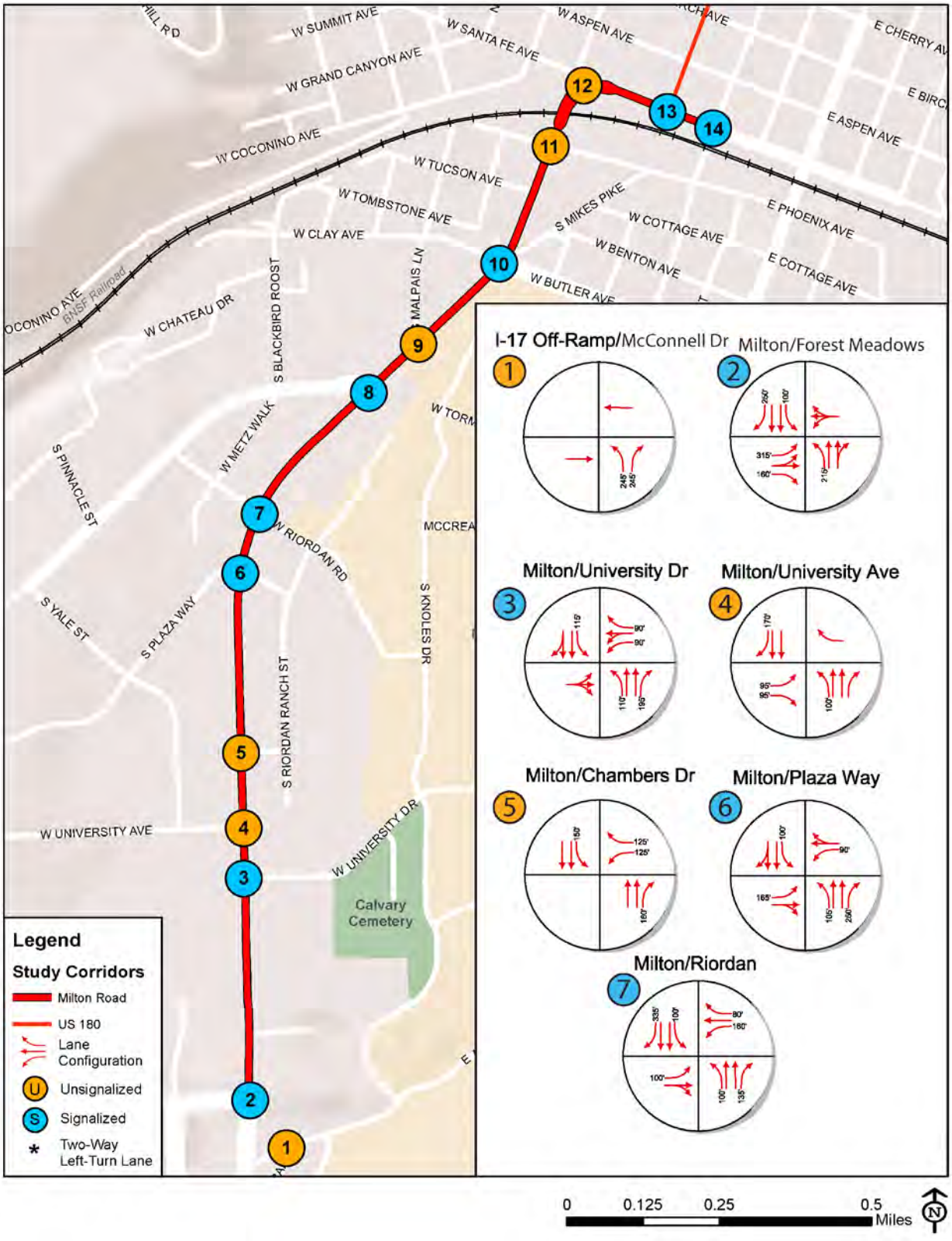


Figure 5-4: Existing 2017 Intersection Control & Lane Geometry (Continued)

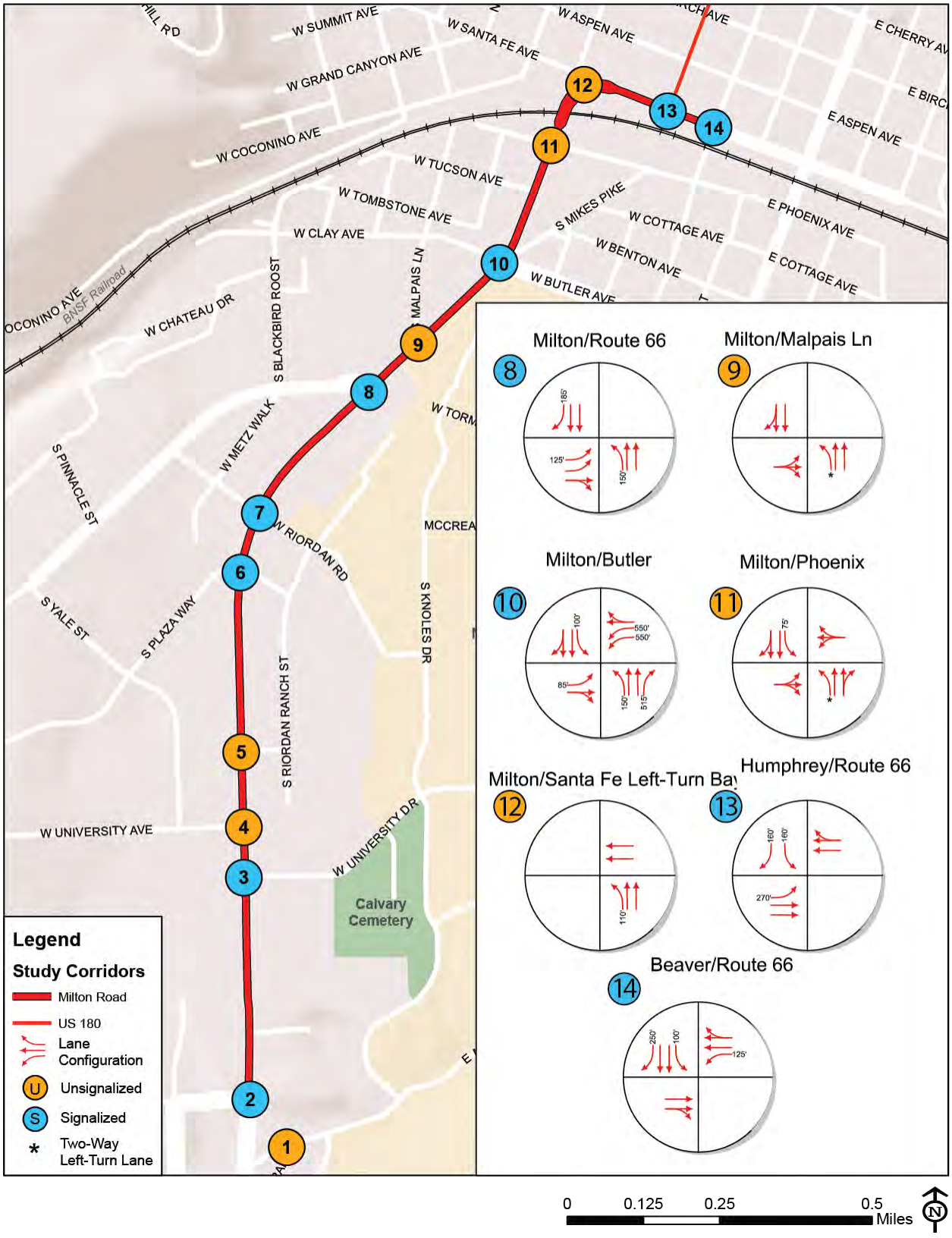


Figure 5-5: Existing Traffic Control at Study Intersections

Existing Travel Conditions, LOS & Congestion

Existing Traffic Volumes

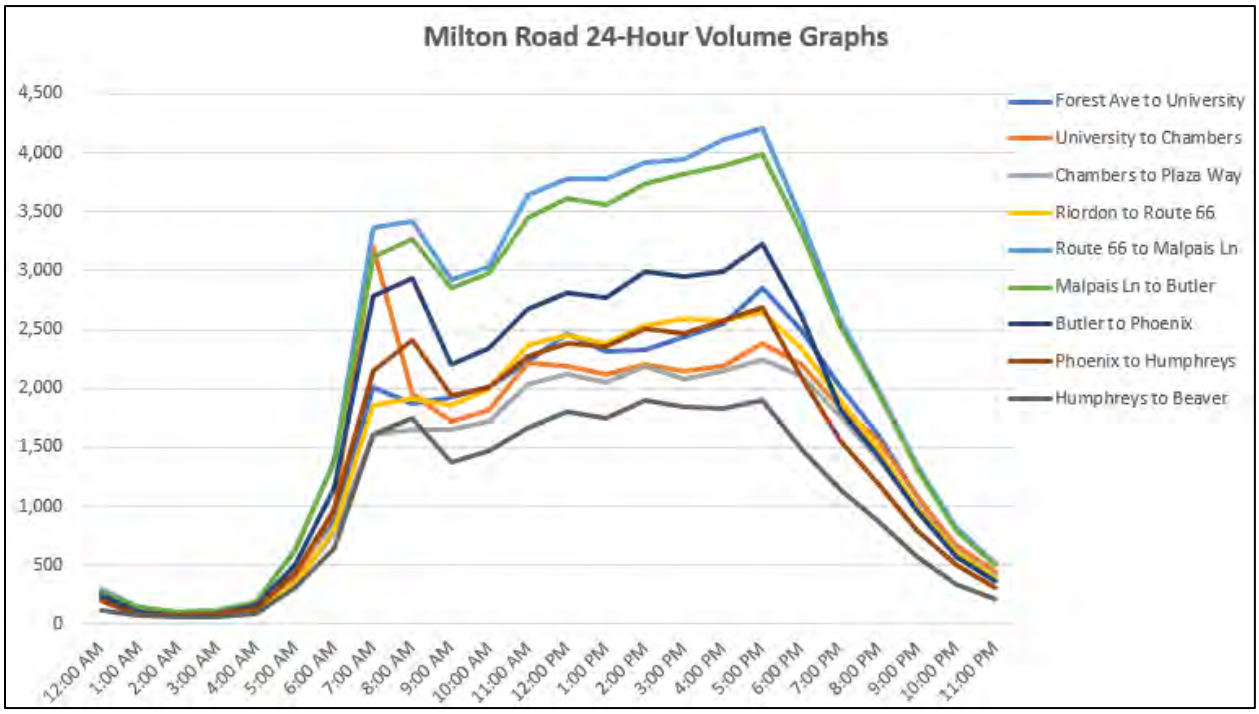
Twenty-four hour daily approach and departure traffic volumes in 15-minute intervals were collected at nine locations along the Milton Road study corridor on Tuesday, September 12, 2017. The collected traffic volumes included vehicular, pedestrian and bicycle counts. **Table 5-1** summarizes the existing daily traffic volumes along the study corridor.

Table 5-1: Existing Daily Traffic Volumes

Count Location	24-Hour Daily Traffic Volume	
	Northbound	Southbound
Between Forest Meadows St and University Dr	17,825	17,437
Between Forest University Dr and Chambers Dr	17,820	16,119
Between Forest University Dr and Plaza Way	14,584	15,891
Between Riordan Rd and Historic Route 66	17,422	17,199
Between Historic Route 66 and Malpais Ln	26,671	27,014
Between Malpais Ln and Butler Ave	25,125	26,367
Between Butler Ave and Phoenix Ave	20,175	20,614
Between Phoenix Ave and Humphreys St	15,863	18,323
Between Humphreys St and Beaver St	12,908	11,954

Figure 5-6 shows a graphical representation of the 24-hour daily traffic volumes along Milton Road corridor.

Figure 5-6: 24-Hour Daily Traffic Volumes



Bicycle and Pedestrian Counts

Table 5-2 and **Table 5-3** summarizes the number of pedestrians and bicyclists respectively at the study area intersections within the Milton Road study corridor during the Mid-Day (11:00 am to 1:00 pm) and PM peak hours (4:00 pm to 6:00 pm).

The highest number of pedestrians crossing Milton Road occurred at Beaver Street, Clay/Butler Avenue and at University Drive. Pedestrian volume is observed to be higher during the PM peak hour at the study intersections with the exception of Route 66, Plaza Way, Chambers Drive and Forest Meadows Street, where the pedestrian volume is higher during the Mid-Day peak hour.

The highest number of bicyclists crossing Milton Road occurred at Beaver Street, Clay/Butler Avenue and at University Drive. Bicycle volume is observed to be higher during the PM peak hour at the study intersections with the exception of Riordon Road, Plaza Way, Chambers Drive, University Avenue and Forest Meadows Street where the bicyclist volume is higher during the Mid-Day peak hour.

Table 5-2: 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
Beaver St	17	35	9	3	65	101	41	63
Humphreys St	6	20	0	0	0	0	0	0
Phoenix Ave	1	2	1	0	7	9	23	33
Clay/Butler Ave	93	116	0	0	73	71	29	35
Malpais Ln	0	0	0	0	0	0	6	14
Route 66	0	0	33	0	0	0	54	51
Riordon Rd	16	22	24	16	10	25	24	19
Plaza Way	14	8	43	34	9	12	29	16
Chambers Dr	0	0	6	0	7	8	0	0
University Ave	1	0	0	0	8	8	26	27
University Dr	80	106	0	0	16	10	25	23
Forest Meadows St	0	0	8	13	10	8	12	6

Table 5-3: 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
Beaver St	4	7	5	1	6	13	34	28
Humphreys St	2	6	0	0	1	1	0	1
Phoenix Ave	1	7	1	1	7	2	14	36
Clay/Butler Ave	17	29	4	7	11	36	3	6
Malpais Ln	0	0	0	0	0	3	4	5
Route 66	1	0	2	0	0	3	12	3
Riordon Rd	4	12	1	4	6	3	6	6
Plaza Way	9	6	6	4	3	3	2	2
Chambers Dr	0	0	1	0	2	0	0	0
University Ave	0	0	1	0	4	2	6	3
University Dr	36	32	0	0	2	4	9	12
Forest Meadows St	0	0	2	10	3	5	4	9

Existing Intersection Operational Analysis

Existing Turning Movement Volumes

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 the major 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. **Figure 5-7** depicts the Mid-Day and PM peak hour traffic volumes at the major signalized and unsignalized intersections along the study corridor.

In addition to the existing turning movement volumes at intersections on Milton Road, peak hour turning movements were also obtained at the intersection of Sitgreaves Street and Santa Fe Avenue and at the intersection of I-17 Off Ramp and McConnell Drive. Existing turning movement volumes at the intersection of Sitgreaves Street and Santa Fe Avenue and at the intersection of I-17 Off-Ramp and McConnell Drive are also shown in Figures 5-7 and 5-8.

Existing turning movement volumes at the intersection of Sitgreaves Street and Santa Fe Avenue shall be used to determine the northbound left-turn traffic volume from Milton Road onto Santa Fe Avenue at the left-turn bay located approximately 0.1 miles west of Humphreys Street.

Figure 5-7: Existing 2017 Peak Hour Traffic Volumes – (Mid-Day) PM Peak Hours

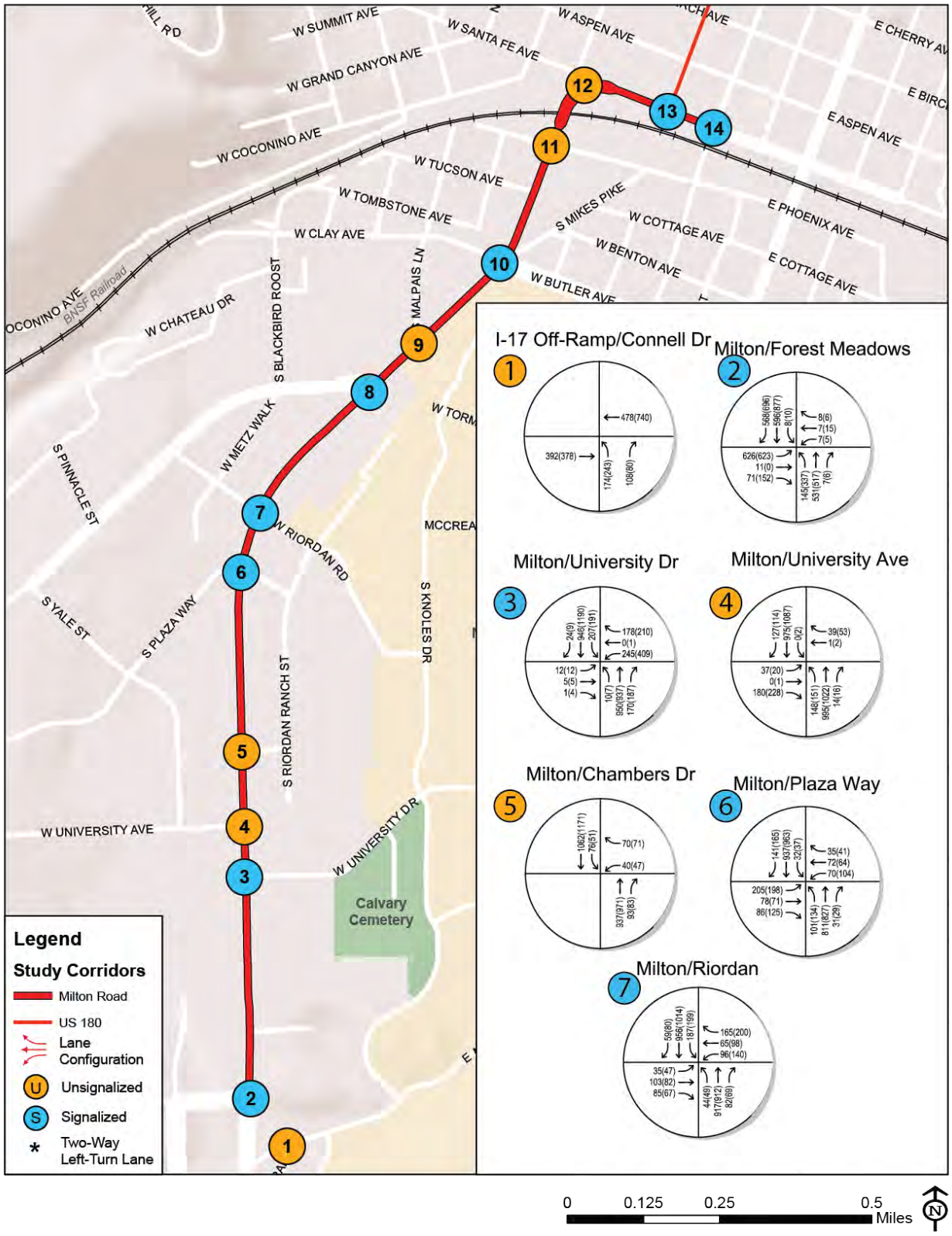
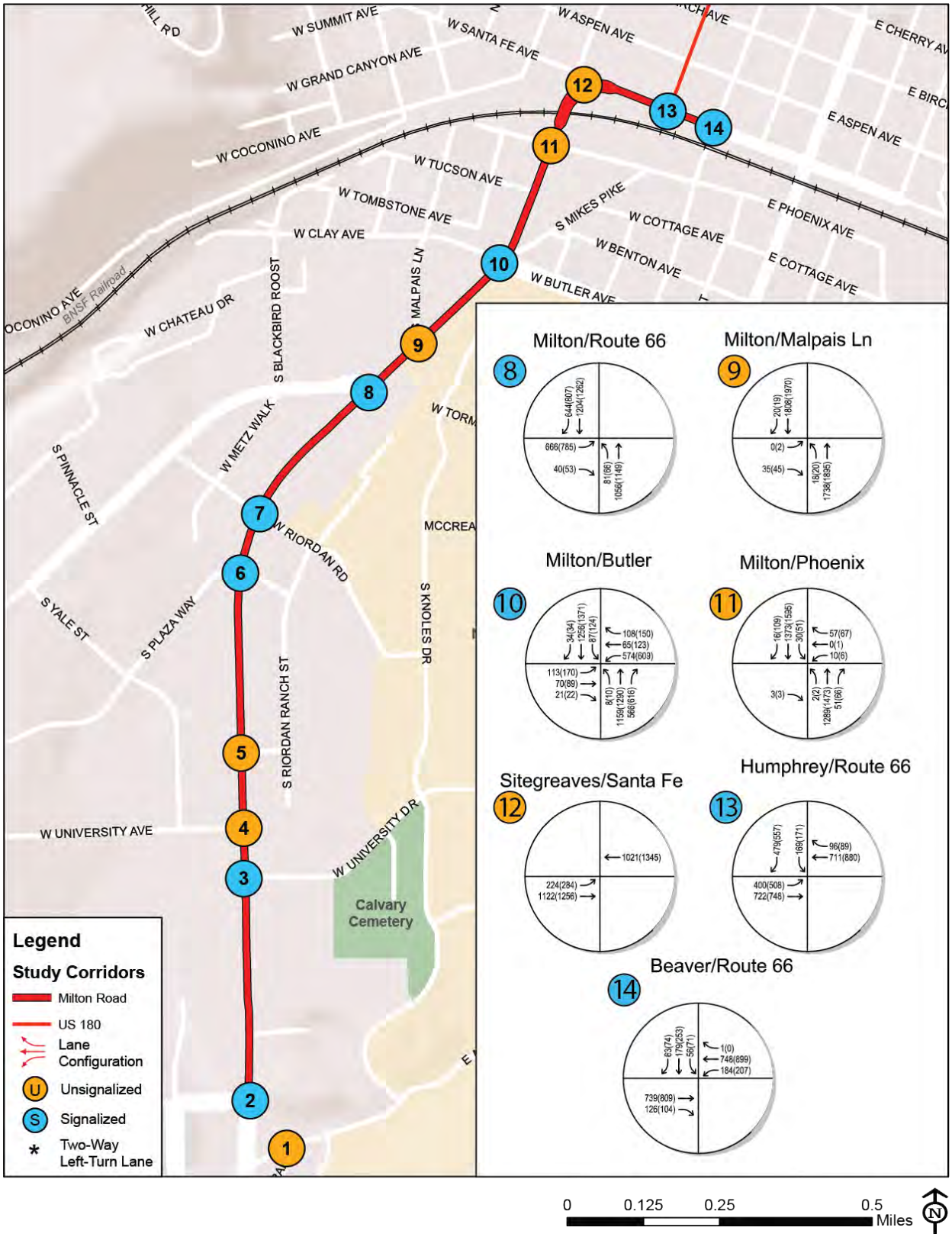


Figure 5-8: Existing 2017 Peak Hour Traffic Volumes – (Mid-Day) PM Peak Hours (Continued)



Existing Roadway LOS

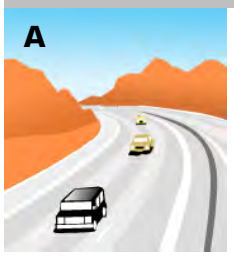
The ability of a transportation system to transmit the transportation demand is characterized as its level of service (LOS). LOS is a rating system from "A", representing the best operation, to "F", representing the worst operation. The appropriate reference for LOS operation is the Highway Capacity Manual, published by the Transportation Research Board. This manual characterizes the LOS for an urban street facility as described in **Table 5-4** Urban Street facilities are described as having interrupted flow (signals, all-way stops, or roundabouts) at a spacing of two miles or less. The LOS descriptions below are applicable for arterial and collector streets.

In general, LOS A and B represent no congestion, LOS C and D represent moderate congestion, and LOS E and F represent severe congestion. Refer to **Table 5-4** for a more thorough description of each LOS category.

Traffic congestion levels were estimated for the Milton Road study corridor using the existing 24-hour daily traffic volumes. The degree of congestion is expressed in terms of level-of-service (LOS).

Highway Capacity Software (HCS) and the most recent traffic counts (September 12, 2017) were used to determine the roadway segment LOS for the Milton Road study corridor. depicts the roadway segment LOS for the Milton Road study corridor.

Table 5-4: Level of Service Criteria for Urban Street Facilities

Level-of-Service	Characterized by Highway Capacity Manual as:
A 	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.
B 	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.
C 	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.
D 	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.
E 	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.
F 	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, LOS F 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.

Existing Intersection Level-of-Service (LOS)

LOS can be calculated for roadway segments, intersections, and freeway mainline lanes and ramps. LOS estimates also can be calculated for different periods, including daily conditions and peak hour conditions. The LOS analysis discussed in this section focuses the LOS for major intersections along the Milton Road corridor. LOS based on peak hour turning movement volumes and anticipated delay is discussed in the following section.

The delay and LOS are calculated for the intersection and each approach. **Table 5-5** lists the LOS criteria for signalized and unsignalized intersections as stated in the HCM manual.

Table 5-5: 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

One of the important conditions for determining LOS at an intersection is the number of lanes provided for each movement on each approach at the intersection. **Figure 5-4** depicts the existing lane configuration and traffic control at the study intersections along the Milton Road corridor.

The existing signal timing and controller data for the signalized intersections along the Milton Road study corridor was obtained from the Arizona Department of Transportation (ADOT). The existing signal timing and controller data obtained from ADOT is included in **Appendix X** of this report and was utilized for the existing LOS analysis.

As mentioned in the *Existing Turning Movement Volumes* section of this report, 2017 peak hour turning movement counts were collected at all the key intersections along the Milton Road study corridor. Existing 2017 peak hour turning movement volumes at intersections along the Milton Road study corridor are shown in Error! Reference source not found..

LOS for the study intersections was analyzed using Synchro 9 software, which utilizes the criteria in **Table 5-5**. For unsignalized intersections, Synchro software only provides the Intersection Capacity Utilization (ICU) for the LOS, which was reported as part of this analysis at the unsignalized intersections.

The input and output of these analyses are provided as **Appendix X** to this report. **Table 5-6** presents the existing 2017 LOS summary for the study intersections along the Milton Road corridor.

Table 5-6: Existing 2017 LOS at Signalized and Unsignalized Intersections

Intersection	Approach	2017 MD Peak		2017 PM Peak	
		LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)
I-17 Exit Drive and McConnell Drive	Northbound	C	22.4	F	196.2
	Southbound	-	-	-	-
	Eastbound	A	0.0	A	0.0
	Westbound	A	0.0	A	0.0
	Overall	**A***	**5.5**	**B***	**44.0**
Milton Road and Forest Meadows Street	Northbound	B	13.8	C	26.0
	Southbound	B	16.4	C	31.4
	Eastbound	D	40.3	D	44.3
	Westbound	E	56.0	E	58.7
	Overall	**C**	**22.6**	**C**	**33.3**
Milton Road and University Drive	Northbound	B	16.7	B	16.3
	Southbound	B	11.7	A	9.1
	Eastbound	E	55.3	E	61.5
	Westbound	D	51.6	E	55.8
	Overall	**C**	**20.2**	**C**	**21.2**
Milton Road and University Avenue	Northbound	A	1.7	A	1.8
	Southbound	A	0.0	A	0.0
	Eastbound	C	18.1	C	22.2
	Westbound	-	-	-	-
	Overall	**A***	**2.4**	**A***	**2.9**
Milton Road and Chambers Drive	Northbound	A	0.0	A	0.0
	Southbound	A	0.7	A	0.4
	Eastbound	-	-	-	-
	Westbound	B	13.6	B	13.6
	Overall	**A***	**1.0**	**A***	**0.9**
Milton Road and Plaza Way	Northbound	A	8.4	A	8.2
	Southbound	B	14.2	B	14.2
	Eastbound	D	41.0	D	50.4
	Westbound	D	43.9	D	50.6
	Overall	**B**	**17.9**	**B**	**20.0**
Milton Road and Riordan Road	Northbound	A	8.1	B	10.1
	Southbound	A	2.8	A	2.8
	Eastbound	D	44.5	D	42.9
	Westbound	D	47.8	D	50.1
	Overall	**B**	**13.4**	**B**	**15.0**

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

Table 5-7: Existing 2017 LOS at Signalized and Unsignalized Intersections (Continued)

Intersection	Approach	2017 MD Peak		2017 PM Peak	
		LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)
Milton Road and Histirical Route 66	Northbound	A	9.2	B	18.0
	Southbound	C	20.4	C	23.0
	Eastbound	D	51.8	D	51.1
	Westbound	-	-	-	-
	Overall	**C**	**22.9**	**C**	**27.2**
Milton Road and Malpais Lane	Northbound	A	0.2	A	0.2
	Southbound	A	0.0	A	0.0
	Eastbound	B	10.7	B	12.2
	Westbound	-	-	-	-
	Overall	**A***	**0.2**	**A***	**0.2**
Milton Road and Clay/Butler Avenue	Northbound	C	22.3	C	32.9
	Southbound	C	24.9	C	33.5
	Eastbound	E	62.5	E	77.2
	Westbound	D	43.6	E	55.3
	Overall	**C**	**29.1**	**D**	**40.1**
Milton Rd and Phoenix Avenue	Northbound	A	0.0	A	0.0
	Southbound	A	0.2	A	0.4
	Eastbound	C	15.4	C	18.3
	Westbound	B	12.6	B	13.3
	Overall	**A***	**0.4**	**A***	**0.5**
Milton Rd and Santa Fe Left-Turn Bay	Northbound	-	-	-	-
	Southbound	-	-	-	-
	Eastbound	A	2.1	A	3.3
	Westbound	A	0.0	A	0.0
	Overall	**A***	**1.2**	**A***	**1.8**
Milton Rd and Humphreys St	Northbound	-	-	-	-
	Southbound	D	49.3	D	51.3
	Eastbound	B	11.0	C	20.3
	Westbound	A	10.0	C	25.3
	Overall	**C**	**20.3**	**C**	**29.6**
Milton Rd & Beaver St	Northbound	-	-	-	-
	Southbound	D	42.6	D	37.6
	Eastbound	A	7.2	B	10.1
	Westbound	A	4.8	A	6.2
	Overall	**B**	**11.2**	**B**	**12.9**

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

The signalized and unsignalized study area intersections operate at LOS "D" or better with the existing 2017 traffic volumes, existing lane geometrics and existing signal timing. All the approaches operate at LOS "D" or better with the following exceptions:

1. Milton Road and Clay/Butler Avenue – LOS E in the eastbound direction during Mid-Day and PM peak hours, LOS E in the westbound direction during the PM peak hour,
2. Milton Road and University Drive – LOS E in the eastbound direction during Mid-Day and PM peak hours, LOS E in the westbound direction during the PM peak hour,
3. Milton Road and Forest Meadows Street – LOS E in the westbound direction during Mid-Day and PM peak hours, and
4. I-17 Exit Ramp and McConnell Drive – LOS F in the northbound direction during the PM peak hour.

Existing Non-Motorized Mobility

Existing Bike Facilities

Bike lanes do not exist along the Milton Road study corridor between Forest Meadows Street and Old Route 66. Bike lanes exists on both sides of Milton Road between Old Route 66 and Phoenix Avenue. Bike lanes also exists on both sides of Milton Road from approximately 290 feet west of Humphreys Street to Beaver Street. There are no existing bike lane signs posted in association with the existing bike lanes.

Existing Pedestrian Facilities

Continuous sidewalks exist on both sides of Milton Road throughout the study corridor. Crosswalks along the Milton Road study corridor only exist at the signalized intersections. At the signalized intersection of Milton Road and Humphreys Street, there is no existing crosswalk to cross Milton Road.

Existing Transit Services

The Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA) is the transit agency in Northern Arizona operating Mountain Line, Mountain Lift and Mountain Link systems in Flagstaff.

Mountain Line and Mountain Lift services are available along the Milton Road study corridor. Bus stops for various routes of Mountain Line are located at the following locations along the Milton Road study corridor:

- North of Forest Meadows – Route 14 in the northbound direction and Route 4 in the southbound direction,
- North of University Drive – Route 14 in the northbound direction,
- North of University Avenue – Route 4 in the southbound direction,
- South of Plaza Way – Route 14 in the northbound direction and Route 4 in the southbound direction, and
- South of Butler Avenue – Route 7 and Route 14 in the northbound direction.

Mountain Line Route 2, Route 5 and Route 66 operate along the Milton Road corridor between Phoenix Avenue and Beaver Street originating at the Downtown Convention Center. However, bus stops for these routes does not exist along the corridor.

The bus stops located north of University Drive, north of University Avenue and south of Malpais Lane have covered structures to accommodate sitting pedestrians and provide shading structures.

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. Mountain Lift service is available along the Milton Road study corridor.

Access Management 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 while adequately meeting the access needs of the abutting land uses along the roadway. 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 to **Table 5-8** below:

Table 5-8: 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 a review of aerial mapping. Each access point was then categorized into one of the following two access types:

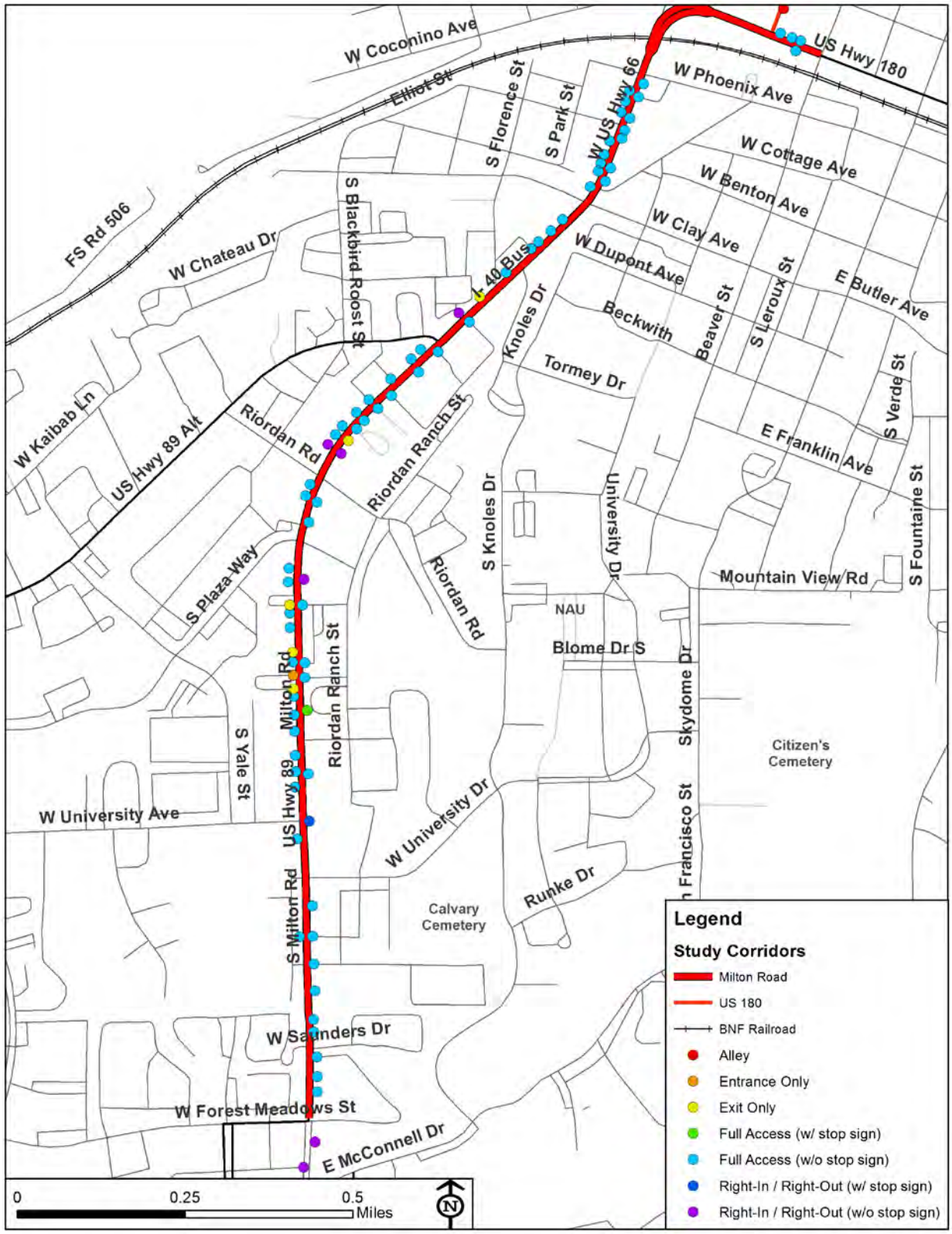
- **Right-in/Right-out (RIRO)** – only two traffic movements, right-in and right-out, are permitted into and out of a side street or a driveway. Intersections are typically controlled by a STOP sign on the side street. RIRO access points along the study corridor provide access to private commercial properties.
- **Full Access** – Full access driveways generally allow all traffic movements on all approaches. These intersections are either STOP controlled on both the side streets or traffic signal controlled.

Figure 5-9 illustrates the locations of existing driveways and intersections along the study corridor. Milton Road corridor has excessive number of driveways as well as varying types of driveways along the corridor. There is a total of 75 driveways along the Milton Road CMP corridor and the number of each type are listed below:

- 65 Full access (without stop sign),
- 1 full access (with stop sign),
- 1 right-in / right-out (with stop sign),
- 3 right-in / right-out (without stop sign),
- 1 Entrance Only,
- 4 Exit Only, and
- 0 Alleys.

Milton Road corridor has a two-way left-turn lane through the corridor. Due to the absence of a raised median along the corridor, access control at existing driveways and intersections is limited.

Figure 5-9:Existing Access Points



Existing Pavement Conditions

The pavement surface for the entire corridor is asphaltic concrete with the exception of a short segment near the BNSF underpass (between Phoenix Avenue and Humphreys Street) which is Portland Cement Concrete Pavement (PCCP). Pavement condition data was obtained from the street view of Google Earth and cursory field review of the corridor. Roadway conditions at the time of review were defined as:

> **Good Condition:** Like new pavement with few defects as perceived by field reviewers, no sign of cracking and pavement deterioration, no maintenance is required as cracks are barely visible or well-sealed.
>
> **Fair Condition:** Slight rutting, and/or cracking, and/or roughness that became noticeable by field reviewers. The road may also be bumpy but not enough to reduce vehicle speed, and may have some pavement raveling.
>
> **Poor Condition:** Multiple cracks, potholes, roughness, and/or bleeding are apparent on roadway. Roadway may be uncomfortable to vehicle occupants and drivers may need to correct or avoid road defects. Previous road repairs are deteriorated and require maintenance.

Based on the Google Earth and cursory field review, Milton Road is experiencing longitudinal and traverse cracking through the Milton Road study corridor. North of University Drive, alligator cracking is observed on Milton Road. There are minor potholes along the corridor. Rutting is observed on Milton Road where the roadway surface changes from PCCP to asphalt concrete west of Humphreys Street. Based on the Google Earth and field review, the Milton Road appears to be in a good to fair condition throughout the study corridor.

CHAPTER 6: EXISTING CORRIDOR SAFETY CONSIDERATIONS

A crash analysis was conducted for the study corridor to identify trends, patterns, predominant crash types, and high crash intersections. The purpose of the crash analysis is to discover safety hazard locations that need to be addressed to improve area safety. Crash data for the five-year period from January 1, 2012 to December 31, 2016 was obtained from the Arizona Department of Transportation Traffic Records Section.

Vehicular Crash Data Analysis (5 years)

During the five-year analysis period, 1,489 crashes occurred within the Milton Road study corridor. The following sections discuss the crashes along the Milton Road study corridor within the five-year analysis period.

Injury Severity

There were two fatalities reported in the analysis period within the study area in the year 2015, one at Milton Road and University Avenue and the other at Milton Road and Humphreys Street. 338 of 1,489 crashes (23%) 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 Milton Road study corridor and the Statewide average is shown in **Table 6-1.**

Table 6-1: Crash Severity Comparison

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

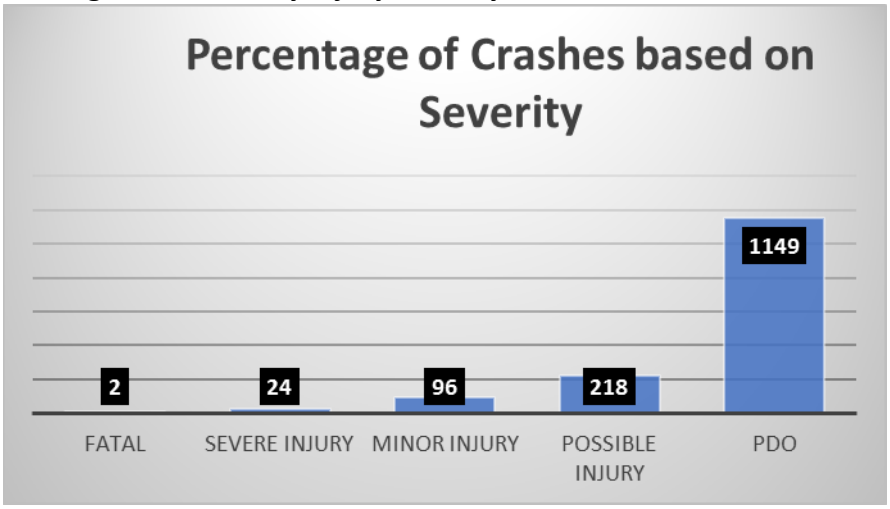
Average of all crashes from 2012-2016

Figure 6-1 shows the location of crashes along Milton Road on a map and categorizing them by the severity of the injury. There is the highest concentration of crashes on at the inter section of Milton Road and Butler Avenue. It is also important to note that the two fatalities occurred at the intersection of Route 66 and Humphrey's Street, and the intersection of Milton Road and University Avenue.

Figure 6-2 illustrates the number of crashes that occurred along the corridor during the five-year analysis period based in the severity of crashes.

Figure 6-1: Milton Road Crashes by Injury Severity Map

Figure 6-2: Percentage of Crashes by Injury Severity



Intersection Relation

Figure 6-3, 57% of the total crashes within the analysis period of five-year occurred at intersections. For the purposes of this analysis, intersection and non-intersection related crashes were based on the "Junction Relation" column included in the crash data excel files.

Figure 6-3: Crash Percentages based on Intersection Relation

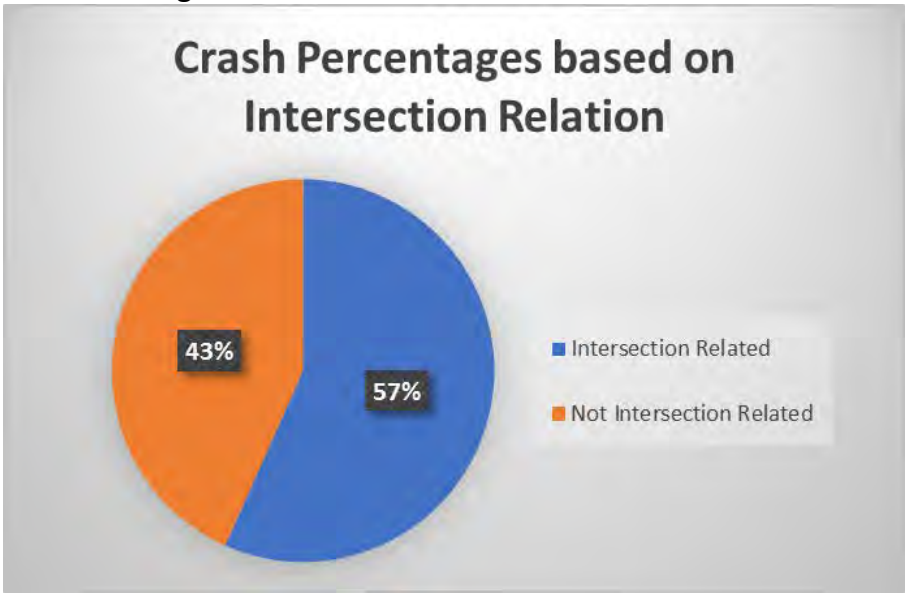


Table 6-2 depicts a summary of the intersection related crashes along the Milton Road study corridor. The crash data depicted in **Table 6-2** is based on the crashes that were within 300 feet of that particular intersection.

Table 6-2: Summary of Intersection Crashes

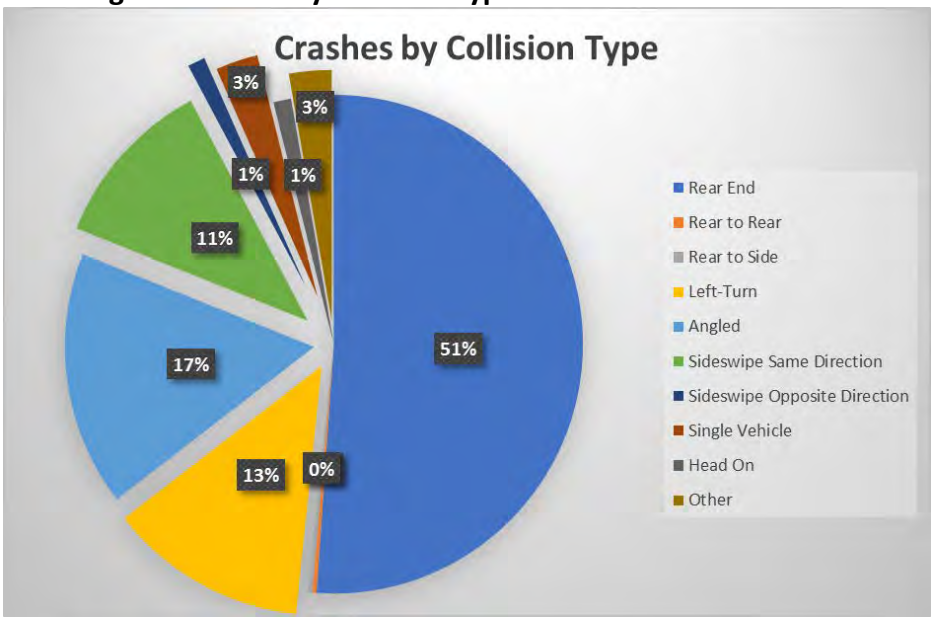
Intersection		Beaver St	Humphreys St	Phoenix Ave	Clay/Butler Ave	Malpais Ln	Route 66	Riordon Rd	Plaza Way	Chambers Dr	University Ave	University Dr	Forest Meadows St
Total Crashes		*57*	*77*	*69*	*118*	*98*	*135*	*82*	*68*	*29*	*64*	*69*	*59*
Severity	Fatality	0	1	0	0	0	0	0	0	0	1	0	0
	Severe Injury	0	3	0	1	3	0	2	2	0	1	3	1
	Minor Injury	2	2	4	7	10	11	5	5	3	4	2	2
	Possible Injury	8	17	9	17	20	17	9	4	2	11	6	7
	PDO	47	54	56	93	65	107	66	57	24	47	58	49
Type of Collision	Angle	12	5	7	13	3	18	21	12	7	21	16	17
	Head On	0	2	0	0	0	1	0	2	2	1	0	3
	Sideswipe	12	9	4	13	8	10	13	4	5	10	7	10
	Left-Turn	1	9	5	7	3	17	20	10	4	20	13	10
	Rear End	28	38	51	74	79	82	19	38	8	7	31	15
	Rear to Rear	0	0	0	1	0	0	0	0	0	1	0	0
	Rear to Side	2	0	1	0	0	0	0	0	0	0	0	0
	Pedestrian	0	1	1	1	2	0	2	1	0	2	0	0
	Bike	1	6	0	4	3	3	2	0	2	0	1	1
	Single Vehicle	0	4	0	5	0	4	2	0	1	1	1	2
	Other/Unknown	1	2	0	0	0	0	3	1	0	1	0	1
Light Conditions	Daylight	42	66	64	86	82	107	60	43	18	51	47	35
	Dawn	1	3	0	2	0	0	1	1	0	0	0	0
	Dusk	5	3	1	1	4	7	3	1	2	1	3	2
	Dark Lighted	9	4	4	27	10	19	18	22	8	9	18	20
	Dark not Lighted	0	1	0	2	2	2	0	1	1	3	1	2

Collision Manner

Figure 6-4 illustrates the percentage of crashes that occurred along the corridor during the five-year study period by collision type. As shown in the Figure, 51% of the total crashes during the analysis year were rear end collisions, 17% were angled other than left-turns collisions and 13% were left-turn related crashes.

A further analysis revealed that 53% of the reported rear end collisions were intersection related crashes. The remaining 47% were non-intersection related crashes

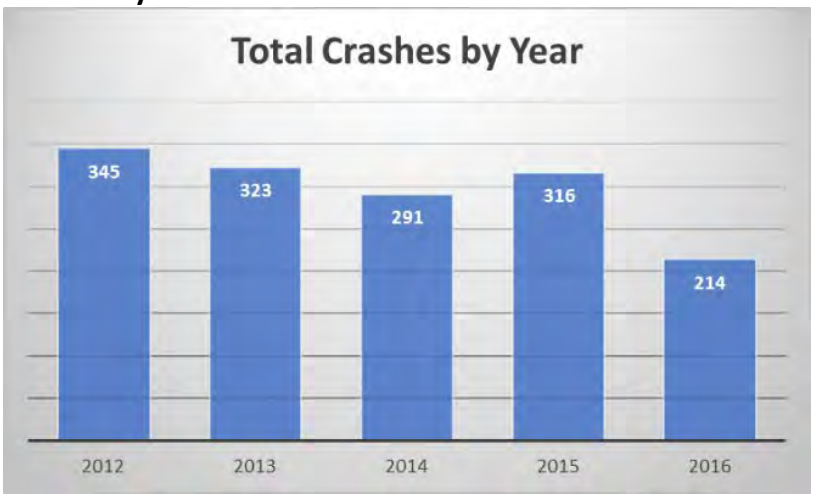
Figure 6-4: Percentage of Crashes by Collision Type



Crashes by Year

Figure 6-5 illustrates the total number of crashes that occurred along the corridor during the five-year study period in each year. As shown in the Figure, the corridor experiences the highest number of crashes in the year 2012 (with total 345 crashes). This number is significantly higher than the number of crashes in the year 2016, 214 crashes.

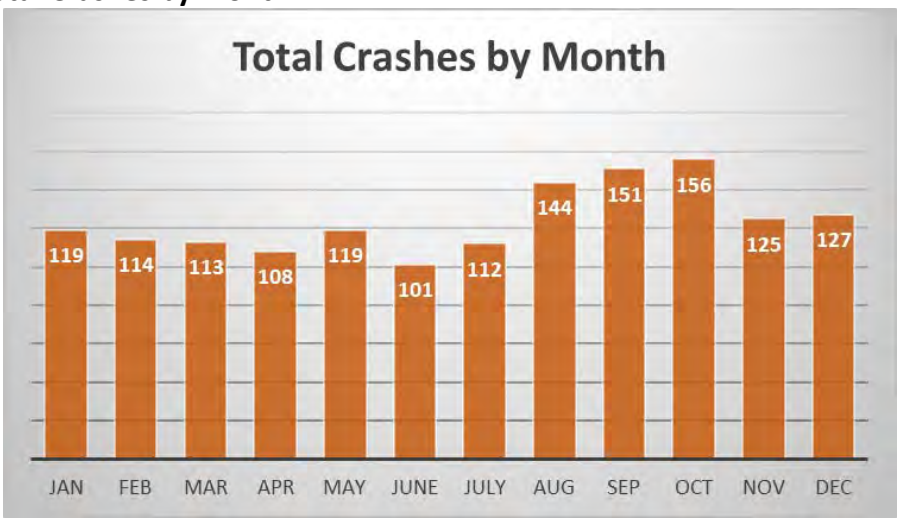
Figure 6-5: Total Crashes by Year



Crashes by the Time of the Year

Figure 6-6 illustrates the total number of crashes that occurred along the corridor during the five-year analysis period by month. As shown in the **Figure**, highest number of crashes occurred in the months of August, September and October.

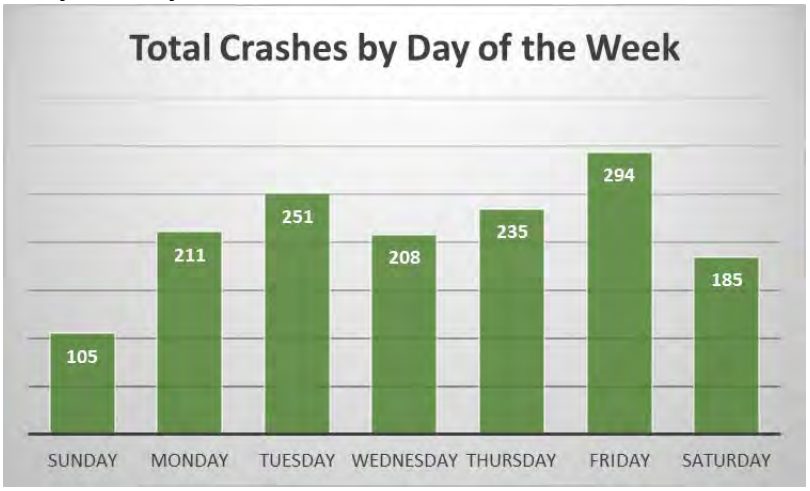
Figure 6-6: Total Crashes by Month



Crashes by the Day of the Week

Figure 6-7 illustrates the total number of crashes that occurred along the corridor during the five-year analysis period by the day of the week. As shown in the Figure, majority of crashes occurred during weekday, higher number occurring on Friday.

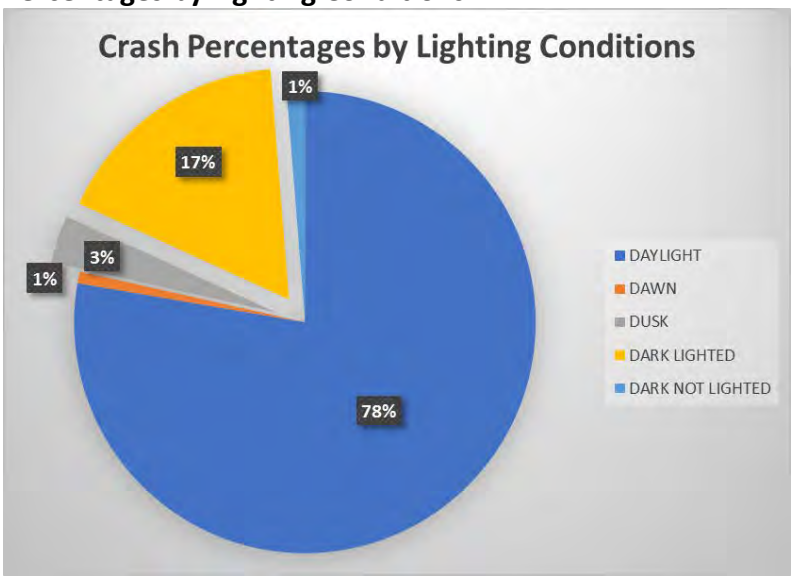
Figure 6-7: Crashes by the Day of Week



Lighting Conditions

Figure 6-8 illustrates the percentage of total crashes that occurred along the corridor during the five-year analysis period based on the lighting conditions of the study area. As shown in the Figure, 78% of the total crashes occurred during daylight and 17% of the crashes occurred during dark lighted conditions. Further analysis of crash data shows that 94% of injury crashes and 100% of fatalities occurred during daylight and dark lighted conditions.

Figure 6-8: Crash Percentages by Lighting Conditions

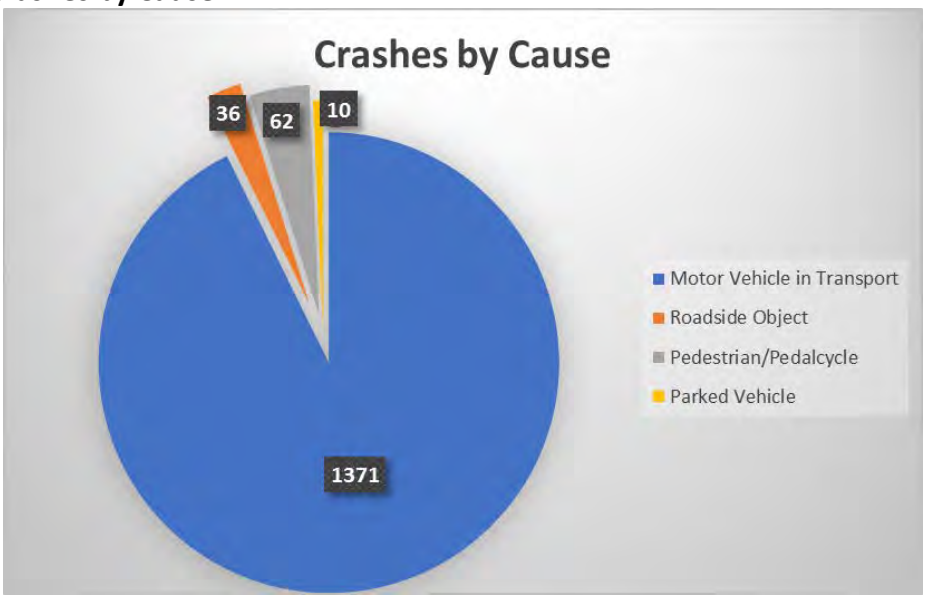


Crashes by Cause

Analyzing the crash events assists in identifying hazards that cause safety issues along study roadways. **Figure 6-9** illustrates the total number of crashes that occurred along the corridor during the five-year analysis period based on the reason for the collision. Based on five-year crash data on the Milton Road study corridor, 1,371 of the total 1,489 crashes were cause due to a motor vehicle in transport. Of the remaining 118 crashes, 36 were due a roadside object, 62 were pedestrian/pedal cycle related and 10

were due to a parked vehicle. Overturn/rollover, animal related and other non-reported crashes were minimal along the study corridor.

Figure 6-9: Crashes by Cause



Pedestrian & Bicycle Crash Data Analysis

As mentioned in the ***Crashes by Cause*** section of the report, 62 of the total 1,489 crashes were pedestrian/pedal cycle related collisions. **Figure 6-10** illustrates the total number of pedestrian/pedal cycle crashes that occurred along the corridor during the five-year analysis period.

Two of the 62 pedestrian related crashes resulted in fatalities, both in the year 2015, one at the intersection of Milton Road and University Avenue and the other at the intersection of Milton Road and Humphreys Street. Both the fatalities occurred because of the pedestrian not using the crosswalk. Both the pedestrian related fatalities occurred during dark lighted conditions. Alcohol was a factor in both the reported fatalities. Of the remaining pedestrian related crashes, 22 were no injury crashes and 38 were injury crashes.

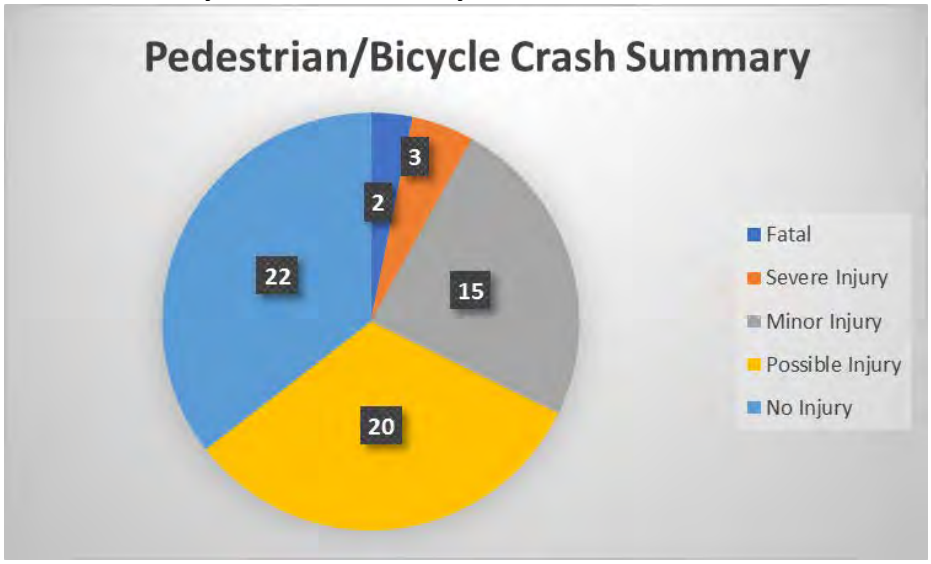
A comparison of pedestrian/bicycle crashes that occurred within the five-year period for the Milton Road study corridor and the Statewide average is shown in **Table 6-1.**

Table 6-3: Crash Severity Comparison

Crash Severity	Number	Milton Road %	Statewide Average %*
Fatal	2	0.03%	6%
Injury	38	61%	84%
Property Damage Only	22	35.5%	11%

Average of all pedestrian/bicycle related crashes from 2012-2016

Figure 6-10: Pedestrian/Bicycle Crash Summary



Mid-Block Crossings

As mentioned in the *Existing Pedestrian Facilities* section of this report, crosswalks along the Milton Road study corridor only exist at the signalized intersections. At the signalized intersection of Milton Road and Humphreys Street, there is no existing crosswalk to cross Milton Road. There are no existing mid-block crossings along the Milton Road study corridor.

Railroad Requirements and Restrictions

The BNSF Railway (BNSF) operates on two east-west transcontinental mainline tracks through the City of Flagstaff, Arizona. It is one of the busiest railroad corridors in the United States, carrying more than 100 freight and passenger trains daily and BNSF has considered potentially adding a third line.

Milton Road in Flagstaff intersects the rail corridor through a roadway underpass located west of Humphreys Street. Any proposed widening of Milton Road would require a substantial change to the railroad superstructure. To determine the viability of the proposed options for any potential widening of the roadway and designing the underpass structure, it is important to understand early in the project what the railroad requirements and restrictions are to decide the cost and viability of alternatives.

The following outline summarizes critical railroad requirements and restrictions. These should be considered when evaluating any proposed alternatives and while developing design plans.

Standards and References – Railway improvements shall be designed and constructed with the most current policies and standards, including the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, and the Association of State Highway and Transportation Officials (AASHTO), BNSF Railway Guidelines for Railroad Grade Separation Projects, as well as State railroad requirements.

General Design – For underpass structures, only simple spans with ballast decks are permitted. Cast-in-place concrete superstructures are unacceptable.

Track Closures – Due to the number of trains operating on the transcontinental mainline, a full closure of the tracks during the time needed for construction will more than likely not be approved for extended periods. As such, all construction activities that impact railroad operations must be coordinated with railroad officials early during the design and construction phases. The general rule of thumb is that the proposed design should not interrupt railroad operations during construction unless specifically approved by BNSF officials. It is important that agency representatives contact BNSF's Manager Public Projects during the concept phase to determine if additional railroad requirements must be met.

Track Alignment in the Railroad Right-of-Way – The preferred track alignment should be centered in the railroad right-of-way.

Shoofly Tracks – To maintain rail operations during any proposed construction phase, a project may require the temporary rerouting of train traffic through the implementation of a Shoofly track. It is important to note that two mainline tracks must be operational throughout any construction period. The following points outline additional requirements to consider when designing the Shoofly track:

- The track design speed shall be the maximum authorized timetable speed plus 10% for freight and passenger trains.
- Design plans shall meet BNSF track standards and operating requirements.
- Railroad tracks shall be fully operational at all times except during pre-approved periods for cut-over operations and other activities, as agreed upon by BNSF officials.

Access Roads – During the conceptual design phase of any proposed construction project, representatives from the City of Flagstaff, Arizona Department of Transportation, and BNSF will need to determine if an access road leading up to the structure is required. The access road will be used and controlled by railroad employees for maintenance, inspection and repair operations. At double-track locations, a single access road adjacent to one side of the track is recommended. If a third track is constructed, an access road may be required on both sides.

- The outside edge of the access road shall be located a minimum of 27 feet from the centerline of the nearest existing or planned future track.
- For an underpass structure, there are two preferred options for the required access road: a road on the bridge or a road on a separate bridge. See BNSF Railway Guidelines for Railroad Grade Separation Projects for additional details.

Temporary Horizontal Construction Clearances – All physical obstructions shall have a minimum temporary clearance of 15 feet during any proposed construction that is measured perpendicular from the centerline of the nearest track. For curved tracks, the temporary horizontal clearance shall increase by 6 inches or by 1.5 inches for every degree of curve, whichever is greater.

Permanent Horizontal Clearances – Permanent horizontal and vertical clearances must conform to the requirements outlined in the BNSF Railway Guidelines for Railroad Grade Separation Projects or AREMA Chapter 15, Part 1.

- For curved tracks, the permanent horizontal clearance shall increase by 6 inches or by 1.5 inches for every degree of curve, whichever is greater.
- A minimum of 20 feet (preference is 25 feet) spacing measured from centerline to centerline of the track shall be designed for proposed structures that accommodate multiple tracks. If 25 feet horizontal spacing is not met, then a "crash wall" or similar protective device will need to be designed.

Permanent Vertical Clearance (under the structure) – The existing vertical clearance for northbound and southbound Milton Road is 13'-9".

Figure 6-11: Existing Northbound and Southbound Milton Road Vertical

Unless specified by BNSF Railway officials, the vertical clearance of the underpass structure for any proposed widening of Milton Road should be increased to ensure that the structure will be protected by providing sufficient vertical clearance and protective devices.

- According to Guidelines for Railroad Grade Separation Projects, the minimum vertical clearance over the entire roadway width for all new or reconstructed structures are the following:
  - 16'-6" for steel superstructure with five or more beams or four or more deck plate girders per track.
  - 17'-6" for concrete superstructure or steel through plate girders with bolted bottom flanges.
  - 20'-0" for steel through plate girders without bolted bottom flanges.
- Railroad officials shall approve any variance from the vertical clearances noted above. To obtain a variance, the applicant must provide BNSF officials with written justification that include extensive details for review.
  - If the variance is approved, all structures shall be protected with a sacrificial device on each side of the structure. This protection may be in the form of a redundant steel or concrete fascia beam.

Skewed Structure – The preferred angle of intersection is 90 degrees between centerline of track and centerline of bridge supports transverse to the track. If this angle cannot be met, then an approach slab is required. For the maximum allowable skew, reference the most current BNSF Railway Guidelines for Railroad Grade Separation Projects and AREMA Manual.

Ballast Retainers – During construction and final implementation, ballast retainers must be designed to prevent ballast from inadvertently falling onto the roadway and sidewalk.

Fences and Handrails – At minimum, handrails shall be provided on both sides of the structure and shall meet Federal Railroad Administration (FRA) and Occupational Safety and Health Administration (OSHA) standards. Fencing may be considered by railroad or agency officials.

Walkways – The underpass structure requires a walkway ballast section or a walkway structure on both sides of the structure.

CHAPTER 7: FUTURE TRAFFIC CONDITIONS

Projected Traffic Conditions & Congestion

The primary purpose of forecasting future traffic volumes is to estimate the additional travel demand added to existing roadways and to forecast congestion levels due to projected growth in population and employment. The following section presents the corridor intersection traffic volumes and levels of congestion, if no roadway improvements are made (*No-Build Condition)*. It should be noted that the Project Partners are continuing to analyze and refine future traffic condition modeling parameters. To supplement the analysis and findings described in this chapter, additional future traffic projections will be provided from the Flagstaff Metropolitan Planning Organization (FMPO). This supplemental modeling methodology, analysis and results will be described in Working Paper #2.

Roadway Network

Based on the Beulah-University Alignment Study completed by Kimley-Horn in November 2015, the west leg of the existing University Avenue will be realigned south to intersect with University Drive, forming the west leg of the existing University Drive. Traffic volume patterns on the roadways surrounding Milton Road in the vicinity of University Avenue and University Drive are expected to change when the Beulah-University realignment is completed.

Design Year 2040 Traffic Volumes

For the purposes of this analysis, year 2040 is considered as the design year. Peak hour turning movement volumes for the intersections along the Milton Road study corridor were developed based on the *Milton Road Alternatives Operations Analysis Micro-Simulation Modeling* Final Report completed by Kimley-Horn in September 2016 (Milton Road Micro-Simulation Study), and the calculated growth rate for the study area.

Growth Rate

Historical average daily traffic volume information on Milton Road south of Route 66 and on Milton Road north of Butler Road were obtained from the ADOT Transportation Data Management System (TDMS) website. Years 2012 and 2016 traffic volumes were available on Milton Road south of Route 66, and years 2013 and 2015 traffic volumes were available on Milton Road north of Butler Avenue. The historical daily traffic volumes obtained from the ADOT TDMS website were used to calculate the growth rate within the study area. **Table 7-1** shows the traffic volume growth rate calculations for the study area.

Table 7-1: Growth Rate Calculations

Year	ADT	Yearly Growth %	Average Growth %
Milton. S of Route 66			
2012	37,333		
		1.56%	
2016	39,711		
Milton, N of Butler			
2013	35,881		**1.80%**
		2.05%	
2015	37,366		

Based on the historical daily traffic volumes obtained from the ADOT TDMS website, the average exponential growth rate was calculated to be 1.8% along the Milton Road study corridor.

Milton Road Micro-Simulation Study

The Milton Road Micro-Simulation study considers the Beulah-University Avenue realignment and the realigned University Drive lane configurations for the future conditions baseline analysis. The future design year traffic volumes included in the Milton Road Micro-Simulation study were developed by applying a 20% growth factor to the existing volumes after reflecting the Beulah-University realignment.

Peak Hour Traffic Volumes

As mentioned in the *Growth Rate* section of this report, a 1.8% exponential growth rate was calculated along the Milton Road study corridor. Applying a 1.8% exponential growth rate to the existing 2017 traffic volumes for 23 years (from 2017 – 2040) will result in a 50% growth in the traffic volumes. However, the existing 2017 traffic volumes does not reflect the Beulah-University Drive realigned lane geometry. Therefore, for the purposes of this analysis, the difference in the calculated growth factor (50%) and the growth factor used in the Milton Road Micro-Simulation study (20%) was applied to the design year traffic volumes from the Milton Road Micro-Simulation study to obtain the year 2040 peak hour traffic volumes, with the following exceptions:

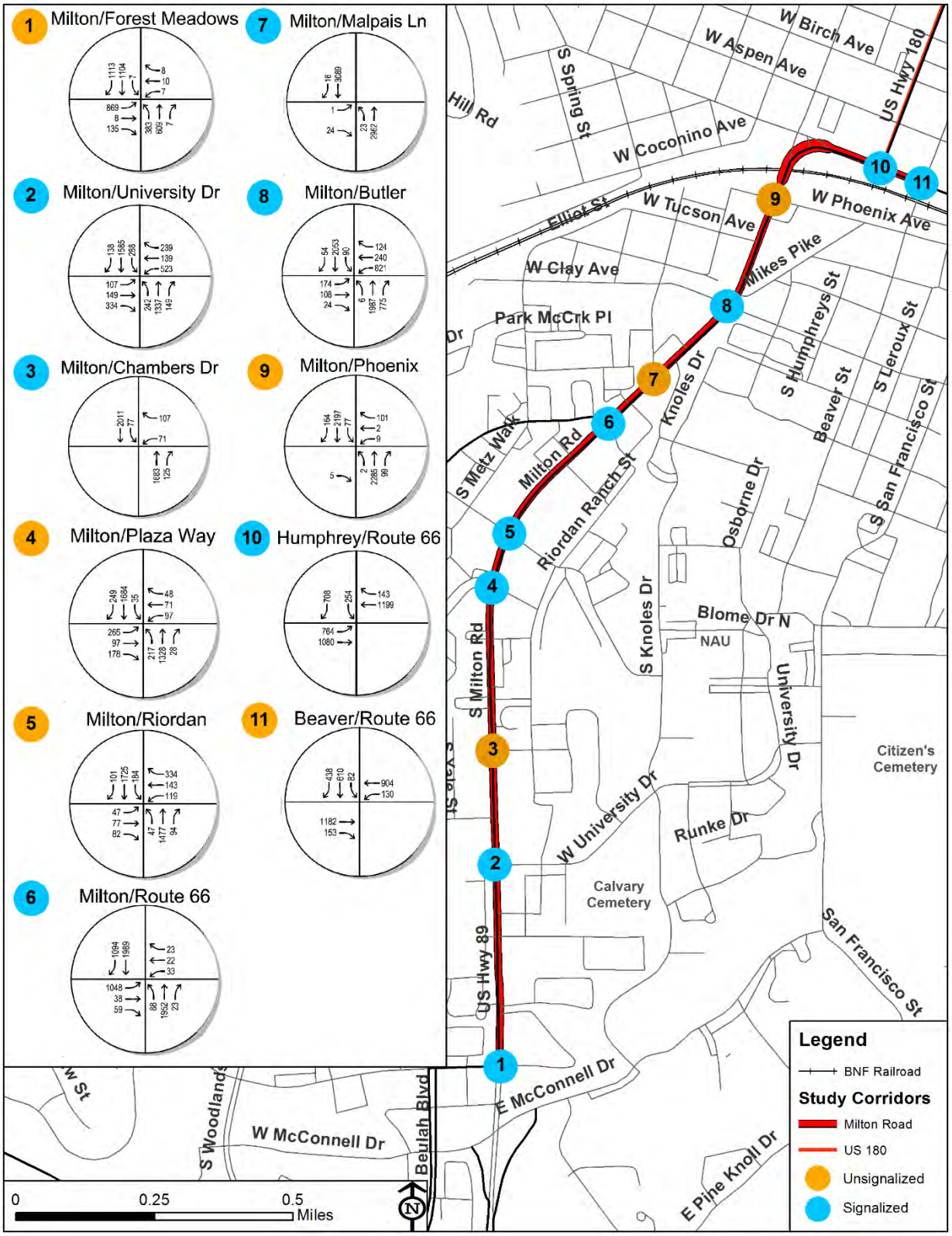
1. Intersections of Milton Road/Clay-Butler Avenue, Milton Road/Riordon Road and Milton Road/Malpais Lane – the east/west sides of these intersections lead to residential, commercial and/or office developments which are completely operational in the year 2017. Traffic volumes at these intersections were already increased based on the Milton Road Micro-Simulation study. Therefore, no additional growth rate was applied to the turning movements that are entering and exiting the east/west legs of these intersections.
2. Intersections of Milton Road/Plaza Way and Milton Road/Forest Meadows Street – the east legs of Plaza Way and Forest Meadows Street lead to an existing shopping center which are completely operational in the year 2017. Traffic volumes at these intersections were already increased based on the Milton Road Micro-Simulation study. Therefore, no additional growth rate was applied to the turning movements that are entering and exiting the east legs of these intersections.
3. Intersections of Milton Road/Chambers Drive and Milton Road/Phoenix Avenue – peak hour traffic volumes for the intersection of Milton Road and Chambers Drive and the intersection of Milton Road and Phoenix Avenue were not included in the Milton Road Micro-Simulation study. Side street approach traffic volumes and the turning movements on Milton Road at these intersections were obtained by applying the 1.8% exponential growth rate (50% growth factor) to the existing 2017 traffic volumes. The north/south through movements on Milton Road at Phoenix Avenue were calculated by balancing the traffic volumes on Milton Road between Phoenix Avenue and Clay/Butler Avenue. The north/south through movements on Milton Road at Chambers Drive were calculated by balancing the traffic volumes on Milton Road between Chambers Drive and University Drive.

The Milton Road Micro-Simulation study only included the PM peak hour traffic volumes for the design year reflecting the realigned Beulah-University intersection. Comparing the existing 2017 Mid-day and PM peak hour volumes, the PM peak hour volumes were higher and deemed appropriate for the peak hour

analysis of the design year. Therefore, for the purposes of this analysis, only the PM peak hour was analyzed in the year 2040.

PM peak hour traffic volumes for the year 2040 at the intersections along the Milton Road study corridor are shown in **Figure 7-1**.

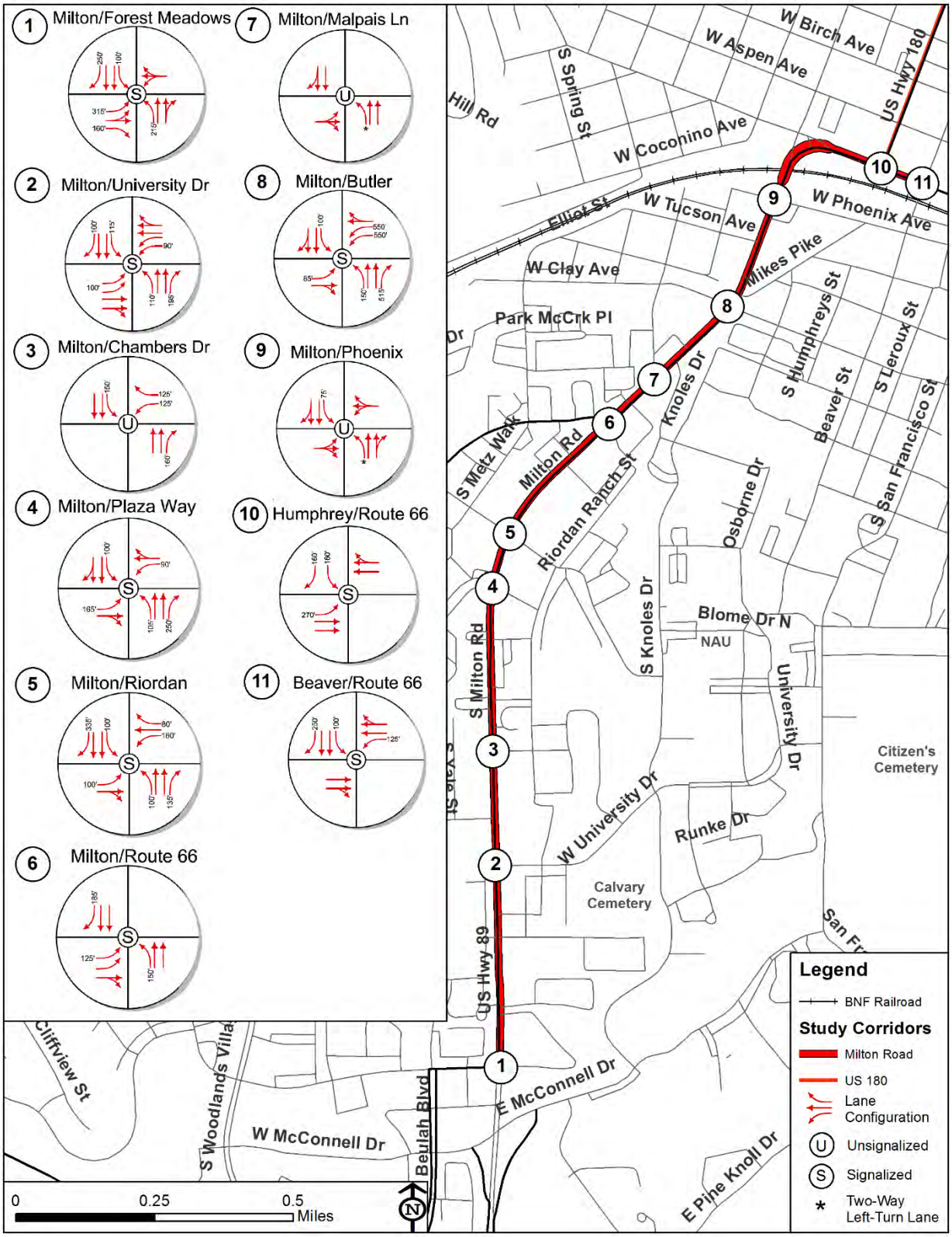
Figure 7-1: 2040 PM Peak Hour Traffic Volumes



Future Intersection Operational Analysis

The operational analysis for the future conditions was conducted utilizing the projected turning movement volumes with existing roadway geometry, existing traffic control and existing signal timing with the exception of the intersection of Milton Road and University Drive. Intersection control and lane geometry for the intersection of Milton Road and University Drive was based on Figure 4, Future Condition Baseline Lane Configuration from the Milton Road Micro-Simulation study. Signal phasing and timing for the intersection of Milton Road and University Drive was optimized for the 2040 peak hour traffic volumes. **Figure 7-2** shows the intersection control and lane geometry for the year 2040 along the Milton Road study corridor.

Figure 7-2: 2040 Intersection Control and Lane Geometry



Design Year 2040 LOS

Level-of-Service for the study area intersections along the Milton Road study corridor is analyzed for the year 2040 with the PM peak hour traffic volumes. The LOS for the signalized and unsignalized study area intersections are described in ***Existing Intersection LOS*** section of this report. Future 2040 PM peak hour traffic volumes, shown in **Figure 7-1**, and future intersection control and lane geometry, shown in **Figure 7-2**, were utilized to determine the future 2040 PM peak hour LOS at the study area intersections. **Table 7-2** presents the 2040 PM peak hour LOS summary for the intersections along the Milton Road study corridor. The input and output of these analyses are provided as **Appendix X** to this report.

Table 7-2: 2040 PM Peak Hour LOS at Signalized and Unsignalized Intersections

Intersection	Approach	2040 PM Peak	
		LOS	Delay (Sec/Veh)
Milton Rd & Beaver St	Northbound	-	-
	Southbound	D	40.7
	Eastbound	C	22.4
	Westbound	B	13.0
	Overall	**C**	**25.5**
Milton Rd and Humphreys St	Northbound	-	-
	Southbound	F	246.5
	Eastbound	F	331.8
	Westbound	F	128.2
	Overall	**F**	**246.1**
Milton Rd and Phoenix Avenue	Northbound	A	0.0
	Southbound	A	1.4
	Eastbound	D	27.5
	Westbound	E	44.8
	Overall	**A***	**1.8**
Milton Road and Clay/Butler Avenue	Northbound	F	682.4
	Southbound	F	526.6
	Eastbound	F	82.9
	Westbound	F	253.3
	Overall	**F**	**522.2**
Milton Road and Malpais Lane	Northbound	A	1.2
	Southbound	A	0.0
	Eastbound	E	36.7
	Westbound	-	-
	Overall	**A***	**0.7**
Milton Road and Route 66	Northbound	F	289.9
	Southbound	F	528.4
	Eastbound	F	243.6
	Westbound	-	-
	Overall	**F**	**399.7**
Milton Road and Riordan Road	Northbound	A	8.9
	Southbound	B	14.8
	Eastbound	D	44.4
	Westbound	D	49.9
	Overall	**B**	**18.8**
Milton Road and Plaza Way	Northbound	C	29.5
	Southbound	F	515.0
	Eastbound	E	62.7
	Westbound	D	51.1
	Overall	**F**	**257.1**
Milton Road and Chambers Drive	Northbound	A	0.0
	Southbound	A	0.6
	Eastbound	-	-
	Westbound	C	20.2
	Overall	**A***	**1.2**
Milton Road and University Drive	Northbound	F	125.9
	Southbound	F	392.6
	Eastbound	F	924.9
	Westbound	D	50.5
	Overall	**F**	**305.6**
Milton Road and Forest Meadows Street	Northbound	D	50.1
	Southbound	F	455.4
	Eastbound	E	58.9
	Westbound	E	58.4
	Overall	**F**	**263.8**

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

As shown in **Table 7-2,** the overall 2040 PM peak hour LOS at the intersections along the Milton Road study corridor is expected to be "F" at the signalized and unsignalized study area intersections with the exception of the following intersections:

- Milton Road and Beaver Street – LOS C,
- Milton Road and Riordan Road – LOS B, and
- Milton Road and Malpais Lane – LOS G.

The high traffic volumes on Milton Road and existing intersection control and lane geometry can be attributed to the poor LOS at most of the intersections along the Milton Road study corridor.

Short-Term Projected Traffic Conditions &Needs

In addition to the design year 2040 analysis, operational analysis at the intersections was performed to determine the growth rate and the timeline when the intersections along the Milton Road study corridor could not handle the projected traffic volumes with the existing intersection control and lane geometrics.

Different iterations were performed by applying 2% and 3% exponential growth rates to the existing 2017 traffic volumes at the study intersections. The 2017 existing intersection control, lane geometrics and signal timing were used for the iterations. Based on the results of these analysis, the following intersections are expected to operate at unacceptable LOS:

- Clay/Butler Avenue – in approximately 4 years with 2% exponential growth rate and 2.5 years with 3% exponential growth rate,
- Clay/Butler Avenue and Forest Meadows Street – in approximately 4.75 years with 2% exponential growth rate and 3 years with 3% exponential growth rate,
- Clay/Butler Avenue, Forest Meadows Street and Malpais Lane – in approximately 7 years with 2% exponential growth rate and 4.75 years with 3% exponential growth rate,
- Clay/Butler Avenue, Forest Meadows Street, Malpais Lane and Route 66 – in approximately 8.5 years with 2% exponential growth rate and 5.5 years with 3% exponential growth rate, and
- Humphreys Street, Clay/Butler Avenue, Route 66, Forest Meadows Street, Phoenix Avenue and Malpais Lane – in approximately 9 years with 2% exponential growth rate and 6 years with 3% exponential growth rate.

CHAPTER 8: MILTON ROAD CORRIDOR MASTER PLAN ENVIRONMENTAL OVERVIEW

The purpose of the environmental overview for the Milton Road Corridor Master Plan is to outline existing environmental resources, conditions and information in the study area by describing the natural, cultural and social resources, and environmental conditions and potential concerns This information will be used to both avoid developing alternatives that should be ruled out based on environmental challenges that likely can't be overcome as well as recognizing and minimizing environmental impacts in alternatives that will be carried forward for added evaluation and study.

This is not the first environmental overview performed in the study area. This overview represents a combination of some newly obtained information and a significant compilation of existing information from previous studies. In fact, specific guidance from the Project Partners suggested that due to the large volume of existing environmental overview information from other recent studies in the area, the Project Partners desired that this environmental overview be streamlined to summarize the most salient components from existing studies and minimize the efforts to generating new data to the extent it is already available. Much of the information summarized herein is provided from a recent environmental overview for the entire Milton Road Corridor as captured in the Flagstaff/Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA) Transit Spine Route Study (Kimley-Horn, 2016).

General Information

Environmental stewardship in Flagstaff and Coconino County are long held core values. The Flagstaff Regional Plan 2030 identifies eight guiding principles identified to help promote future development. These eight guiding principles represent the collective community values. These principles have carried on into the Blueprint 2040 Regional Transportation Plan. These include: the environment matters, sustainability matters, a smart and connected community matters, prosperity matters, people matter, place matters, cooperation matters and trust and transparency matter. A key point identified in this is that it is important to the community not to sacrifice natural resources. The number one value for the community was open space.

Key environmental issues noted at a February 2016 FMPO/ADOT long range transportation planning meeting for the region had attendees expressing support (p. 32, Blueprint 2040) for an "increased focus on system preservation, creating redundancy and resiliency across all modes and particularly in rural areas, strong support for tourism and recreation and sensitivity to environmental concerns." Key environmental issues or concerns noted were noise pollution, salt on roads, wildlife and dark skies lighting.

Threatened, Endangered & Sensitive Species

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) System (https://ecos.fws.gov/ipac/) was reviewed to identify special status state species and federally listed threatened, endangered and candidate species potentially affected by activities in the Milton Road corridor. The IPaC system identifies species listed as threatened or endangered under the Endangered Species Act. In addition to this information, the IPaC system also identifies species that are candidates or

are proposed for listing under the Endangered Species Act. The search of the IPaC system was conducted in December 2017. The species listed in the vicinity of the project area are listed in **Table 8-1**.

Table 8-1: Federally Listed Species

Common Name	Scientific Name	Status
Birds		
California Condor	*Gymnogyps californianus*	Experimental Population Non-Essential
California Condor	*Gymnogyps californianus*	Endangered
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened
Yellow-billed Cuckoo	*Coccyzus americanus*	Threatened
Reptiles		
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Threatened
Fishes		
Roundtail Chub	*Gila robusta*	Proposed Threatened
Flowering Plants		
San Francisco Peaks Ragwort	*Packera franciscana*	Threatened*

*Final critical habitat for the San Francisco Peaks Ragwort has been determined. This project area is outside the critical habitat area.

There were no critical habitats identified in the project area.

In addition to the endangered species information, there are 15 species of migratory birds that may impact the project area. These include the bird species noted in **Table 8-2**.

Table 8-2: Migratory Birds potentially impacted by the Project Location

Common Name	Scientific Name	Status
Migratory Birds		
Bald Eagle	*Haliaeetus leucocephalus*	Not a BCC*; Concern due to Eagle Act
Bendire's Thrasher	*Toxostoma bendirei*	BCC
Black Throated Sparrow	*Amphispiza bilineata*	BCC
Black-chinned Sparrow	*Spizella atrogularis*	BCC
Chestnut-collared Longspur	*Calcarius ornatus*	BCC

Common Name	Scientific Name	Status
Migratory Birds		
Elf Owl	*Micrathene whitneyi*	BCC
Golden Eagle	*Aquila chrysaetos*	Not a BCC; Concern due to Eagle Act
Gray Vireo	*Vireo vicinior*	BCC
Lark Bunting	*Calamospiza melanocorys*	BCC
Lewis's Woodpecker	*Melanerpes lewis*	BCC
Mexican Whip-poor-will	*Antrostomus arizonae*	BCC
Phainopepla	*Phainopepla nitens*	BCC
Pinyon Jay	*Gymnorhinus cyanocephalus*	BCC
Red-faced Warbler	*Cardellina rubrifrons*	BCC
Rufous Hummingbird	*Selasphorus rufus*	BCC

*BCC = Bird of Conservation Concern

In the event of any significant future construction and/or reconstruction of Milton Road (or alternative alignment), it is recommended that the species listed above and the migratory birds should be evaluated for any project area. It is also recommended that a more in-depth evaluation should occur prior to any construction or modifications to the roadway. A new biological review should also be performed to see if any new information is known within the project area prior to new development or redevelopment occurring.

Wildlife Movement

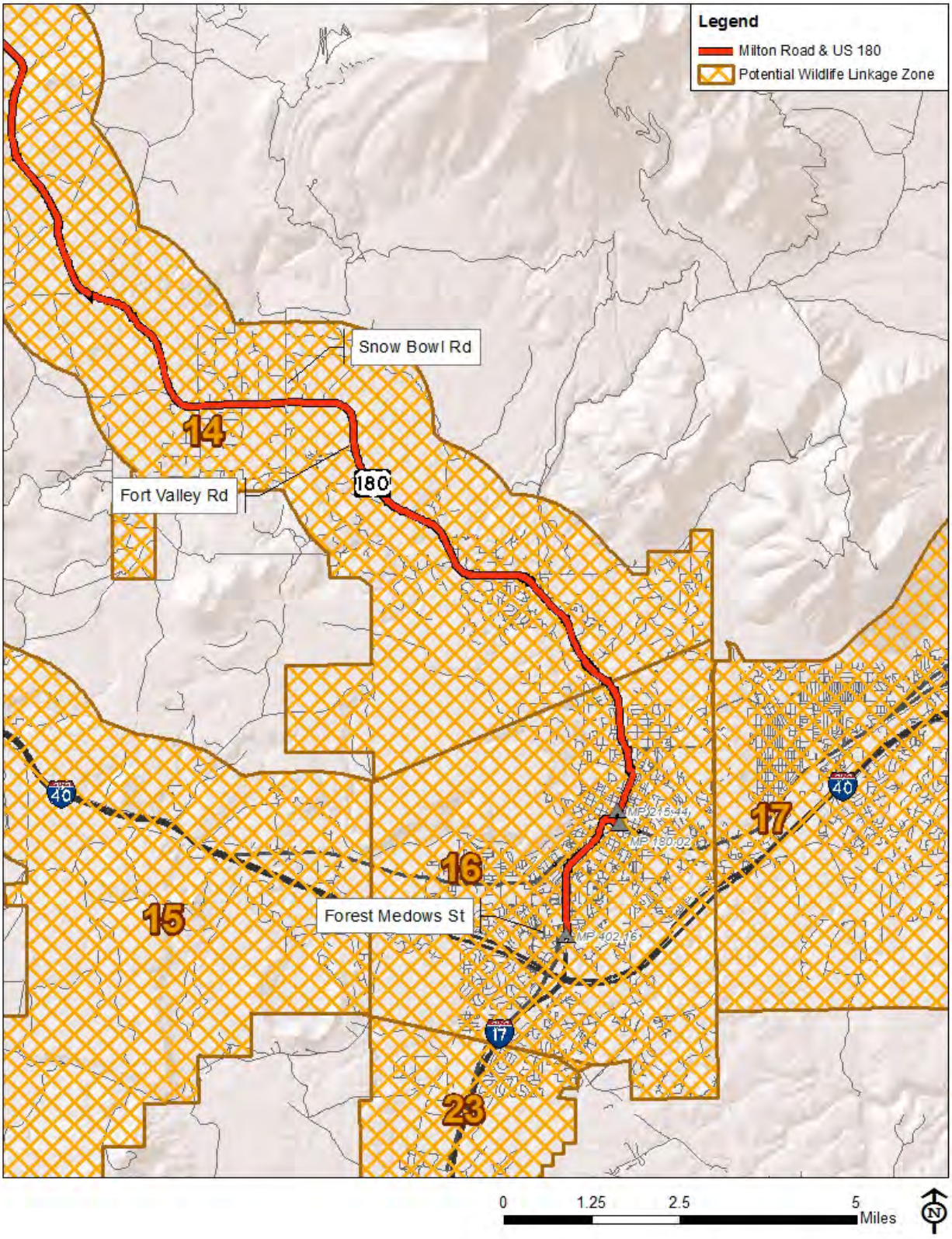
Largely developed urbanized areas, such as along the Milton Road corridor, present a barrier to the movement of wildlife. Many rural areas just outside the city of Flagstaff of course represent large swatches of publicly managed lands where wildlife is abundant. According to the Arizona Wildlife Linkages Workgroup (AWLW) Wildlife Linkages Assessment report, the Milton Road corridor traverses through two wildlife linkage areas. The AWLW represents a collaboration between ADOT and nine other public and non-profit agencies to identify statewide wildlife movement corridors amongst large publicly managed land areas. According to the Arizona Game and Fish Online Environmental Review Tool (https://azhgis2.esri.com), there is a wildlife corridor identified as the Peaks to Rim Linkage Design that is near the Fort Valley area.

The one wildlife linkage is linkage 16 – Flagstaff (p. 50) which is shown in **Figure 8-1.**The Flagstaff linkage area surrounds the city of Flagstaff with predominantly Petran Montane Conifer Forest vegetation and the identified species migratory and movements patterns effected by the corridor include Allen's Big-eared Bat, Arizona Myotis, Black Bear, Elk, Fringed Myotis, Gray Fox, Mexican Spotted Owl, Northern Goshawk, and Riparian Obligates. The other major threats to the Flagstaff Wildlife Linkage are the BNSF

railroad, I-40 and urbanization. There are no wildlife corridors that intersect with Milton Road within Flagstaff.

One of the items noted in Blueprint 2040 (pp. 32 & 218) was the desire for the Flagstaff region to consider the establishment of an urban wildlife policy. It has been noted that in several locations within existing and future areas, roadways and wildlife have the potential to come into conflict with one another with undesirable outcomes. By establishing an urban wildlife policy, this could assist with safety efforts and wildlife habitat protection. A future evaluation should look into whether there is an urban wildlife policy that could impact this project area.

Figure 8-1: Wildlife Linkage Zones



Source: ADOT Wildlife Linkages Assessment

Invasive, Noxious Weeds & Protected Arizona Native Plants

As noted in the NAIPTA study (Kimley Horn, 2016), no invasive/noxious weed species were noted during a windshield reconnaissance survey for the Milton Road study area. It is recommended that prior to construction, a presence/absence survey should be conducted to determine if any species are present in the construction area and to determine if any mitigation measures are required per Executive Order 13112 and the Arizona Native Plant Law.

Similarly, a native plant survey should also be conducted for individual development projects/sites to determine if any protected native plant species are impacted due to a future development project.

It is also advisable that prior to conducting these surveys that the ADOT biology team and Natural Resources professionals in the North-Central District should be consulted to determine their experience with invasive/noxious weeds and native plants in the project area.

Water Quality, Water Resources & Floodplains

The Milton Road corridor is located within both the Little Colorado/San Juan and the Verde Watersheds (**Figure 8-2**).

There are no impaired or outstanding waters in the study area. ADEQ's electronic mapping portal (http://gisweb.azdeq.gov/arcgis/emaps/?topic=assessed) does not show any water quality concerns at this time. In the future, should development occur in the corridor, the impaired water list and outstanding waters list should be reviewed for any updates. Should new waters be listed, there may be a requirement to address water quality concerns.

The City of Flagstaff and Coconino County are regulated by the Phase II stormwater program administered by ADEQ under AZPDES permit AZG2016-002.

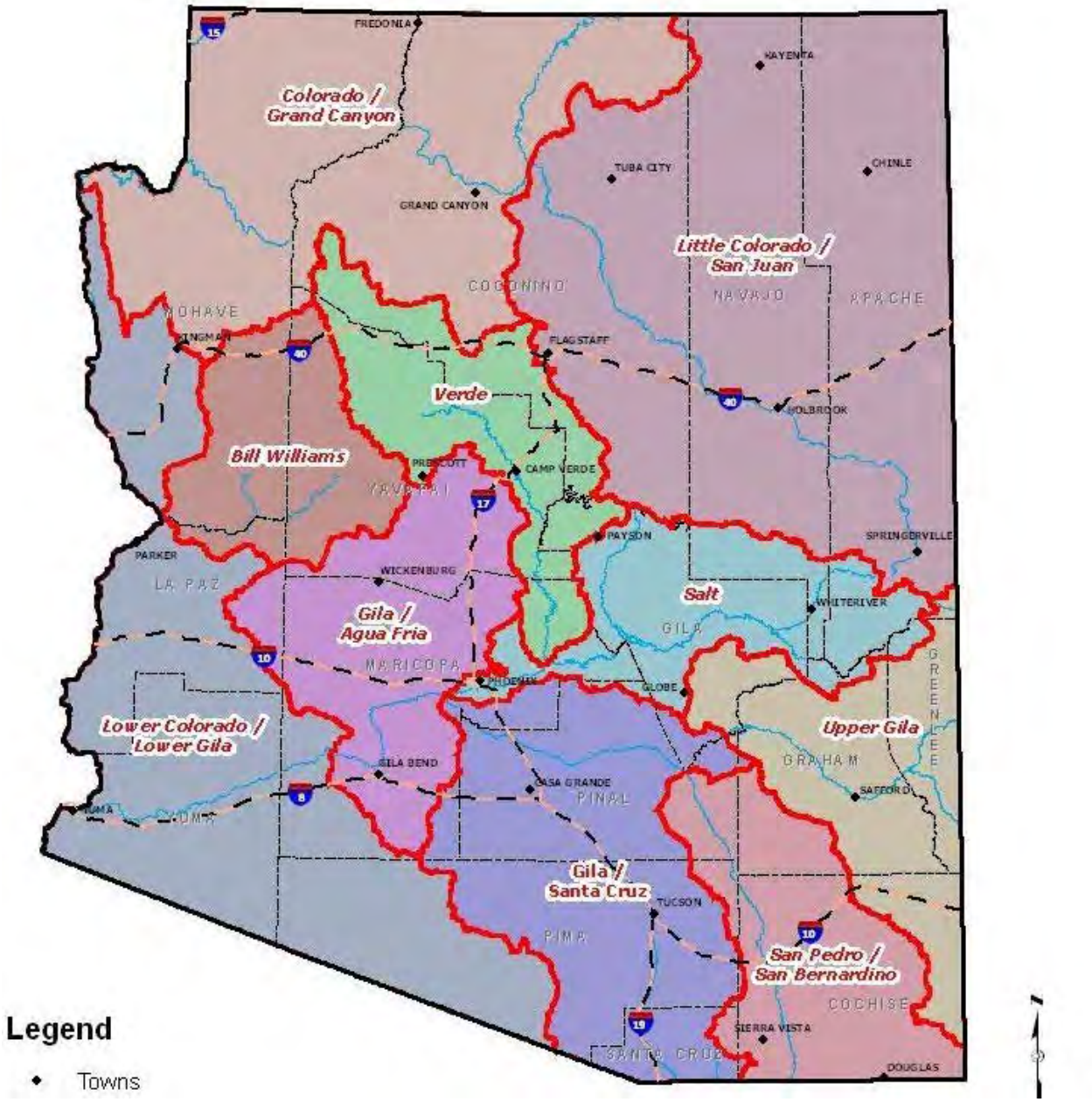
A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the study area indicates that the area has mapped floodplains. The list of FEMA FIRM panels in the study area include:

- 04005C6816G
- 0405C6808G
- 04005C6809G

Figure 8-3 illustrates the floodways in proximity to the Study Area. There are two locations where the regulatory floodway intersects the corridor. At the intersection of Butler/Clay Avenue and along Historic Route 66 just west of Humphreys Street. There is currently infrastructure in place to mitigate flooding and it is imperative to incorporate stormwater infrastructure at these two locations when developing alternatives for the corridor. In addition, the northern half of the corridor lays within the 100-year flood plain, indicating a 1% chance that this area would experience flooding every year. There will likely be additional drainage needed on Milton Road between Riordan Road and Beaver Street.

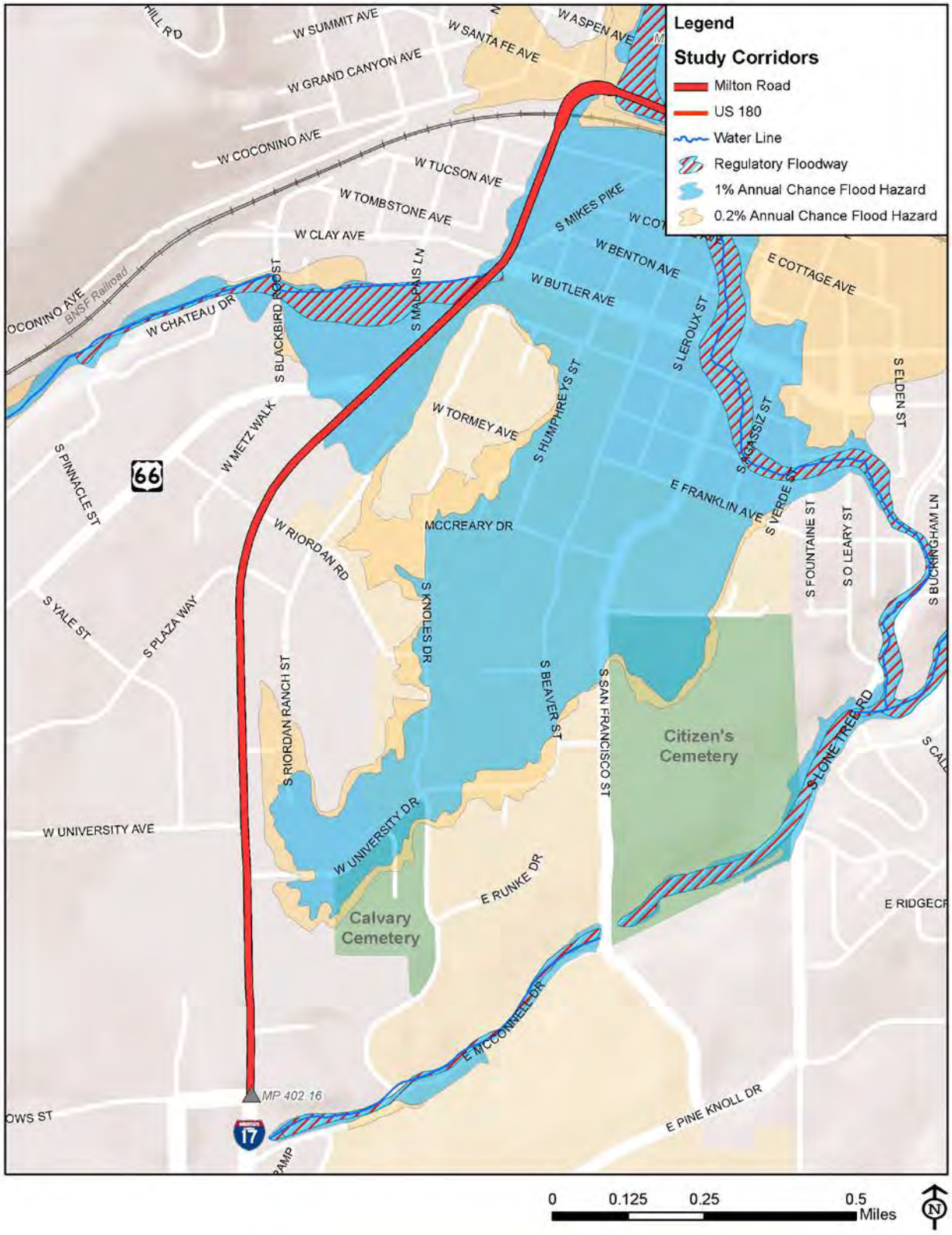
As noted in the Kimley-Horn report (pp. 16-18, 2016) a summary of groundwater conditions, surface water conditions, sections 401, 402 (stormwater - AZPDES) and 404 of the CWA as well as floodplains are described. Key environmental considerations for future development evaluations would need to include considerations for 404 permits, 401 certification statements and issues related to the City of Flagstaff and/or Coconino County's MS4 permits.

Figure 8-2: Arizona Watersheds



Source: US Department of Agriculture (USDA): Natural Resources Conservation Service - Arizona

Figure 8-3: Flood Hazard



Source: Federal Emergency Management Agency (FEMA) National Flood Hazard Layer

Noise

Noise generated by high capacity roadways such as Milton Road is a condition that occurs with urbanization and must be balanced by developing appropriate land uses along high capacity corridors. The evaluation of alternatives for the Milton Road CMP should consider the land uses adjacent to the proposed alternatives. ADOT's Noise Abatement Policy and FHWA Noise Abatement Criteria identify generally acceptable levels of traffic noise for varying land use types. Milton Road predominately has commercial and institutional (NAU) land uses adjacent to the 1.8 miles corridor. ADOT and FHWA will consider mitigation measures for homes, schools and churches for noise levels of 64 dBA or higher.

Noise should generally be evaluated in the review of viable alternatives to ensure there are no disproportionally high and adverse effects of transportation programs, policies, and activities on minority and low-income populations for Title VI Environmental and Social Justice evaluation. If noise isfound to be a concern when considering alternatives, a detailed noise study (beyond the scope of this project) would need to be conducted to identify if existing or proposed noise levels exceed acceptable noise thresholds.

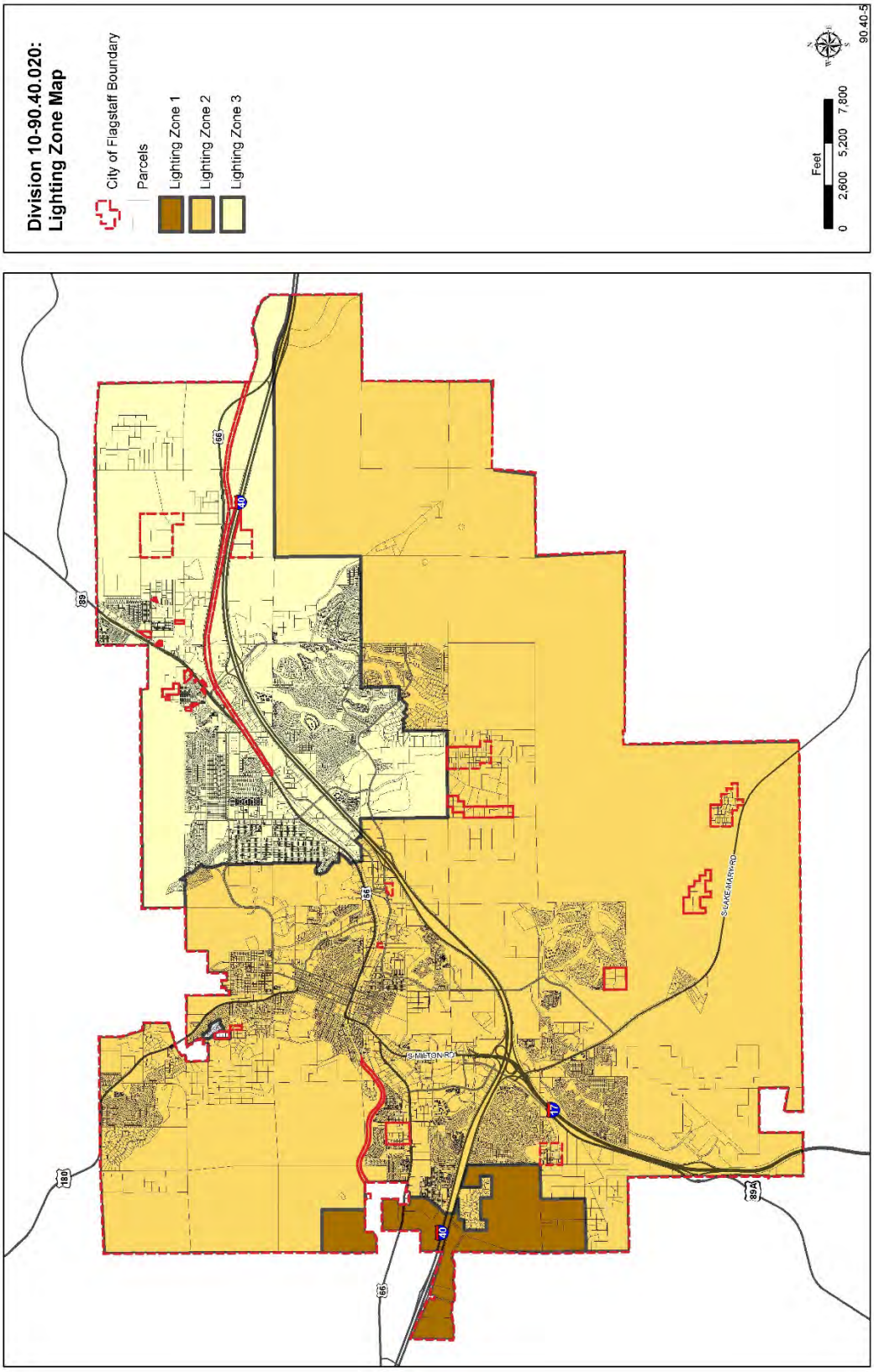
ADOT recently updated their noise policy in May 2017. It is called the "Arizona Department of Transportation Noise Abatement Requirements." All federal projects that require a new noise analysis or existing projects that have yet to begin a noise analysis are required to follow these new requirements.

Visual Resources

Visual resources in the area are described on pages 40-41 of the NAIPTA study (2016). The San Francisco Peaks Scenic Road is along US 180 and extends north of the City of Flagstaff.

In addition to the discussion of visual resources and viewsheds in the area, there is a great deal of concern in the Flagstaff area and northern Arizona related to ambient light pollution and sky glow. The City of Flagstaff has adopted lighting standards (Division 10-50.70: Outdoor Lighting Standards) that resulted in its recognition as the world's first International Dark Sky City in October 2001 (**Figure 8-4**). The lighting code is greatly valued by residents of the area. It helps ensure the dark skies are enjoyed by the Flagstaff community, its visitors and still provide safe and efficient lighting for public safety and provides an ideal natural resource for the astronomical industry in the area. The Flagstaff Dark Skies Coalition celebrates, promotes and protects the glorious dark skies of Flagstaff and northern Arizona. The support and importance to the public on maintaining Flagstaff's dark skies has and Northern Arizona skies has been noted in many reports, studies, and public meetings over the years. It has been referenced most recently in the Fort Valley Plan (2011), the NAIPTA study (2016) and Blueprint 2040 (2017). Although a study of lighting standards and light pollution is not directly required by NEPA, consideration of the importance of maintaining dark skies in the area is highly valued. Measures should be taken to address these issues as further development in the corridor occurs.

Figure 8-4: City of Flagstaff Lighting Zone Map



Air Quality

Air quality in the Milton Road corridor (and surrounding areas in Flagstaff and Coconino County) is in attainment for all criteria pollutants, which include Ozone, Particulate Matter and Carbon Monoxide. ADEQ's electronic mapping portal (http://gisweb.azdeq.gov/arcgis/emaps/?topic=nonattain) does not show any nonattainment areas near the study area at this time. Should future development occur in the corridor, a reassessment to verify this is still the case is warranted.

As noted in the Blueprint 2040 Regional Transportation Plan (Chapter 17, p. 204), "The Flagstaff region's air quality is currently in attainment, so the region is not eligible to receive special funding. However, ozone levels have exceeded federal limits to the extent that the Arizona Department of Environmental Quality briefly considered recommending to the EPA that Coconino County be designated as non-attainment for ozone. Implementing low cost solutions now can mitigate future mandated processes and solutions that will be more expensive." If dust control measures are not appropriately implemented during construction activity there is the potential for temporary negative air quality impacts.

There has also been concern expressed regarding the use of salt on roads at public meetings due to its potential environmental impact. If salt is not used, other alternatives may include the expanded use of sand and cinders. Particulate matter from sand and cinders has the potential to become air borne and thus an air quality concern. As a result, an awareness of winter storm management operations by ADOT and the City of Flagstaff may need to be reviewed prior to drawing any conclusions on air quality in the region.

Hazardous Materials

A review performed by the Kimley Horn NAIPTA study identified over 200 regulated facilities throughout the NAIPTA study area (Section 3.6, Kimley-Horn, 2016). Documented concerns included underground storage tanks, leaking underground storage tanks and varying degrees of contamination related to soil and or groundwater.

Figure 8-5 shows the underground storage tanks and leaking underground storage tanks adjacent to the Milton Road Corridor. There are a total of 16 underground storage tanks and six leaking underground storage tanks. Five of the six leaking underground storage tanks are closed. One of the Trailways underground storage tanks south of Plaza Way is the only leaking tank that has not been decommissioned. Refer to **Table 8-3** list the underground storage tanks adjacent to the Milton Road corridor.

Table 8-3: Underground Storage Tanks

Name/Location	Number of Tanks	Status
All Underground Storage Tanks		
5 Points Mobil	7	Closed: 4 Open: 3
Century 21 Associates	1	Closed
Economy Gas Station	1	Closed

Five Points Intersection	1	Closed
GASAMAT #804	3	Closed
Lube Shop	2	Closed
Trailways	2	Closed
Leaking Underground Storage Tanks		
5 Points Mobil	1	Closed
Century 21 Associates	1	Closed
Economy Gas Station	1	Closed
GASAMAT #804	2	Closed
Trailways	2	Closed

Source: Arizona Department of Environmental Quality (ADEQ)

Remediation of some facilities was pending or undocumented. Should there be any land acquisitions, or easements a Phase I Environmental Site Assessment would be recommended. Hazardous materials surveys should be conducted for any abatement/demolition of any buildings with asbestos surveys and any paint striping on the roadway or highways should be evaluated for lead based paint prior to any disturbance including milling or grinding operations. These evaluations would need to be done prior to any disturbance and would require coordination with the Hazardous Materials Coordinator at ADOT in the Environmental Planning Group.

Furthermore, there are no hazardous materials restricted routes in northern Arizona or the study area.

Figure 8-5: Underground Storage Tanks

Source: Arizona Department of Environmental Quality (ADEQ)

Cultural Resources

This section presents an overview of cultural resources that occur within the study area, which is defined herein as a 200-ft wide corridor along Milton Road between West Forest Meadows Street and South Beaver Street, a distance of about two miles. A formal Class I literature review was not completed for this Corridor Master Plan study. For this project, Archaeological Consulting Services, Ltd. (ACS) conducted a desktop review of the online AZSITE Cultural Resources Database (AZSITE), the ADOT Historic Preservation Team Portal (Portal), and the online repository of the National Register of Historic Places (NRHP) to identify archaeological sites, historical structures (both in-use and abandoned), and historic-age buildings. ACS also visited the Arizona State Historic Preservation Office (SHPO) to obtain information on architectural surveys conducted along the corridor. Finally, ACS contacted the City of Flagstaff's Historic Preservation Office (FHPO) to obtain any information on locally listed or inventoried historic neighborhoods and individual historic buildings within or immediately adjacent to the 200-ft wide study area. No field visits or surveys were conducted for this study.

Limited archival research was conducted in order to identify building resources that were greater than 50 years of age (resources constructed prior to 1968). Given the limited scope of work for this phase of the project, only online sources were reviewed to identify historical resources within the study area. The archival research was conducted by Thomas Jones, ACS Historian, and included a review of online USGS aerial photographs, supplemented by the parcel information available on the Coconino County Assessor's online interactive parcel viewer (Coconino County 2017; U.S. Geological Survey 2017).

The limited cultural resource review identified a total of 29 cultural resources within or immediately adjacent to the study area, including three in-use historical structures, two NRHP-listed historic districts, and 24 individual historic-age buildings, most of which have not been documented or evaluated for eligibility. The three in-use historic structures are linear highways (i.e., US Highways 66, 89, and 180), all of which have been determined eligible under Criterion D as part of the Arizona State Highway System (1912–1955) (Federal Highway Administration and Arizona State Historic Preservation Office 2002). Per the *Interim Procedures for the Treatment of Historic Roads* (2002), impacts to characteristics of a historic highway eligible under Criterion D are assessed to determine if the location or function/design of a roadway will be affected, which would result in an adverse effect to the resource. Ubiquitous components of the Historic State Highway System are not typically recommended for further documentation in a formal Historic State Highway System report in accordance with the *Interim Procedures*, which state that only "historic roadway features…considered worth recording…would be documented" with photographs and a feature table including appropriate measurements and descriptions.

Of additional consideration, per the *Interim Procedures for the Treatment of Historic Roads* (2002), Historic US Highway 66 (Route 66) and the Apache Trail, as "Crown Jewels" of the Arizona State Highway System, are to be evaluated under multiple criteria for eligibility to the NRHP (Federal Highway Administration and Arizona State Historic Preservation Office 2002). Therefore, in addition to Criterion D, Route 66 as a whole has also been determined eligible for inclusion in the NRHP under Criterion A for its association with the development of Federal Aid transportation projects in Arizona. In some instances, Route 66 highway segments exhibiting distinctive engineering attributes or distinctive bridges and culverts have been determined eligible under Criterion C.

A summary of cultural resources identified by the research is presented in the tables below (**Table 8-4 – Table 8-5**). From this information, ACS identified areas of sensitivity along the Milton Road corridor, including the presence of known Section 4f properties. Cultural resources that have been listed, or recommended/determined eligible for listing, in the NRHP were coded in green. Cultural resources for which eligibility has not been evaluated were coded in yellow, and cultural resources recommended or determined ineligible were coded in red. Areas not coded represent locations not associated with a known cultural resource.

As noted above, the purpose of this study was to identify known cultural resources that intersected the study area corridor. As the project area itself was not defined for the current effort beyond the 200-ft wide study corridor, should additional phases of the project advance for further consideration, ACS recommends that future studies include identification of a formal area of potential effects, followed by a formal Class I literature review, Class III survey (as needed), and historic building inventory and assessment to fully determine any historic properties that occur within or adjacent to the corridor.

Table 8-4: Summary of Previously Recorded Cultural Resources

Site Number (ASM)[1]	Site Type	Eligibility (Criterion)[2]	Section 4f Resource	Reference(s)
AZ I:15:156	Historic US Highway 66	Determined Eligible (A,C,D) (SHPO: 11/15/2002 and 5/10/2011)	Yes	(Federal Highway Administration and Arizona State Historic Preservation Office 2002; Lonardo 2006)
AZ I:3:10	Historic US Highway 89	Determined Eligible (D) (SHPO: 11/15/2002)		(Federal Highway Administration and Arizona State Historic Preservation Office 2002; Stone 1985)
AZ Q:7:74	US 180 and SR 61	Determined Eligible (D) (SHPO: 5/29/2007)		AZSITE Inventory No. 87256 (Bowler 2012)
AZ I:14:53	Railroad Addition Historic District and Boundary Expansion	Determined Eligible (A,C) (SHPO: 11/15/1982)	Yes	(Garrison et al. 1982)
	Northern Arizona Normal School Historic District	Determined Eligible (A,C) (SHPO: 4/21/1986)	Yes	(Chambers 1986)

[1] Italicized site numbers represent in-use structures or resources.
[2] Recommended=Archaeologist's opinion; Determined: SHPO concurrence with recommendation.

Table 8-5: Historical Buildings on South Milton Road (Constructed prior to 1968)

Parcel No.	Address	Property Name	Previously Inventoried/ Documented	Previous Project[1]	Eligibility Status [2,3]	Section 4f Resource	Comments
103-21-001	1801 S Milton Rd	ADOT facility and Motor Vehicle Division	Yes	Evaluated by FHPO staff	Not eligible[4]		Loss of integrity due to alterations
103-20-001	1313 S Milton Rd	Travel Inn Lodge	No		Unevaluated		
103-04-007	914 S Milton Rd	Econo Lodge	No		Unevaluated		
103-04-011	913 S Milton Rd	Budget Inn	No		Unevaluated		
103-04-005	910 S Milton Rd	America's Best Inn (Arizonan Hotel)	Yes	Route 66 Survey (Inv. No. 296)	Recommended Eligible (A)	Yes	
103-02-014	901 S Milton Rd	Rent-A-Center / Bun Huggers	No		Unevaluated		Former Safeway grocery store[4]
103-05-001 103-05-002	307 W Dupont Ave	Blome Building (NAU property)	Yes	Northern Arizona Normal School Historic District (Inv. No. 5)	Contributor (A,C)[3]	Yes	
103-06-004	501 S Milton Rd	Motel Canyon Inn (Starlite Motel)	Yes	Route 66 Survey (Inv. No. 297)	Recommended Eligible (A)	Yes	
103-06-001	203 S Milton Rd	Matador Coffee Roasting Co.			Unevaluated		Former gas station
100-39-005D	204 S Milton Rd	VP Racing Fuels (C&M Garage)	Yes	Route 66 Survey (Inv. No. 301)	Recommended Not Eligible		Loss of integrity due to alterations
103-06-008A	224 S Mikes Pike	Knights Inn Flagstaff (Spur Motel)	Yes	Route 66 Survey (Inv. No. 302) / Evaluated by FHPO staff	Recommended not eligible[4]		Loss of integrity due to alterations
100-37-001	121 S Milton Rd	The L Motel	Yes	Route 66 Survey (Inv. No. 300)	Recommended Eligible (A)	Yes	
100-39-004C	218 S Milton Rd	Granny's Closet			Unevaluated		Large lot with lumberman statue
100-37-004A	101, 103, 105 S Milton Rd	Commercial building (multiple businesses)	Yes	Route 66 Survey (Inv. No. 304)	Unevaluated		Additional research recommended
100-38-010 100-38-011	1 S Milton Rd	Floor Coverings International			Unevaluated		

Parcel No.	Address	Property Name	Previously Inventoried/ Documented	Previous Project[1]	Eligibility Status [2,3]	Section 4f Resource	Comments
100-39-020A	2 S Milton Rd	Ruff's Sporting Goods			Unevaluated		
100-43-003B	216 W Phoenix Ave.	Building (Municipal)			Unevaluated		Unknown function
100-43-002A	511 W Coconino Ave	BNSF Property (Walls, supports, etc.)			Unevaluated		Former street ROW
100-21-012A	211 W Aspen Avenue	Flagstaff City Hall (Hiway Diner No. 7)	Yes	Route 66 Survey (Inv. No. 309)	Recommended Not Eligible		Demolished
100-21-006	122 W Route 66	Rodeway Inn (Townhouse Motel)	Yes	Route 66 Survey (Inv. No. 310)	Recommended Eligible (A)	Yes	
100-21-005	118 W Route 66	Ponderosa Pawn and Trading Co			Unevaluated		Former Greyhound Station–likely significant[4]
100-21-003A	114 W Route 66	Fast Auto Loans, Inc.			Unevaluated		
100-44-006B	101 W Route 66	Greater Flagstaff Chamber of Commerce			Unevaluated		Possibly a former railroad building
100-20-023	24 W Route 66	Jimmy John's	Yes	Evaluated by FHPO staff	Recommended not eligible[4]		Loss of integrity due to alterations

[1] Route 66 Survey: (Motley Design Group 2012) | Northern Arizona Normal School District: (Chambers 1986)
[2, 3] With one exception, the previously documented buildings were evaluated individually. The exception is the Blome Building—a contributor to the Northern Arizona Normal School Historic District.
[4] Karl Eberhard personal communication, October 25, 2017

CHAPTER 9: CONSIDERATION OF EXISTING AND NEWLY DEVELOPED ALTERNATIVES

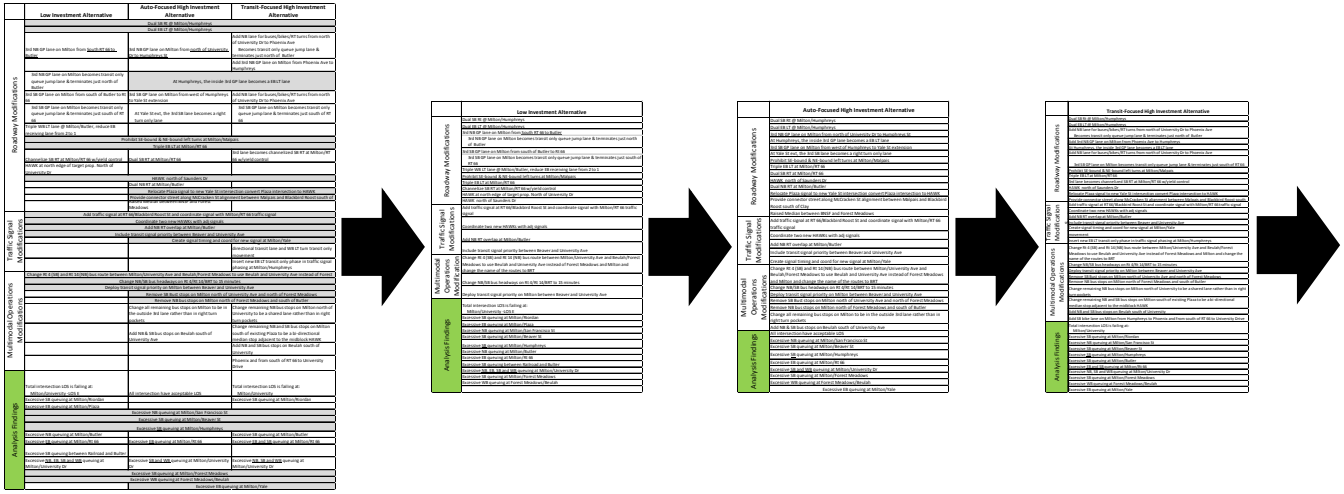
Identifying Existing Alternatives to Date

A Project Partners directive identified at the onset of this study process was to obtain a clearer understanding of the existing "universe of alternatives" from previously prepared reports and to develop new possible alternatives for consideration for the Milton Road CMP process.

The first step in evaluating and defining the existing alternatives was a thorough review of the 2016 *Milton Road Alternatives & Operations Analysis Study.* This report utilized a robust series of microsimulation models to assess the operational effectiveness of alternative mobility treatments for the Milton Road/Route 66/Business Route 40 corridor (including cross-streets) between Forest Meadows Street and San Francisco Street.

The *Milton Road Alternatives & Operations Analysis Study* identifies a series of possible modifications/improvements for: multimodal operations, traffic signal operations and roadway modifications. The Study outlines a range of investment choices across each of the three possible modification/improvement types. These are; low investment alternatives, auto-focused high investment alternatives, and transit focused high investment alternatives. **Figure 9-1** below illustrates the "Summary Matrix" that was developed by the Study Team to graph the various improvement types and their relationship to the three investment levels. This Summary Matrix began to adequately summarize and depict the various alternatives that the Project Partners felt was needed to bring clarity to understanding and conveying the existing alternatives that had been described to date.

Figure 9-1: Matrix of Alternatives



Universe of Alternatives

1. Collection of various spot improvements per "Low Investment Alternative"
2. Traffic signal and multi-modal Operational Improvements only
   - Transit signal priority b/w Beaver and University Dr.
   - Two new HAWK's
   - Change headways from 30 min. to 15 min.
   - Adaptive signals
   - Others

Alternatives Utilizing Existing 100-foot ROW Footprint

1. 4, 11' GP Lanes + 2, 14' BRT/bike/right turn lanes w/ center median/turn lane and 2, 7-foot s/w both sides (NAIPTA Concept)
2. No build + access management + spot improvements
3. No build (maintain as is)
4. 6, 12' GP lanes w/ center median/turn lane and 2, 7-foot s/w both sides

Note: Less than 100' of ROW exists at BNSF crossing

Expanded ROW Alternatives

1. 6 GP lanes + bike lanes + 7-foot s/w both sides
2. 6 GP lanes + signal preemption + bus que jumping
3. 8 lanes = 6 GP lanes + 2, 14' BRT/bike/right turn lanes w/ center median/turn lane and 2, 7-foot s/w both sides
4. 8 lanes = 8 GP lanes

Alternate Route Alternatives

(moved to US 180 CMP)

Transit Focused Alternatives

(per NAIPTA email to Dan G. 10/27)

1. Transit along 180 corridor as far as Kendrick Park Watchable Wildlife area including opportunities for a variety of stops along the way. We look at a variety of incentives as well as transit only access. Park n' rides opportunities will be included in this.
2. Expansion of Mountain Express service to Snowbowl under forced and incentivized programs.
3. Bus access to other snow play areas such as Fort Tuthill to encourage their use.
4. Parking fees (price elasticity) to get behavior change for people to take the bus.
5. The authority to permit, introduce fee-only access or close US180 on certain dates/ time.
6. The impact of rerouting Grand Canyon traffic through Williams.
7. Alternate access/ agree for residents, visitors and emergency vehicles on: A1, FS428, FS518, Wing Mountain or simply using Valle- Williams- Flagstaff

This "Universe of Existing Alternatives" matrix as it became known as, was introduced and vetted with the Project Partners. Collectively, a total of 72 potential improvement/modification projects were identified. These 72 possible improvement/modification projects covered the gamut of low investment spot improvements such as mid-block HAWK's, adding dual turn lanes or extending storage depths for example. High investment alternatives such as relocation of signals, intersection improvements and adding a BRT lane were also included. Of the 72 total possible improvement types, 29 were high investment transit focused, 26 were high investment auto-focused and 17 were low investment alternatives.

Creation of Additional Alternatives for Consideration

Once the "Universe of Existing Alternatives" was completed, the Study Team and Project Partners collaboratively developed an additional list of "newly introduced alternatives". The Study Team developed a listing of newly introduced alternatives for Project Partner consideration. In meeting with the Project Partners, they reviewed and added supplemental alternatives to complete an exhaustive list of existing and newly developed alternatives for consideration. These alternatives are described and depicted in greater detail below.

Evolution of the Universe of Alternatives to System Alternatives and Base Build Spot Improvements

As the Project Partners began to review that information in greater detail, it was generally felt that the information was useful from a technical point of view, but due to the sheer number and variation of project types, the approach was likely going to be difficult to manage, equitably evaluate and rank alternatives. It was also felt that this approach would be confusing in describing the interrelationship of these diverse alternatives to the general public.

For these reasons, the Project Partners expressed their desire to streamline and simplify the various existing and newly introduced alternatives by "bundling" them into a more manageable set of "System Alternatives" and "Base Build Spot Improvements". The System Alternatives and Base Build Spot Improvements are derived from the previous "Universe of Alternatives" tables and will enable a more straight-forward presentation of the alternatives and ability for the Project Partners, stakeholders and public to equitably compare, rank and prioritize these alternatives.

"Preliminary System Alternatives" include the previously described alternative routes and added road capacity/managed lanes. "Base Build Spot Improvements" include the previously described low investment/spot improvements. The idea is that the "Preliminary System Alternatives" will be presented for comparison and ranking to the public (including cross-sections graphically depicting the facilities). Preliminary System Alternatives that receive the most favorable feedback or consensus from the public and interested stakeholders will proceed forward as "Preferred System Alternatives" for a more detailed technical and quantitative analysis and ranking.

The intent of the "Base Build Spot Improvements" is that these type of improvements, regardless of which System Alternative is ultimately selected, will likely be necessary in the short term to support the longer-term System Alternative improvements. As such, the listing of Base Build Spot Improvements will continue to evolve as the System Alternatives becomes more refined as the process moves forward.

Preliminary System Alternatives

As **Table 9-1** shows, there are three categories of Preliminary System Alternatives for Milton Road CMP consideration. These are; 1) Preliminary System Alternatives that utilize the existing right of way. 2) Preliminary System Alternatives that require and expanded right of way, and 3) Preliminary Alternative Routes.

Table 9-1: Milton Road Preliminary System Alternatives

MILTON ROAD PRELIMINARY SYSTEM ALTERNATIVES
Within Existing Right-of-Way
1. No Build (Maintain As Is)
2. Reversible Center Lane
3. Six, 11 Foot General Purpose Lanes with Center Median/Turn Lane with 6 Foot sidewalks on both sides of the street
4. Four, 11 Foot General Purpose Lanes with Center Median/Left Turn Lane, two 14 Foot Shared Bus/Bike Lane (SBBL), and two 7 Foot Sidewalks on both sides of the street
Requires Expanded Right-of-Way
5. Six, 11 Foot General Purpose Lanes, 12 Foot Center Median or Center/Two-Way Left Turn Lane, 6 Foot Bicycle Lanes, and 6 Foot Sidewalks on both sides of Street
6. Six, 11 Foot General Purpose Lanes, Two 13 Foot Shared Bus/Bike Lanes (SBBL), Center Median/Left Turn Lane, and 7 Foot Sidewalks on Both Sides of the Street
7. Eight General Purpose Lanes
8. Four, 11 Foot General Purpose Lanes, Two 14 Foot Shared Bus/Bike Lanes, 16 Foot Landscaped Median with access managed Turning Movements, 10-foot landscaped setbacks, and 10 foot sidewalks on Both Sides of the Street
Alternative Routes
9. No Build + Lone Tree Design Concept Report concept
10. “Backage” Roads improvements

Each of these Preliminary System Alternatives will be reviewed and discussed by the Project Partners and interested stakeholders to gauge the community acceptance or preference for these preliminary, conceptual System Alternatives. Variations of each alternative could be considered based on the context, character and specific design measures of any particular road segment within the broader study corridor. The Preliminary System Alternatives that receive the most supportive interest and/or input from Project Partners and interested stakeholders will proceed forward as Preferred System Alternatives that will receive additional technical evaluation and traffic modeling analysis in order to quantitatively determine the operational efficiency, safety and performance of each Preferred Alternative.

For each of the Preliminary System Alternatives presented below, additional considerations for access management, safety and signal timing require additional traffic modeling and design considerations and analysis should the alternative receive future consideration moving forward. In addition, these are preliminary alternatives which can be modified to include certain features.

Each of the Preliminary System Alternatives are described and depicted below:

Preliminary System Alternatives *Utilizing Existing Right of Way*

1. NO BUILD (MAINTAIN AS IS)

A "No Build" option is identified for consideration and future ranking/prioritization. The "No Build" options favors maintaining the existing Milton Road right of way and facilities "as is". The No Build alternative is important for public and stakeholder consideration. It also meets FHWA and ADOT Planning and Environmental Linkages (PEL) guidance (further explained in Chapter 5 of this report) for certain planning studies and promotes smoother environmental studies should future implementation projects present themselves for consideration.

2. Reversible Center Lane

A "Reversible Lane" as the name implies, is a concept in which the middle traffic lane may travel in either direction, depending upon the time, day and/or operation sign/signal displayed. Reversible traffic lanes add capacity to a road and decrease congestion by borrowing capacity from the other (off-peak) direction. This holds especially true in situations where options for expanding the existing right of way are limited or when traffic in the corridor is heavily imbalanced for a short period of time such as leading to/from a special event.

The concept is often referred to by FHWA and transportation professionals, as "managed lanes" in that high demand on existing facilities, such as Milton Road, especially at peak demands are placed on the roadway, it necessitates the efficient management of those facilities. This alternative is Illustrated in **Figure 9-2** and **Figure 9-3**. It is important to note that the access right-of-way displayed in **Figure 9-3** is consumed by at intersections where the roadway widens and at mid-block right turn decal lanes where applicable.

There are a wide variety and combination of approaches to managed lane operations. These have typically encompassed such methods as:

- Static signing and striping
- Changeable message signs
- Lane control signals
- Temporary traffic control devices
- Law enforcement / legal restrictions
- Economic incentives / disincentives

Figure 9-3: Milton Road System Alternative 2 Cross-Section: Reversible Center Lane*

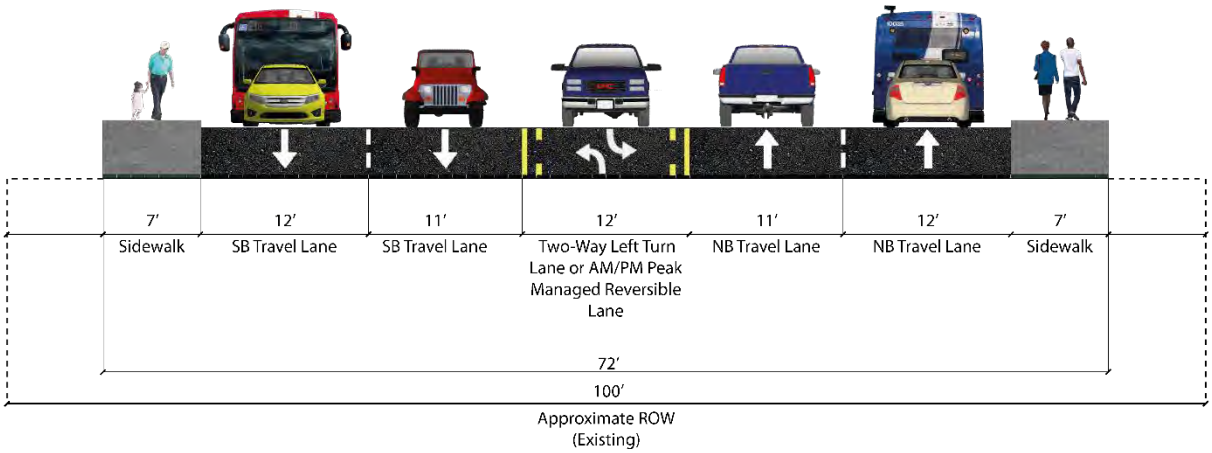
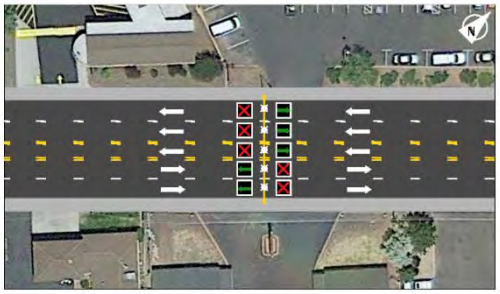
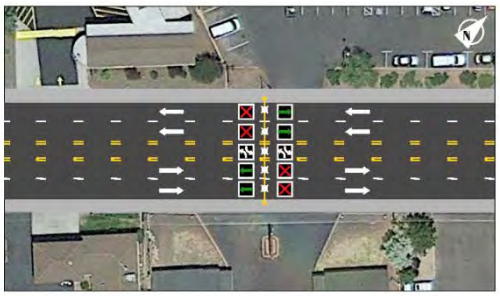


Figure 9-2: Milton Road System Alternative 2 Plan View: Reversible Center Lane*

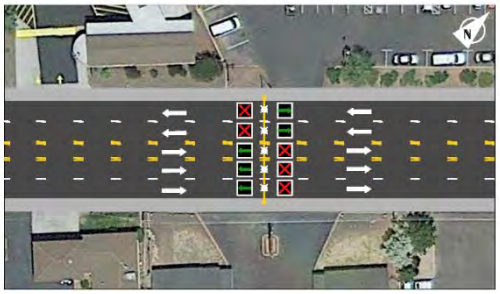
AM Peak Period Traffic Designation



Mid-Day / Standard Traffic Designation



PM peak Period Traffic Designation



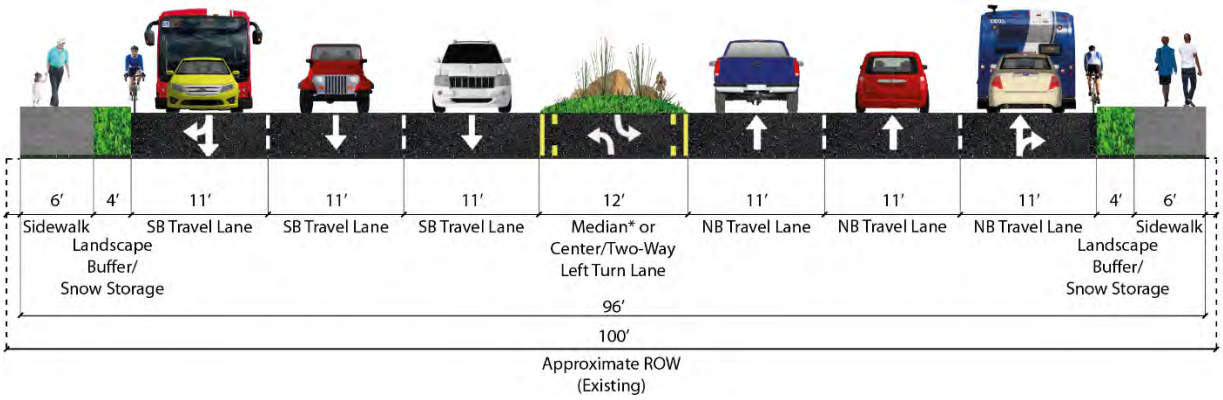
Detailed traffic studies are necessary to apply this concept to any arterial/highway such as Milton Road to address matters safety, access management and multimodal considerations.

3. Six, 11 Foot General Purpose Lanes with Center Median/Turn Lane with 6 Foot sidewalks on both sides of the street

As **Figure 9-4** illustrates, this alternative calls for three, 11 foot general purpose lanes in each direction with a 12 foot center median or a center/two-way left turn lane. The center lane would vary between a center median, center left turn lane, or a two-way left turn along the study corridor based on need and level of access management required. Additional investigation on access management for left turning movements will be necessary to decide the location of the three center lane functions. Each of the outside general purpose lanes would accommodate buses, vehicles and right turning movements. Bicycle facilities and landscaping setbacks are not included in this alternative,. This alternative adds vehicular capacity to existing Milton Road by adding two additional general purpose lanes (one south-bound, one north-bound) that do not currently exist.

This alternative could be constructed utilizing the existing 100-foot right of way, but would require reconstruction of the existing roadway that includes expansion of the existing pavement section and relocation of the sidewalks (both sides).

Figure 9-4: Milton Road System Alternative 3 Cross-Section



Median treatment may change along the corridor

4. Four, 11 Foot General Purpose Lanes with Center Median/Left Turn Lane, two 14 Foot Shared Bus/Bike Lane (SBBL), and two 7 Foot Sidewalks on both sides of the street

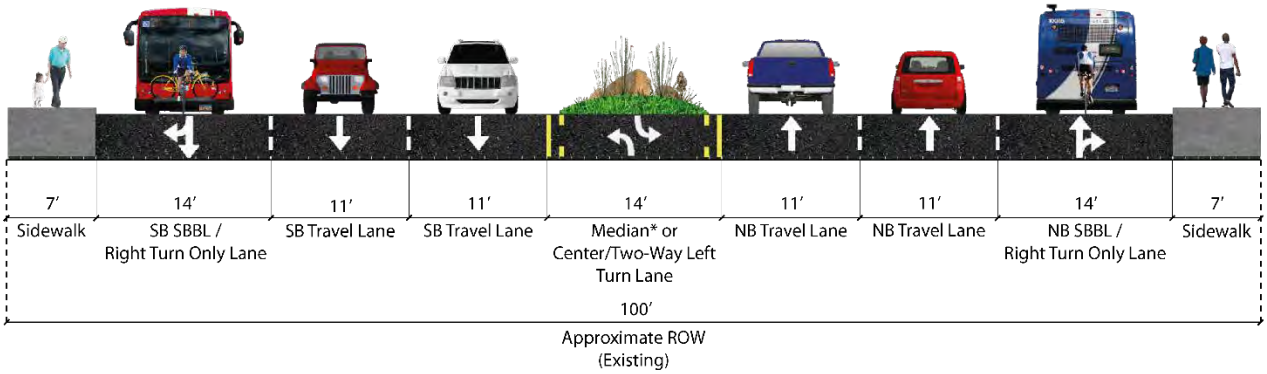
As displayed in **Figure 9-5**, Preliminary System Alternative 4 illustrates a multimodal Milton Road by adding capacity for other modes of transportation through the introduction of a 14 foot shared bus/bike lane (SBBL) in each direction, while maintaining the same vehicular capacity as Milton Road exists today. This alternative was NAIPTA's Locally Preferred Alternative (LPA) resulting from NAIPTA's Transit Spine Study, which also considered center-lane transit running for analysis and consideration.

Although a third lane is added, this alternative can be accomplished within existing 100 foot right-of-way because the two general purpose lanes in each direction were reduced to 11 feet, and the SBBL would also function as right turn only lanes, eliminating the need for right turn deceleration lanes. The four total general purpose lanes would only accommodate the through movement of regular vehicular traffic. The center lane would vary between a center median, center left turn lane, or a two-way left turn along the study corridor based on the need and level of access management required. Additional investigation on access management for left turning movements will be necessary to decide the location

of the three center lane functions. It is important to note that adequate signage, striping, pavement markings, and enforcement will be required in order for the SBBls to operate effectively, efficiently and safely.

As noted early, this alternative could be constructed utilizing the existing 100 foot right-of-way, but would require reconstruction of the existing roadway that includes expansion of the existing pavement section and relocation of the sidewalks (both sides).

Figure 9-5: Milton Road System Alternative 4 Cross-Section



Median treatment may change along the corridor

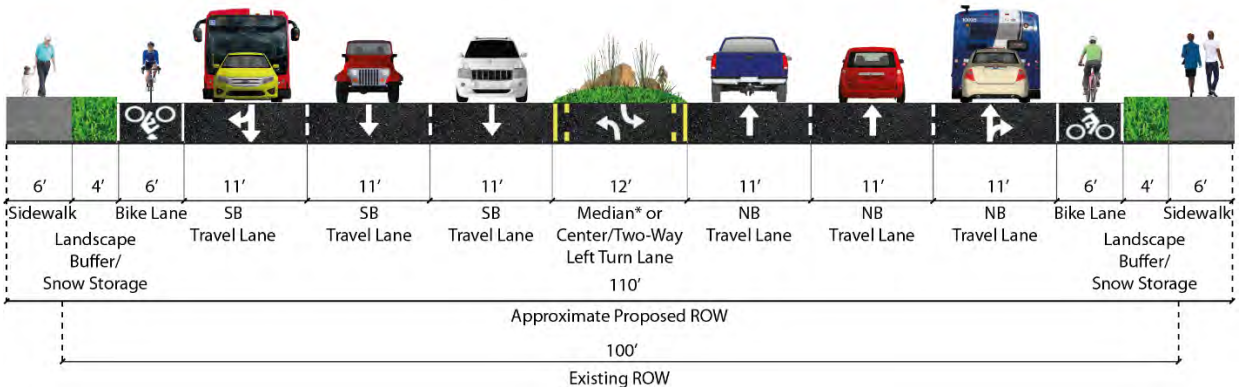
Preliminary System Alternatives *Requiring Expanded Right-of-Way*

5. Six, 11 Foot General Purpose Lanes, 12 Foot Center Median or Center/Two-Way Left Turn Lane, 6 Foot Bicycle Lanes, and 6 Foot Sidewalks on both sides of Street

As **Figure 9-6** illustrates, this alternative calls for three, 11 foot general purpose lanes in each direction, a 12 foot center median or center/two-way turn lane, and a 6 foot bicycle lane in each direction. Each of the outside general purpose lanes would accommodate buses, vehicles and right turning movements. Landscaping setbacks are not included in this alternative. This alternative adds vehicular capacity and bicycle mobility to the existing Milton Road by adding two additional general purpose lanes (one south-bound, one north-bound) and continuous bicycle lanes that currently do not exist. The center lane would vary between a center median, center left turn lane, or a two-way left turn along the study corridor based on the need and level of access management required. Additional investigation on access management for left turning movements will be necessary to decide the location of the three center lane functions.

This alternative would require an approximate 10 foot expansion of the existing 100 foot Milton Road right-of-way (a 100 foot right-of-way exists from Forest Meadows Street to Route 66 intersection), including the expansion and re-striping of the existing pavement section and relocation of the sidewalks (both sides).

Figure 9-6: Milton Road System Alternative 5 Cross Section



Median treatment may change along the corridor

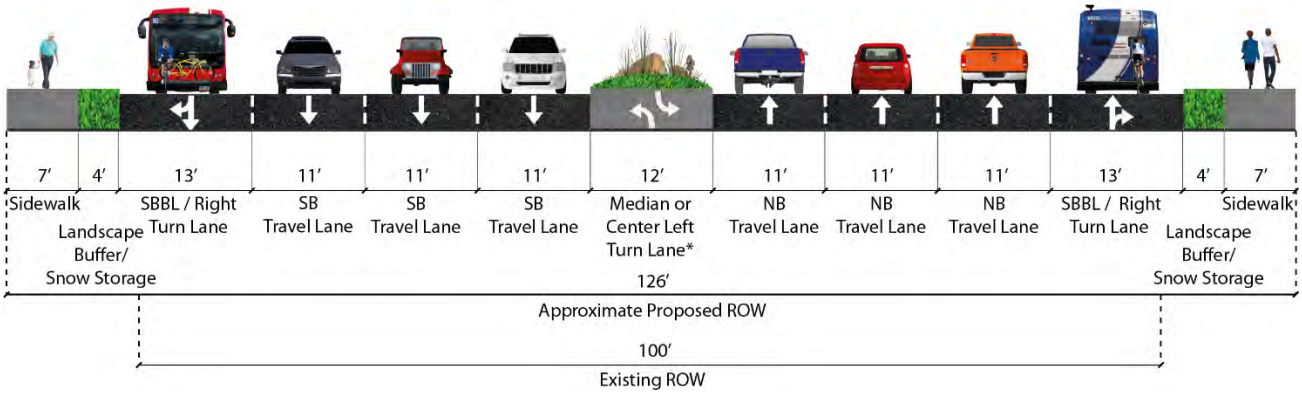
6. Six, 11 Foot General Purpose Lanes, Two 13 Foot Shared Bus/Bike Lanes (SBBL), Center Median/Left Turn Lane, and 7 Foot Sidewalks on Both Sides of the Street

Figure 9-7 shows how this alternative calls for three 11 foot general purpose lanes in each direction, a 12 foot center turn lane/median and two 13 foot SBBLs with 7 foot sidewalks on both sides. Landscape setbacks are not included with this alternative.

This proposed alternative adds four additional lanes of vehicular capacity (one lane south-bound and one lane north-bound) plus one dedicated bus/BRT lane (in each direction) that shares functionality as a bicycle lane and right turn lane.

This alternative would require an approximate 26 foot expansion of the existing 100-foot Milton Road right of way (a 100 foot right-of-way exists from Forest Meadows Street to Route 66 intersection), including the expansion and re-striping of the existing pavement section and relocation of the sidewalks (both sides).

Figure 9-7: Milton Road System Alternative 6 Cross-Section



Median treatment may change along the corridor

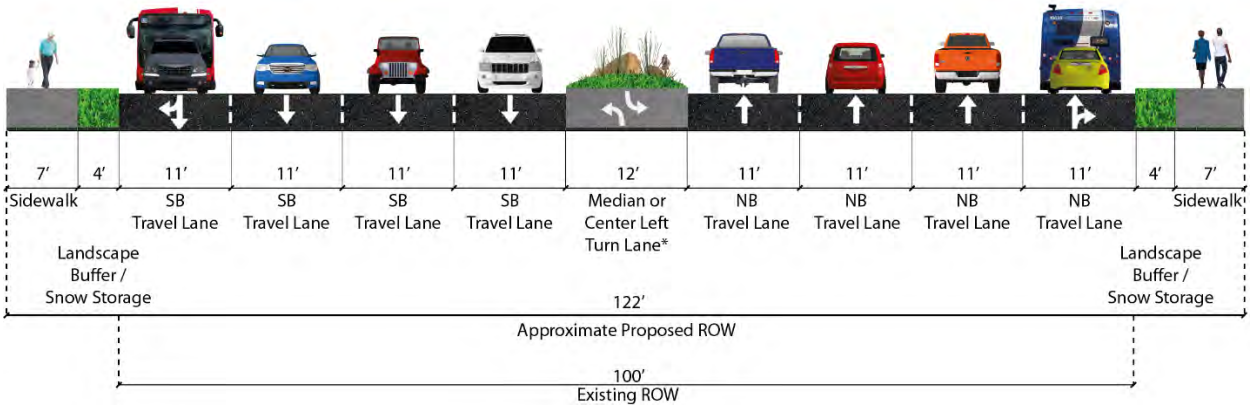
7. EIGHT GENERAL PURPOSE LANES

This alternative calls for eight 11 foot general purpose lanes (4 in each direction) with a 12 foot center turn lane/median and 7 foot sidewalks on both sides. Landscape setbacks are not included with this alternative in **Figure 9-8**.

This proposed alternative adds four additional lanes of vehicular capacity (two lanes south-bound and two lanes north-bound) which in effect doubles the roadway capacity of the existing Milton Road. The fourth (outside) general purpose lane would be shared by both automobiles and buses.

This alternative would require an approximate 22-foot expansion of the existing 100-foot Milton Road right of way (a 100-foot right-of-way exists from Forest Meadows Street to Route 66 intersection), including the expansion and re-striping of the existing pavement section and relocation of the sidewalks (both sides).

Figure 9-8: Milton Road System Alternative 7 Cross-Section



Median treatment may change along the corridor

8. Four, 11 Foot General Purpose Lanes, Two 14 Foot Shared Bus/Bike Lanes, 16 Foot Landscaped Median with access managed Turning Movements, 10 foot landscaped setbacks, and 10 foot sidewalks on Both Sides of the Street

Illustrated in **Figure 9-9**, this alternative calls for four 11-foot general purpose lanes (same as existing condition), with the addition of two 14 foot SBBL, a 10 foot landscape setback behind curb and the introduction of a 10 foot sidewalks on both sides of the street. Bike lanes are not included in this alternative, however the SBBL and the sidewalk width of 10 feet is intended to accommodate both pedestrians and bicyclists, particularly in areas with a high concentration of pedestrians, such adjacent to NAU.

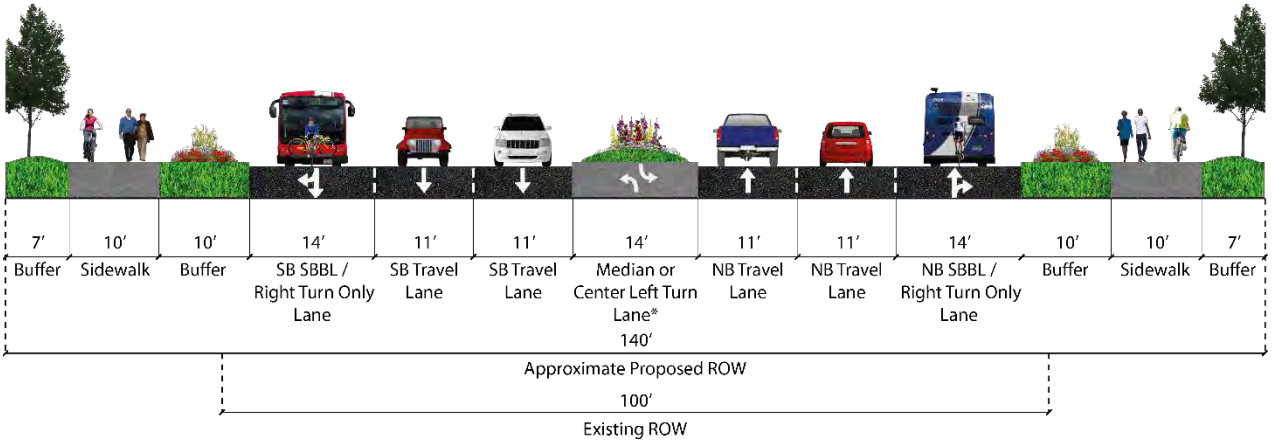
This alternative includes design and aesthetic attributes that yield a more "complete street" that facilitates all modes of transportation while also offering opportunities to enhance the character of Milton Road with landscaping treatments. In this regard, a 14 foot raised landscape median is proposed that would also facilitate one way left turning movements and possibly dual left turns at select signalized

intersections. Two, 6-foot landscaping setbacks behind each curb can serve the dual function of landscape treatment and possible stormwater catchment and harvesting areas.

This alternative also promotes alternative modes of transportation by including two 14 foot SBBLs and 10 foot sidewalks on each side of the roadway. A 10 foot wide sidewalk can comfortably accommodate both bicycle and pedestrian modes and the landscape setback from the roadway offers a safety buffer for these users.

This alternative would require an approximate 40 foot expansion of the existing 100 foot Milton Road right-of-way (a 100 foot right-of-way exists from Forest Meadows Street to Route 66 intersection), including the expansion and re-striping of the existing pavement section and relocation of the sidewalks (both sides).

Figure 9-9: Milton Road System Alternative 8 Cross-Section



Median treatment may change along the corridor

ALTERNATIVE ROUTES TO MILTON ROAD

Alternative Route Preliminary System Alternatives are intended to explore other potential roadway corridor options besides Milton Road itself for potentially reducing traffic congestion on Milton Road. Milton Road of course serves as the primary "backbone" high capacity north-south roadway corridor through Flagstaff and there is a limited inventory of other north-south roadways that could be leveraged to complement and/or support traffic congestion on Milton Road. The two Alternative Routes include:

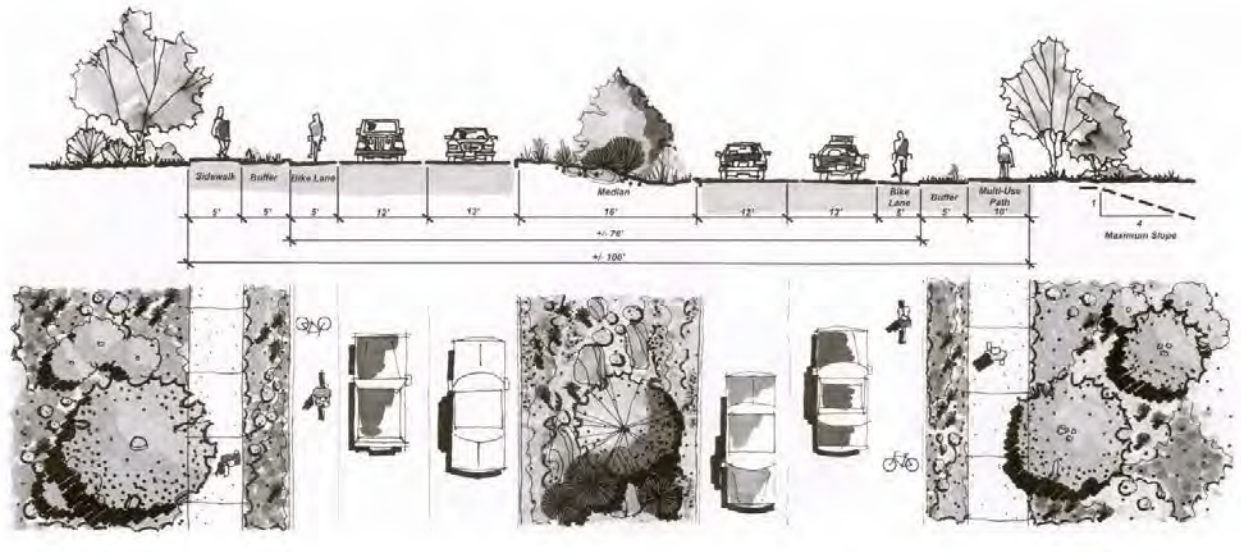
9. MILTON ROAD NO BUILD + LONE TREE DESIGN CONCEPT REPORT

This alternative would focus upon the use and potential expansion of Lone Tree Road to provide supplemental capacity to Milton Road. Currently, Lone Tree Road is located approximately ¾ mile due east of Milton Road and is generally a two-lane collector roadway that primarily serves access for local destinations. The Flagstaff Regional Plan calls for Lone Tree Road to ultimately connect JW Powell Boulevard and downtown Flagstaff.

The Lone Tree Road Corridor Study, completed in 2006, underscores the need to establish additional north-south links within the central portions of Flagstaff. However, the study also notes that significant features such as a traffic interchange to connect with I-40 and a grade separated crossing of the BNSF railway mainline are instrumental facilities to enhance the local and regional effectiveness of Lone Tree Road (and therefore congestion reduction of Milton Road).

The Preferred Alternative illustrated in **Figure 9-10** from the Lone Tree Road Corridor Study recommends a 100-foot right-of-way whose typical roadway section consists of 4 general purpose travel lanes (two in each direction), a raised median, on street bicycle lanes, pathways on both sides, a sidewalk on one side and a FUTS trail on one side.

Figure 9-10: Milton Road System Alternative 9 Cross-Section



Source: Lone Tree Corridor Study, DMJM Harris | AECOM 2006

10. BACKAGE ROAD IMPROVEMENTS

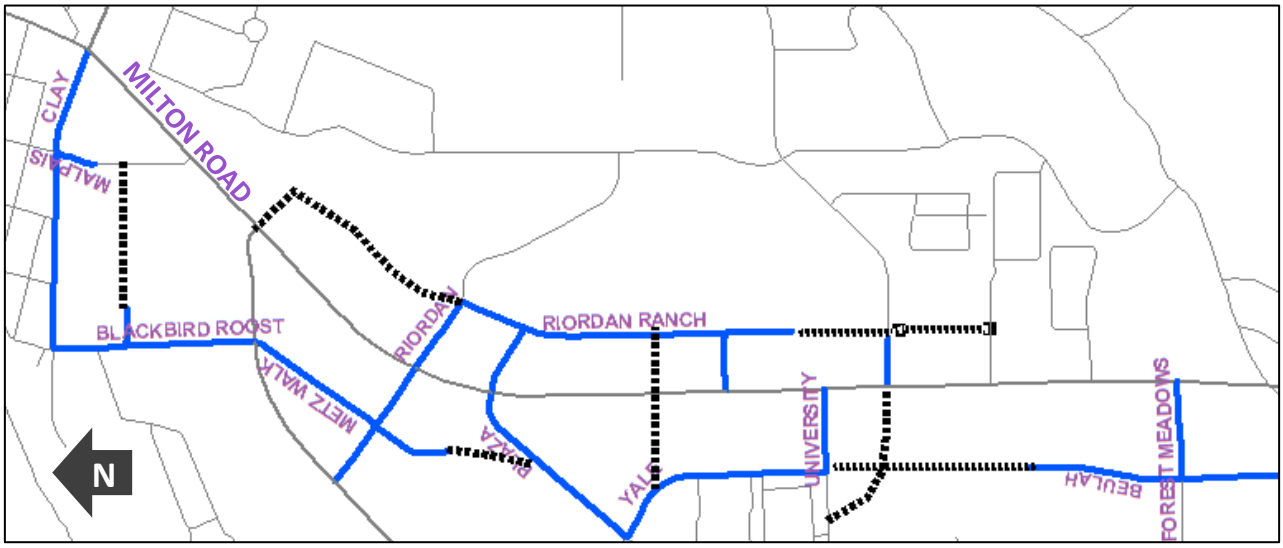
The concept of "backage roads" (aka reverse frontage roads) is a road that runs parallel to the arterial roadway (Milton Road) and behind developed land. Backage roads can be advantageous in reducing traffic congestion on the mainline (Milton Road), they can minimize visual distractions and headlight glare on both the mainline and backage road. However, backage roads can also create opportunities for delay, congestion and crashes if there is insufficient storage for entering and exiting vehicles.

There are a handful of backage road scenarios illustrated in **Figure 9-11** that together and/or separately could possibly support mitigate traffic congestion for northbound and southbound traffic on Milton Road. It should be noted that future traffic modeling analysis of any backage road scenario(s) is needed to adequately quantify the anticipated performance and level of service of backage roads.

The following backage road scenarios include:

- Clay Ave./Malpais Lane/McCracken/Blackbird Roost Street – though likely contributing to some neighborhood encroachment concerns, the McCracken option will also afford access to future commercial redevelopment opportunities and reduces neighborhood cut through traffic.
- West Route 66/Riordan Ranch Street – Riordan Ranch Street currently exists from Chambers Drive to its intersection with Riordan Road to the north. A northerly extension of Riordan Ranch Street (where is currently terminates into a parking lot near the Newman Center, NAU Art Museum and other NAU buildings) to the north to connect with the Milton Road /Route 66 intersection is needed. Additional investigations as to whether NAU would prefer to see a connection to Knoles Drive is also needed.
- Metz Walk extension to Plaza Drive – this conceptual backage road would require a right of way acquisition through the existing Safeway parking lot to connect to Plaza Way
- Plaza Way/Yale Street/University Avenue – utilizing the existing roadways, this potential backage road network afford a 1/3 mile backage road deviation from the Milton Road mainline. The 80-foot turning pocket on southbound Plaza Way and broad turning radius at the Yale Street may present operation and safety challenges.
- Route 66/Yale Street/Beulah Extension/Ft. Tuthill – Utilizing Route 66 to Yale Street, the southern leg of this proposed backage road network would require a ¼ mile extension of Beulah Boulevard from its current northern just north of Forest Meadows Drive to the intersection of University Avenue and Yale Street.

Figure 9-11: Milton Road System Alternative 10 Backage Road Network



Source: Flagstaff Metropolitan Planning Organization (FMPO)

PRELIMINARY BASE BUILD SPOT IMPROVEMENTS

As observed above, the intent of the "Base Build Spot Improvements" is that these suggested improvements, regardless of which Preliminary System Alternative is chosen for consideration as a Preferred System Alternative for further study, the spot improvement(s) will likely be necessary in the short term to support the longer-term System Alternative improvements.

As such, the preliminary listing of Base Build Spot Improvements listed in **Table 9-2** will evolve as the Preferred System Alternative(s) becomes more refined as this Milton Road CMP process moves forward. As transportation modeling and technical analysis is completed on Preferred System Alternatives, and a clearer picture of the specific design and performance needs/considerations are identified, the specific list of Base Build Spot Improvements associated with each Preferred System Alternative will be identified.

Table 9-2: Milton Road Preliminary Base Build Spot Improvements

PRELIMINARY BASE BUILD SPOT IMPROVEMENTS
1. Dual SB right turn lane at Milton Road and Humphreys Street
2. Dual EB left turn lane at Milton Road and Humphreys Street
3. 3rd NB general purpose (GP) lane on Milton Road from South RT 66 to Butler Avenue
4. 3rd NB GP lane on Milton Road becomes transit only queue jump lane & terminates just north of Butler Avenue
5. 3rd SB GP lane on Milton Road from south of Butler Avenue to Rt 66
6. 3rd SB GP lane on Milton Road becomes transit only queue jump lane & terminates just south of Rt 66
7. Triple WB left turn lane at Milton Road and Butler Avenue, reduce EB receiving lane from 2 to 1
8. Prohibit SE-bound & NE-bound left turns at Milton Road and Malpais Street
9. Triple EB left turn lane at Milton Road and RT 66
10. Channelize SB right turn lane at Milton Road and RT 66 with yield control
11. Install a HAWK at north edge of target property North of University Drive
12. Install a HAWK north of Saunders Drive
13. Transit Vehicle Signal Preemption at Strategic Intersections

CHAPTER 10: REFERENCES CITED

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