GREATER TRIANGLE AREA TRANSPORTATION PLAN

BOZEMAN • BELGRADE • FOUR CORNERS • GALLATIN GATEWAY

APRIL 21, 2022

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GALLATIN COUNTY

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ACRONYMS

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AC	Advisory Committee
ACS	American Community Survey
ADA	Americans with Disabilities Act
CAGR	Compound Annual Growth Rate
CDP	Census Designated Place
EPS	Economic Profile System
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
GTATP	Greater Triangle Area Transportation Plan
LOS	Level of Service
LRTP	Long Range Transportation Plan
MDT	Montana Department of Transportation
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
MRL	Montana Rail Link
MSN	Major Street Network
MUTCD	Manual on Uniform Traffic Control Devices
NHS	National Highway System
PCC	Planning Coordination Committee
PCI	Pavement Condition Index
PIP	Public Involvement Plan
PROST	Parks, Recreation, Open Space, Trails
PROWAG	Public Right-of-Way Accessibility Guidelines
RP	Reference Post
RPA	Robert Peccia and Associates
TCC	Transportation Coordination Committee
TDM	Travel Demand Model
TDP	Transit Development Plan
TMP	Transportation Master Plan
TPCC	Transportation Policy Coordinating Committee
TSM	Transportation System Management
TTAC	Transportation Technical Advisory Committee
TWLTL	Two-Way Left-Turn Lane
W&P	Woods & Poole Economics, Inc.

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Advisory Committee

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Gallatin County Commission – TBD

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Chapter 1: Introduction

Gallatin County has completed a transportation planning process focusing on the greater triangle area which includes the communities of Bozeman, Belgrade, Four Corners, and Gallatin Gateway. Recent developments, improvements to the region's transportation system, and other land use changes over the past several years have necessitated a focused examination of transportation issues within Gallatin County. The Greater Triangle Area Transportation Plan (GTATP) is intended to assist the county, as well as the local communities, in guiding transportation infrastructure investments based on identified system needs and anticipated developments over the next 20 years.

1.1. PURPOSE

The GTATP serves as a guide for development of and investment in the region's transportation system in a comprehensive manner. The GTATP was developed by Gallatin County through a collaborative approach with county, state, and city staff, elected officials, and local residents to provide a blueprint for guiding transportation infrastructure investments based on system needs and associated decision-making principles. The GTATP integrates previously completed planning efforts, includes detailed analysis of existing and projected transportation conditions, incorporates meaningful input from citizens and local officials, and provides a framework for future efforts within the context of state and federal rules, regulations, and funding allocations.

This plan provides a comprehensive and integrated strategy for transportation infrastructure and service improvements within the greater triangle area between Bozeman, Belgrade, Four Corners, and Gallatin Gateway. The GTATP focuses on strengthened roadway connections to facilitate safe and efficient travel between these quickly growing communities within the county. The plan is intended to address regional transportation issues, overall travel convenience, traffic safety, sustainability, funding, and multimodal connections. The GTATP includes recommendations for short-term improvements as well as long-term modifications and capital improvements to major roadways.

1.2. BACKGROUND

Gallatin County has experienced significant growth over the past 40 years. The county has consistently outpaced the population growth of other Montana counties. This growth can be attributed to the evolving economies of the county's largest cities, Bozeman and Belgrade, the continued expansion of Montana State University in Bozeman, and in-migration resulting from the high quality of life that the county offers. As Gallatin County continues to grow, it is important to understand growth trends to properly accommodate and prepare for the county's current and future transportation needs.

The last regional county transportation plan, the *Greater Bozeman Transportation Plan Update*[1], was completed in 2007 with more recent updates completed for the urban areas of Bozeman and Belgrade. The GTATP is intended to complement and integrate with these transportation plans as well as current growth policies and other relevant planning documents completed by the county, Bozeman, Belgrade, and other communities within the study area.

1.3. STUDY AREA

The study area for the GTATP includes the areas between Four Corners, Belgrade, and Bozeman and extending south to Gallatin Gateway. It includes lands in Gallatin County where suburban development has occurred and is anticipated to occur in the future. The plan is intended to integrate with the previous and ongoing planning efforts of the Cities of Bozeman and Belgrade but is focused on the areas outside of these communities. The GTATP study area, as presented in **Figure 1**, does not include the areas within the Bozeman and Belgrade urban boundaries.

Field analysis of transportation system conditions occurred only within the defined study area. However, areas adjacent to the study area still influence the transportation system within the study area. Accordingly, the planning process considered growth and land use changes in areas adjacent to the planning boundary. The GTATP builds on the transportation recommendations provided in the *2017 Bozeman Transportation Master Plan* (TMP)[2] and the *2018 Belgrade Long Range Transportation Plan* (LRTP)[3].

The GTATP builds on the past planning efforts of the Bozeman TMP and Belgrade LRTP but focuses on the areas outside the Bozeman and Belgrade urban boundaries.

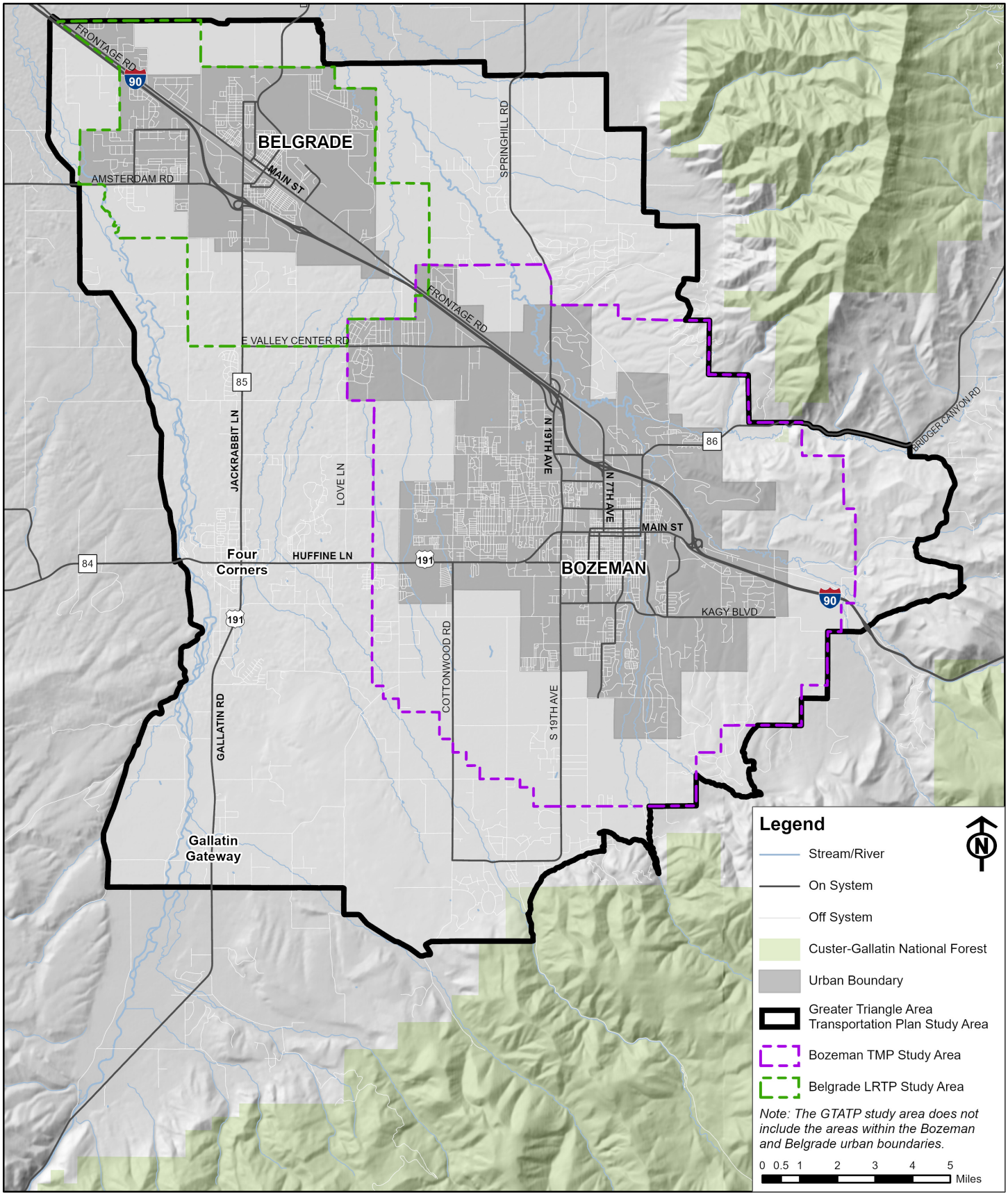

Figure 1: GTATP Study Area

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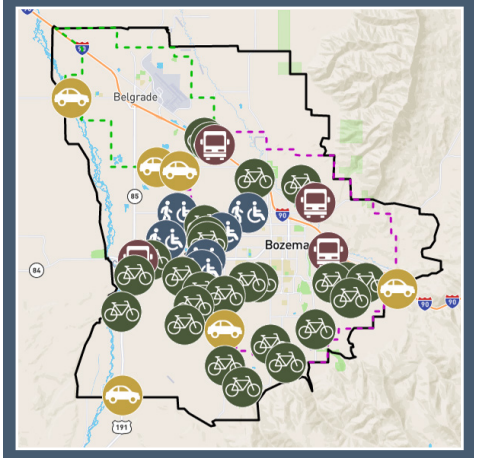
Chapter 2:
Outreach and Public Involvement

Education and public outreach are essential parts of fulfilling the responsibility to effectively inform the public about the transportation planning process. Public involvement is critical to ensure the updated plan reflects community needs, issues, and values relating to the Gallatin County transportation system. Comments and input from the public foster cooperation and help planning staff, consultants, and local officials make informed decisions.

A Public Involvement Plan (PIP) was developed early in the transportation planning process to guide public input opportunities throughout the development of the GTATP. The PIP outlined public participation strategies and opportunities for involvement with members of the public, stakeholders, and elected officials. Specific public outreach activities are noted in this chapter. Meeting materials, such as press releases, advertisements, presentation materials, and meeting summaries are provided in **Appendix A**.



2.1. ON-GOING ENGAGEMENT METHODS

Multiple tools were used to allow participants to engage in the study process at their convenience. Key audiences included state and local officials, stakeholder organizations, and the public.

Email Contact List

The GTATP email contact list included individuals, organizations, and other groups with knowledge of the study area as well as individuals who attended public meetings or signed up for the email list. Emails were sent before informational meetings and to notify plan contacts of key milestones in the plan development.

Plan Website

A website (www.triangletransportationplan.com) was developed to encourage public interaction and to provide information. The website contained contact information, an overview of the planning process, meeting announcements, frequently asked questions, newsletters, maps, and finalized documents. The website also included links to other engagement/commenting opportunities including the online map and online open house discussed in the following sections. The planning team updated the website throughout the planning process as new information and materials became available.

Online Commenting Map

An interactive commenting map, hosted through the wikimap platform, allowed the public to provide feedback throughout the duration of the planning process. Users could leave notes, identify areas of concern, and interact with others' remarks. Over the course of the study, 75 unique comments and 7 replies were posted, with an additional 46 likes and dislikes related to those comments.

2.2. TARGETED OUTREACH EVENTS

Targeted outreach events were scheduled to share important study information, obtain meaningful input and dialogue about the planning process, and to identify important considerations for the plan. The following outreach events were conducted to interact with the study advisory committee, stakeholders, and the public.

Advisory Committee

A study Advisory Committee (AC) was established with representatives from Gallatin County and the Montana Department of Transportation (MDT). Regular AC meetings were held to discuss planning milestones, review materials, and provide feedback on other issues or concerns. The committee advised the consulting team and reviewed study documentation before publication.

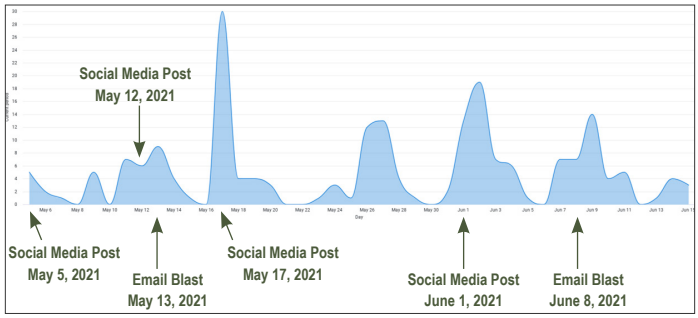
Public Meetings

Public informational meetings were held at two key points during the planning process. The first informational meeting occurred after the planning team conducted initial socioeconomics and land use analysis as well as a preliminary evaluation of existing and projected conditions. The second meeting will coincide with the release of preliminary recommendations and the draft GTATP.

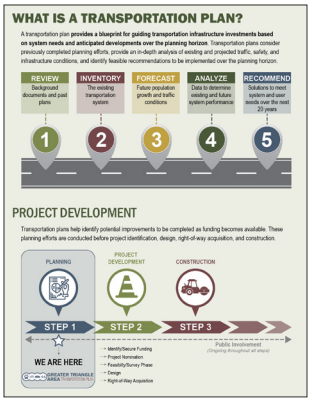
Public Meeting #1: 30-Day Virtual Open House

The first public meeting took place between May 15, 2021, and June 15, 2021. Due to health and safety concerns and restrictions, the meeting was formatted as a virtual open house where interactive online engagement tools were utilized to gather feedback from the public. The purpose of this meeting was to explain the planning process, share initial findings, understand issues and concerns within the study area, and identify community goals and objectives. The meeting allowed members of the public to learn about the plan and provide feedback about transportation related issues and concerns.

Several methods, including print and electronic formats, were used to notify the public and stakeholders of the meeting and promote engagement. The planning team posted an announcement to the website homepage with a link to the public meeting landing page which contained links and embedded content. Gallatin County also posted several announcements on its social media channels throughout the 30-day open house. The county shared a news release with local media outlets and placed display ads in the Bozeman Daily Chronicle and the Belgrade News. Two email updates were sent to the study contact list, one in advance of the open house period and one near the end.



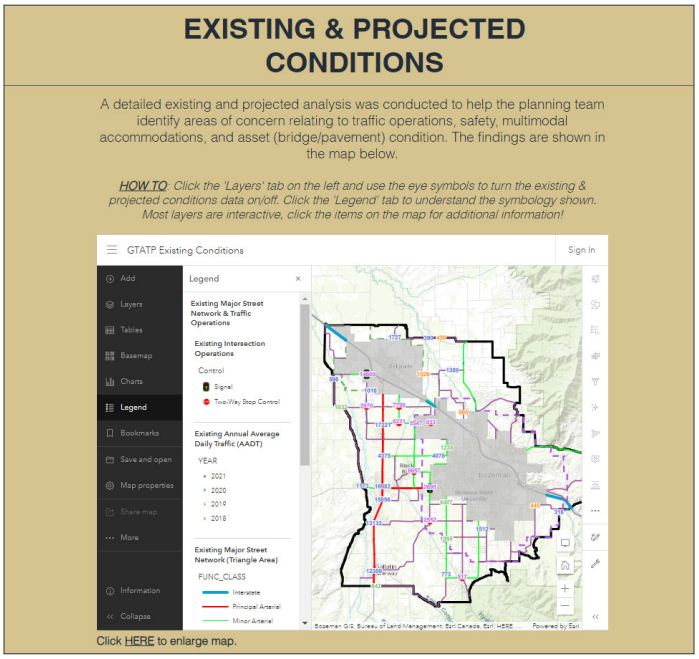
Engagement with the plan website noticeably increased when social media posts and email blasts were released throughout the first public outreach event.



To make the public meeting more interactive and to promote meaningful feedback, several online engagement tools and other supplemental materials were provided. The tools included a public opinion survey, a link to the wikimap commenting platform, a Mentimeter poll, brief video presentation, photo log, and informational sheets highlighting important information and key takeaways. A total of 79 responses were received for the survey and 8 participants provided answers to the Mentimeter poll. Refer to **Appendix A** for a summary of comments received.

Public Meeting #2: 30-Day Virtual Open House

The second public meeting followed a similar 30-day virtual open house format. The open house was active from March 1, 2022 to April 1, 2022 and was hosted virtually on the plan website. The open house included a variety of interactive content including informational sheets, interactive maps, and plan documents. The public was encouraged to participate at their convenience.

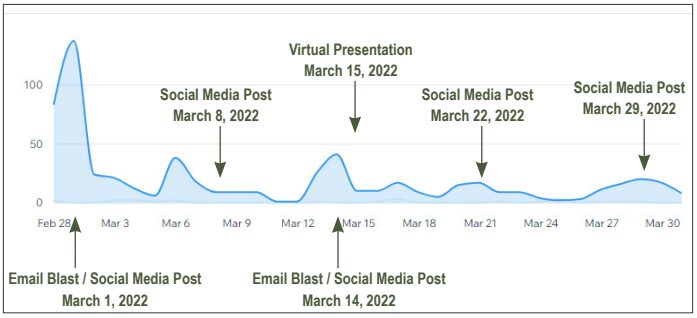


ArcGIS Online was used to share maps of key data from the planning process. The platform allowed users to zoom in to areas of interest and turn layers on and off for easy viewing and comparison.

In addition to the virtual open house, the county hosted a live virtual presentation using Zoom on March 15th. The presentation was coordinated with the release of the draft *Greater Triangle Area Transportation Plan* for public review. The presentation briefly covered the contents of the plan, provided an overview of the identified recommendations, and offered an opportunity for public comment. The presentation was also recorded and posted to the plan website for those who were unable to attend the live event. A total of 40 people registered for the event, but a total of 20 participants joined the meeting, including 5 members of the Advisory Committee.

To maximize participation and feedback, several methods in both print and electronic formats were utilized. In addition to announcements posted to the plan website, social media posts, advertisements in the Bozeman Daily Chronicle and the Belgrade News, and email communications, RPA was contacted by three local media sources for interviews to share more about the GTATP.

A comment box was provided at the bottom of the public meeting #2 landing page to allow participants to easily submit their written comments to the study team. A total of 12 comments were submitted in the comment box. An additional 7 public comments were submitted in other formats. A total of 14 unique comments and 4 replies were also submitted on the Wikimap platform during the second outreach effort. Refer to **Appendix A** for more information about the event and comments received.



A total of 617 new site sessions were reported over the course of the second virtual open house by 431 unique visitors. Engagement increased when email blasts and social media posts were released.

Coordination Meetings

To support coordination with other planning efforts and facilitate plan adoption, the consultant team participated in the following meetings on behalf of the GTATP planning team.

Planning Coordination Committee Meeting

The Planning Coordination Committee (PCC) provides a forum for planning-related coordination in the triangle area of Gallatin County. The PCC is comprised of 3 representatives from each jurisdiction-– Bozeman, Belgrade, and Gallatin County—including a commissioner, planning staff, and planning board member. The consultant team provided presentations at regularly scheduled PCC meetings in April and December 2021 to share information about the GTATP and offer an opportunity for feedback.

Bozeman Transportation Coordination Committee Meeting

The consultant team provided a presentation about the GTATP at the January 2022 Bozeman Transportation Coordination Committee (TCC) meeting. The presentation included an overview of the plan, existing conditions, identified areas of concern, recommendations, visionary networks, and progress to date. TCC members then briefly had the opportunity to ask questions and make comments.

County Commission Meeting

Once the plan is finalized, the consultant team will attend a formal public hearing with the County Commission to facilitate plan adoption.

2.3. PUBLIC AND AGENCY COMMENT PERIOD

A formal public and agency comment period coincided with the release of the draft GTATP and the second virtual open house. However, the planning team considered all feedback collected throughout the planning process and incorporated comments as determined appropriate by the AC into the final version of the GTATP. Over the course of the study, 27 written comments were received via emails to the study contacts, through the general comment form on the plan website, and through the public meeting #2 comment form. A summary of comments received throughout the study is provided on the following page.

- **TRAFFIC VOLUMES:** There is a general concern about growth in the area causing traffic congestion. Growth management and infrastructure improvements are desired to keep up with worsening traffic conditions.
- **TRAFFIC CONTROL:** Many participants expressed the desire for more traffic signals along US 191 to allow more gaps for vehicles to enter the highway. More access control to subdivisions on US 191 was also requested to reduce the number of driveways directly accessed from the roadway. Traffic signals or other traffic control devices are desired at several other high-volume locations within the study area. Left turn signals on lights would be helpful.
- **SAFETY:** Safety for all roadway uses is a high priority. Many community members commented on safety concerns on study roadways related to tight curves, narrow roadways, wildlife crossings, high speeds, intersections, and pedestrian crossings. Other concerns about pedestrian and bicycle safety were mentioned. A focus on multimodal roadways is desired, with special attention given to pedestrians and bikes via separated non-motorized facilities.
- **PEDESTRIANS & BICYCLISTS:** There are desires for less focus on improving the vehicle network and more focus on providing pedestrian and bicycle accommodations including bike lanes, walking paths, and sideawalks. Consistent, continuous, and accessible paths without gaps are desirable. Continuous routes between Belgrade, Bozeman, and Four Corners are desired as well as additional paths generally within the triangle area connecting to existing paths.

  After reviewing the draft GTATP, a few participants recommended including facilities from the visionary non-motorized network as formal recommendations. These public recommendations cited safety concerns and connectivity purposes.

  Participants also questioned how e-bikes are viewed in the plan and whether the term “non-motorized” was inclusive or exclusive of e-bikes and/or mobility devices.
- **TRANSIT:** There is a desire for public transportation options to be expanded. Many participants report that they would utilize public transit if it were more available in their area, was more efficient, and had longer hours of operation. Concerns include improvement/expansion of public transit to keep up with the area’s growth. There is recognition that expanded service could help alleviate some traffic concerns.
- **FUTURE CONNECTIONS:** Some community members expressed concerns with some of the recommended future connections due to constraints relating to topology, land ownership, and conservation easements.
- **STRATEGY:** Some comments received noted that it would potentially be more worthwhile to spend available funds on improving the existing roadway network rather than constructing new roads/projects. Other participants stressed the need to prioritize projects that improve existing roadways that are rapidly deteriorating.

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Chapter 3:
State of the Region

To clearly understand the community needs, it is important to evaluate current social and economic conditions and existing land use. Demographic information was reviewed to gain an understanding of historical trends in population, age, employment, and other socioeconomic conditions. Regional development patterns and land use plans were also reviewed to help understand where conditions may be favorable for new residential and commercial growth. By using population, employment, and other socioeconomic trends as aids, the future transportation needs can be evaluated. For more detailed information about socioeconomic conditions and future projections, please refer to the Socioeconomic and Land Use Technical Memorandum in ***Appendix B****. Note that some of the demographic and economics information in the following sections has been updated since publication of the technical memorandum to reflect results of the 2020 decennial census.*

3.1. SOCIOECONOMICS

Local and regional population and economic characteristics have important influences on travel characteristics within the greater triangle area. The study area for the GTATP includes the urban areas of Bozeman and Belgrade, the unincorporated communities of Four Corners and Gallatin Gateway, as well as the adjoining lands between these communities where suburban development has occurred and will likely occur in the future. Triangle residents work, shop, attend educational institutions, and recreate in all areas of the Gallatin Valley, and their commuting patterns impact the local transportation system. To understand the transportation-related decisions made by area residents, population and employment characteristics were evaluated for Gallatin County, the City of Belgrade, the City of Bozeman, and the unincorporated areas of the county.

3.1.1. Population and Demographic Trends

Gallatin County has been one of Montana's fastest-growing counties over the last 30 years. In terms of numeric increases, Gallatin County has seen the most new residents of any county in the state since 1980. The total population of Gallatin County grew from 32,505 in 1970 to 118,960 in 2020—adding more than 86,000 residents. The county's population has increased by more than 30% in 4 of the last 5 decades since 1970. Although the slowest, population growth during the 1980s was still notable, with county residents increasing by nearly 18% between 1980 and 1990.

Likewise, the Cities of Belgrade and Bozeman experienced significant growth over the 1970-2020 period. Belgrade's population grew from 1,307 to 10,460 residents over the 50-year timeframe while Bozeman's population nearly tripled in size from 18,670 to 53,293 residents over the same period. The population of unincorporated areas of Gallatin County increased by 465% over the 1970-2020 period, with the most rapid growth in the last decade. In 2020, the number of residents living outside incorporated communities in Gallatin County over 55,000 (more than five times higher than in 1970). The majority of the unincorporated area population lives in the greater Gallatin Valley area between Bozeman, Belgrade, and Four Corners and along the I-90 and Frontage Road corridor west of Belgrade.

Both the State of Montana and the United States showed population increases during each decade between 1970 and 2020 but the rates of increase were well below those in Gallatin County, the Cities of Belgrade and Bozeman, and in all unincorporated areas of Gallatin County. The population of the U.S. and State of Montana grew by about 63% and 56%, respectively, between 1970 and 2020.

Figure 2 shows total populations for Gallatin County, Belgrade, Bozeman, and unincorporated areas of the county over the 1970 to 2020 period. The figure also shows the compound average growth rate (CAGR) of the change in residents between the 1970 and 2020 censuses.

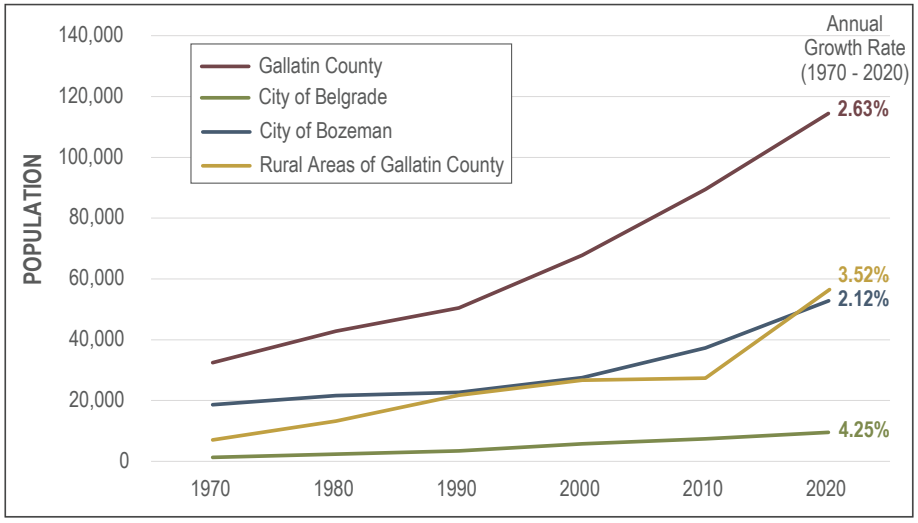


Figure 2: Historic Growth

Age Distribution

Three age categories (residents less than 18 years old, residents 18 to 64 years old, and residents 65 years and over) were considered in the analysis of age distribution. The county's population is notably younger than the state and nation. According to the American Community Survey (ACS), the median age of Gallatin County residents is 33.4 years. By comparison, the median age is 40.1 years for all Montana residents and 38.2 years for all U.S. residents. Of the four communities included in the study area, the median age ranges from a high of 46.6 years for Gallatin Gateway to a low of 27.8 years for Bozeman. The median age is the age at the midpoint of the population (i.e., half of the population is older than the median age and half the population is younger).

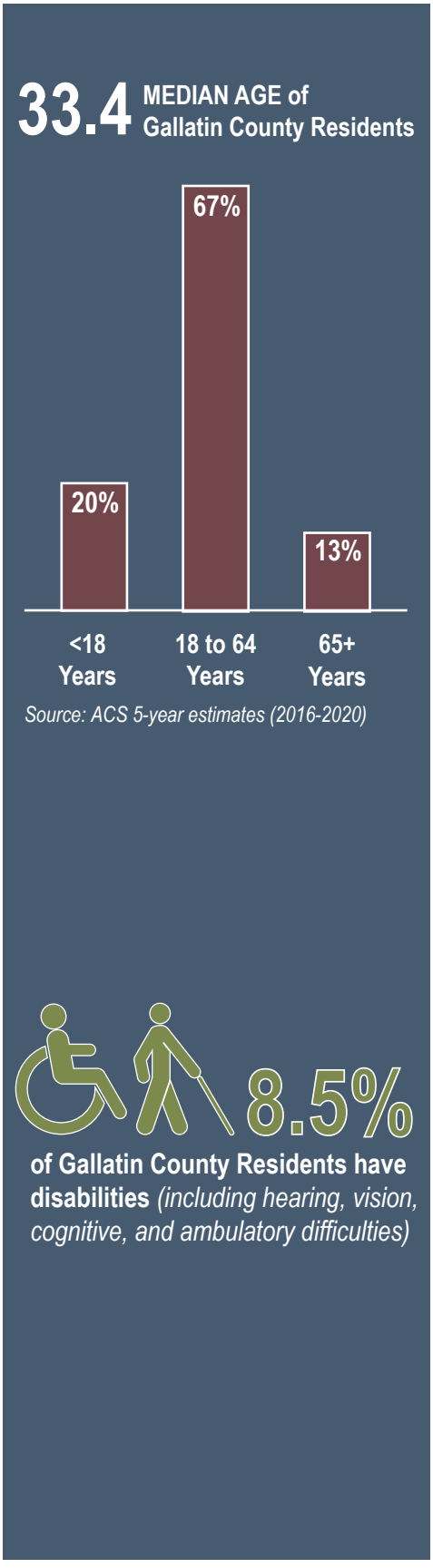
Gallatin County as a whole has a similar percentage of residents under 18 years of age (19.8 percent) compared to the state (21.5 percent) and the nation (22.4 percent), while Belgrade and Four Corners have higher percentages at 30.2 and 30.6 percent, respectively. The county and study area communities have lower percentages of residents 65 years of age and over, ranging from 6.3 to 15.7 percent, in comparison to the state and nation.

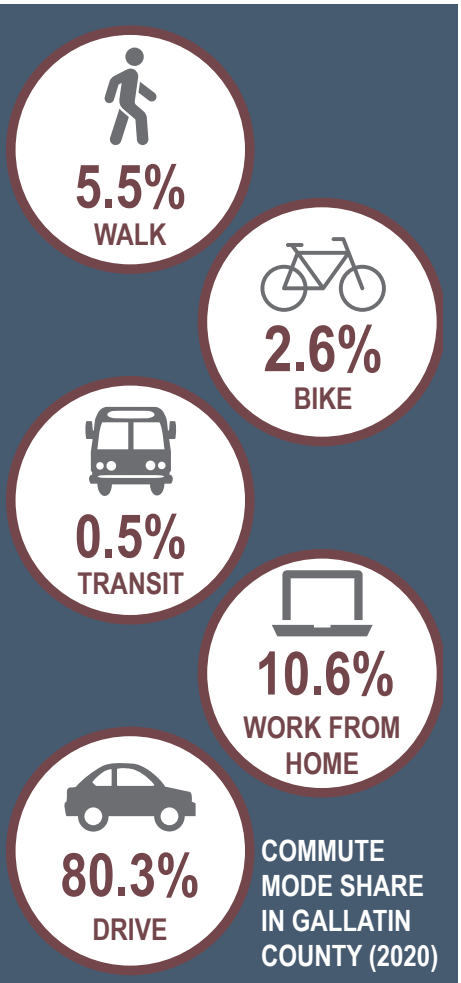
The age group from 18 to 64 generally represents the working-age population. Data for the 2016-2020 period showed Gallatin County and the communities of Bozeman, Belgrade, Gallatin Gateway, and Gallatin County had larger percentages of residents in this age group than the state and the nation.

Disability Status

Information about the number of residents with disabilities (which include hearing or vision difficulties, cognitive difficulties, and ambulatory difficulties) within Gallatin County and the study area communities was obtained to understand the segments of the population which may require special accommodations for transport or unique considerations in the design of transportation infrastructure.

Gallatin County and the four study area communities generally have fewer individuals with disabilities as a percentage of the total population compared to the state and the nation. Within the study area, individuals with disabilities make up 4.7 to 9.3 percent of the working-age population (19 to 64), compared to approximately 10 to 11 percent of the state and national population in the same age category. Overall, Four Corners generally has the lowest share of individuals with disabilities in all age categories, while Belgrade generally has the highest share in all age categories. The only exception to these generalizations is Gallatin Gateway, which has the lowest percentage of individuals with disabilities in the 18 years and under age category (0.0 percent) but the highest percentage in the 65 years and over age category (43.2 percent).





Personal Commuting and Travel Characteristics

Estimates of the total share of workers who commute or work at home, the transportation modes used by commuters, and the mean travel times to work for commuters are presented in **Table 1** for workers in Gallatin County and the study area communities, with statistics for the state and the nation provided for comparison.

According to the ACS, residents in nearly 97 percent of all occupied housing units in Gallatin County had access to one or more vehicles to commute to work or meet other personal needs. In the study area communities, access to at least one vehicle ranged from 95.9 percent in Bozeman to 100 percent in Gallatin Gateway and Four Corners.

More than 80 percent of commuting workers in Gallatin County relied on personal vehicles or carpools for transportation to work destinations, with 55.7 to 79.5 percent of commuters in the study area choosing to drive alone. This data suggests that public transportation options are more limited for Montana residents as compared to elsewhere in the United States. More than 8 percent of Bozeman commuters walk to work, while walking is much less common in the communities of Belgrade, Four Corners, and Gallatin Gateway, ranging from 1.4 to 2.9 percent.

Commute times for workers are highest in Gallatin Gateway at 30.3 minutes and lowest for Bozeman workers at 14.8 minutes. Commute times from Belgrade and Four Corners are 20.6 and 20.1 minutes, about 2 minutes longer than the average for Gallatin County. Commute time data suggests residents are traveling from the Gallatin Gateway, Four Corners, and Belgrade areas and coming into the Bozeman area, among other work destinations such as Big Sky.

Table 1: Mode of Transportation to Work (2016-2020)

Subject	Gallatin Gateway	Four Corners	Belgrade	Bozeman	Gallatin County	State of Montana	United States
Number of Workers 16 Years and Older	**411**	**2,596**	**5,139**	**28,876**	**62,786**	**512,202**	**153,665,654**
Commuted to Work	83.2%	86.4%	92.5%	91.0%	89.4%	92.0%	92.7%
Worked at Home	16.8%	13.6%	7.5%	9.0%	10.6%	8.0%	7.3%
Transportation Mode							
Drove alone, car, truck, van	55.7%	78.9%	79.5%	69.3%	71.9%	75.2%	74.9%
Carpooled	24.6%	5.1%	9.7%	7.3%	8.4%	9.2%	8.9%
Public Transportation (excluding taxicabs)	-	0.5%	0.7%	0.5%	0.5%	0.7%	4.6%
Walked to Work	2.9%	1.7%	1.4%	8.4%	5.5%	4.6%	2.6%
Other means of commuting	-	0.3%	1.2%	5.5%	3.2%	2.2%	1.8%
Mean Travel Time to Work (minutes)	**30.3**	**20.1**	**20.6**	**14.4**	**18.3**	**18.4**	**26.9**

Source: ACS Report: 2016-2020 (5-year estimates), available at: http://census.missouri.edu/acs/profiles/

Housing Units

The U.S. Census Bureau identifies a housing unit as a house, apartment, mobile home, group of rooms, or single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live and eat separately from any other persons in the building and which have direct access from outside of the building or through a common hall. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements.

Table 2 lists the number of housing units within Gallatin County and study area communities during past and current decennial censuses. Overall, the number of housing units in the county increased by 35,662 units (a 208% increase) since 1980 with significant increases in the number of housing units recorded during each of the last two decades in the county. This trend is similar for the Cities of Bozeman and Belgrade which showed an increase of 15,564 units (a 195% increase) and 3,474 units (a 402% increase) between 1980 and 2020.

The population per housing unit gradually decreased in Gallatin County over the 1980-2010 period but increased again in 2020. Because not all housing units are occupied, it is interesting to consider the number of residents per occupied housing unit. In 2020, more than 89% of the housing units in Gallatin County were occupied, with housing occupation ranging from a low of 90% in Gallatin Gateway and a high of 95% in Belgrade. If only occupied housing units are considered, the resulting population per housing unit rate is 2.52 people per unit in the county.

Table 2: Number of Housing Units (1980-2020)

Area	1980	1990	2000	2010	2020
Gallatin County					
Population	42,865	50,463	67,831	89,513	118,960
Total Housing Units	17,173	21,350	29,489	42,289	52,835
Population per Housing Unit	*2.50*	*2.36*	*2.30*	*2.12*	*2.25*
City of Bozeman					
Population	21,465	22,660	27,509	37,280	53,293
Total Housing Units	7,971	9,117	11,577	17,463	23,535
Population per Housing Unit	*2.69*	*2.49*	*2.38*	*2.13*	*2.26*
City of Belgrade					
Population	2,336	3,422	5,728	7,389	10,460
Total Housing Units	865	1,294	2,239	3,174	4,339
Population per Housing Unit	*2.70*	*2.64*	*2.56*	*2.33*	*2.41*
Four Corners CDP					
Population	--	--	1,828	3,146	5,901
Total Housing Units	--	--	795	1,331	2,333
Population per Housing Unit	--	--	*2.30*	*2.36*	*2.53*
Gallatin Gateway CDP					
Population	--	--	--	856	967
Total Housing Units	--	--	--	428	445
Population per Housing Unit	--	--	--	*2.00*	*2.17*

Source: U.S. Census Bureau, Current Estimates, available at: https://data.census.gov/cedsci/
CDP: Census Designated Place; -- indicates data unavailable.

411%

INCREASE IN full and part-time EMPLOYMENT in Gallatin County *(1980 to 2020)*

2.0%

of Gallatin County's laborforce is UNEMPLOYED *(Feb. 2022)*

$70,124

Gallatin County's MEDIAN HOUSEHOLD INCOME *(2020)*

11.0%

of Gallatin County's residents live below the POVERTY line *(2020)*

Employment and Income Trends

As of the 2020 census, Gallatin County is Montana's third most populous county, while the Cities of Bozeman and Belgrade are the state's 4th and 8th largest cities, respectively. Bozeman continues to rank as one of the fastest-growing, most dynamic, and strongest economies among the nation's micropolitan areas and has gained popularity for new startup companies. The economy of Gallatin County is diverse with services, retail trades, construction, manufacturing, technology, outdoor recreation, government, public and higher education, and agriculture all playing notable roles. Bozeman's transition into a regional trade and service center provides a solid basis for continued economic growth in the Gallatin Valley.

The most recently available data show that total full and part-time employment in the county was 89,376 in 2020 with more than 98% of the jobs being non-farm employment. Total full and part-time employment in Gallatin County grew by 311% between 1980 and 2020, meaning the county's total employment increased more than three times during that period. Over this 40-year period, the compound annual increase in employment in Gallatin County was nearly 3.6% per year.

Between 1980 and 2020, all industry sectors in the county gained jobs, with the most notable gains occurring in the services industry where the total number of jobs increased by about 44,100 jobs. Other industry sectors showing sizable increases in employment since 1980 include finance, insurance and real estate (gain of 8,248 jobs); construction (gain of 8,286 jobs); and retail trade (gain of 5,757 jobs).

Montana State University is the largest employer in Gallatin County with 2,613 full time employees, 805 part time employees, and 814 graduate teaching and research assistants as of fall of 2020. Top employers in the private sector in Gallatin County during 2020 include the following.

- Bozeman Deaconess Hospital (1,000+ employees)
- Kenyon Noble Lumber & Hardware (250-499 employees)
- Oracle America (250-499 employees)
- Town Pump (250-499 employees)
- Walmart (250-499 employees)
- 15 other businesses with 100 to 249 employees.

As of February 2022, about 2.0 percent of the county's labor force was unemployed. The county's unemployment rate is lower than the state's (2.6 percent) and the nation as a whole (3.6 percent).

Within the study area, estimated median household incomes range from nearly $59,000 in Bozeman to more than $77,000 in Four Corners. Median household incomes within the study area were higher than the state as a whole and, with the exception of Four Corners, higher than the nation. According to 2016-2020 ACS estimates, approximately 11.0 percent of county residents were living below the poverty line. While the percentage of individuals living in poverty is higher in Bozeman (17.2%) and Belgrade (11.1%), percentages are lower in the other study area communities, ranging from 6.8% in Gallatin Gateway to 6.5% in Four Corners.

3.2. LAND USE AND DEVELOPMENT

Land use plays a critical role in shaping transportation networks. Land use decisions affect the transportation system and shape how people to access work and recreation sites, goods, services, and other resources in the community. The existing and future transportation system may be impacted by the location, type, and design of land use developments through changes in travel demands, travel mode choices, and travel patterns.

Figure 3 at the end of this section shows the Gallatin County Land Planning Map from the *Gallatin County Growth Policy.* The map shows 10 planning designations listed hierarchically by areas most influenced by the growth policy. Areas that have existing zoning or neighborhood plans will be less influenced, as these documents must have already been created in compliance with the growth policy.

3.2.1. Municipalities

Within the triangle area, Bozeman and Belgrade are the only two municipalities with planning jurisdiction and their own growth policies.

City Bozeman

As of 2020, the municipal boundaries of Bozeman covered about 13,000 acres. Most of the 5,900 acres of land annexed since 1996 were on the north and west perimeters of the city. The City of Bozeman and Gallatin County have historically worked together to encourage annexation and development within the city limits. Outward development of the city is strongly connected to availability of municipal water and sewer systems. New development regularly expands the utility service areas encouraging more development.

Today, the city is seeing substantial redevelopment and enhancements within its historic downtown core area, North 7th Avenue, and East Main Street. Rapid expansion of commercial uses has also continued along North 19th Avenue and portions of West Main Street. Most other major streets in the city also have some level of commercial development.

In general, the future land use plan for the city seeks to move away from the auto-oriented development pattern of the past, to promote landscape diversity and maintain community character. The city seeks to develop the community by implementing more focused employment and activity centers which can help shorten travel distances and encourage multi-modal transportation, increase business synergies, and permit greater efficiencies in the delivery of public services.

City of Belgrade

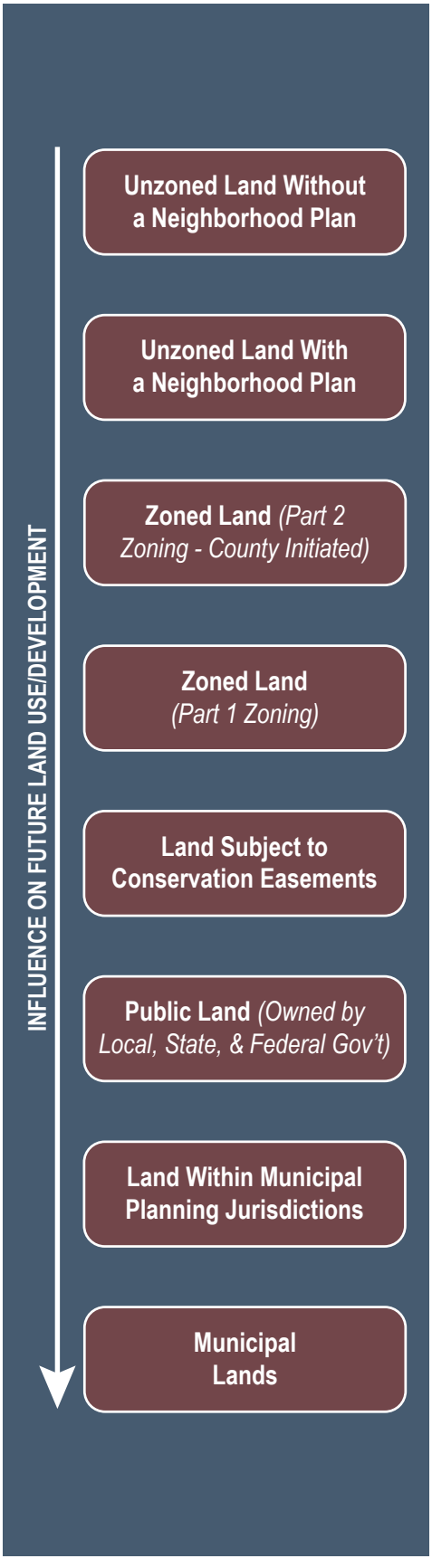
Although Belgrade has a longstanding history as a farming community, the increasing desire from its residents to grow the community, diversify the economy, and increase the number of jobs has shifted land use from agricultural to non-farm uses over the years. In 2004, substantial upgrades to the city's sewer treatment facility enabled Belgrade to consider petitions for annexations for residential, commercial, and retail land uses. The approved annexations totaled over 650 acres, which is nearly a third of the total land owned by the city (about 2,400 acres).

Today, the areas east of Belgrade are dominated by the Bozeman Yellowstone International Airport and large open gravel pits but also contain several residential developments. Areas west of Belgrade have a mix of residential, commercial, industrial, and agricultural land uses. The current trend is expected to continue into the foreseeable future with a growing number of residential developments.

In general, the future land use plan for the city seeks to keep growth concentrated within and near the current city limits and allow medium to low density development to occupy the outermost regions of the 4.5-mile planning jurisdiction. As distance increases from the city, the growth policy encourages a continued preservation of farmland and open space.

3.2.2. Zoned Areas

Zoning regulations for developments within Gallatin County are dictated by individual community zoning districts. Within or immediately adjacent to the study area, multiple zoning districts have prepared formal zoning regulations, which have been adopted by the county in conformity with the *Gallatin County Growth Policy* to the greatest extent possible under existing Montana State Law.



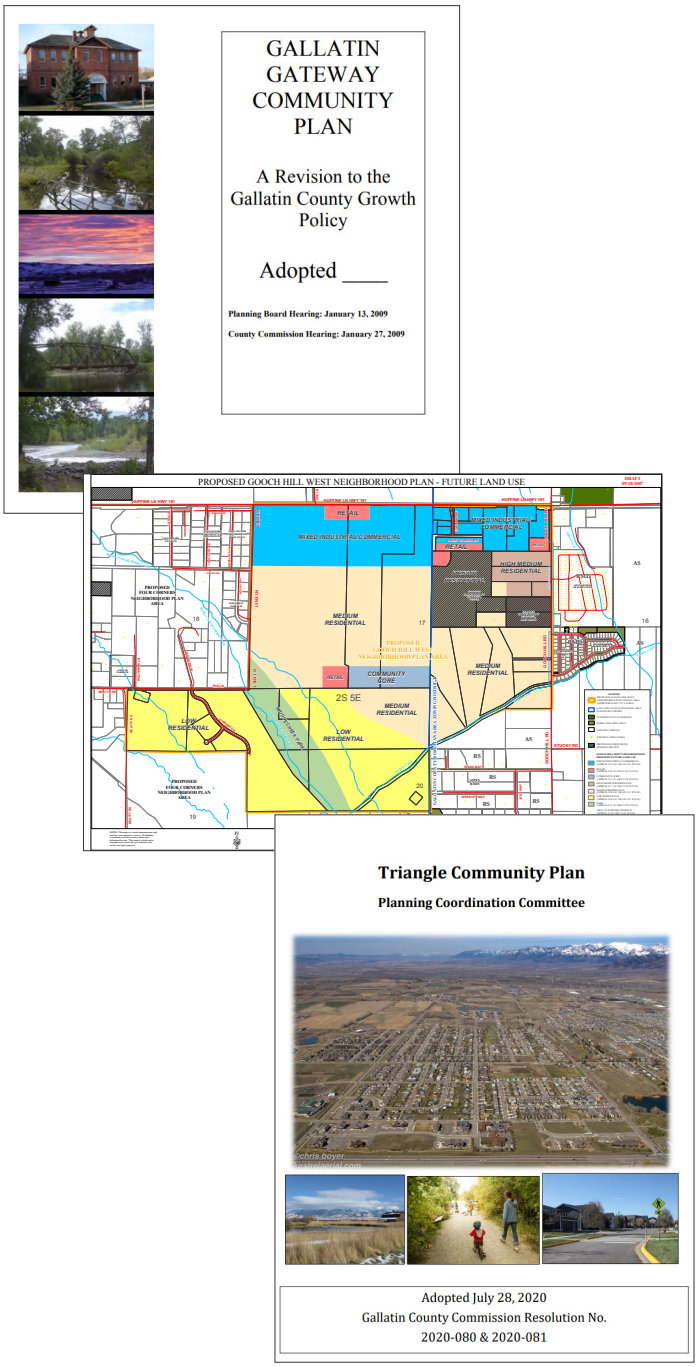
The regulations define zoning types, describe permitted land uses, and outline associated development standards. In general, the purpose of these zoning districts is to encourage appropriate development, preserve valued features and characteristics, and facilitate adequate provision of transportation and public utilities.

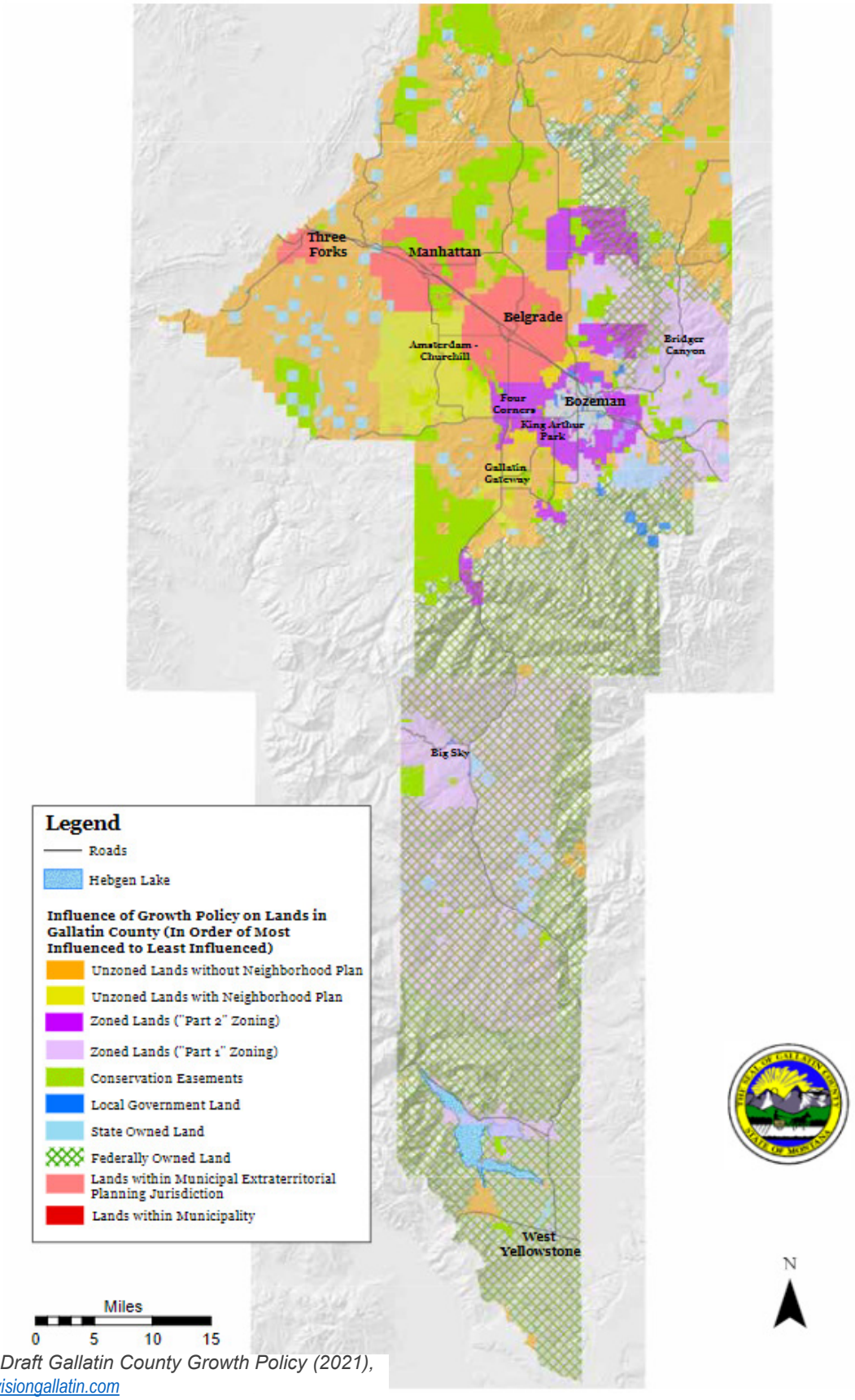
- The **Four Corners** neighborhood zoning jurisdiction is located immediately south of the Belgrade planning jurisdiction, west of the Gallatin County/Bozeman Area zoning jurisdiction, and north of the Gateway planning jurisdiction. The land immediately adjacent to US 191 and at the intersection of Norris Road is zoned as commercial use. Beyond the highway, land is zoned for mixed use, rural residential, low density rural residential, and agricultural uses.
- The **East Gallatin** Zoning District is located northeast of Belgrade and includes a primary commercial district, a smaller neighborhood commercial area, and rural residential/agricultural areas.
- The **Gallatin County/Bozeman Area Donut** Zoning District is located on the perimeter of the City of Bozeman and includes a "donut" of county land surrounding the city. While most of the zoning district is located within the Bozeman TMP study area, there is a small portion of land located along Huffine Lane within the triangle boundary. The land is zoned for residential, commercial/ manufacturing/industrial, and neighborhood service uses.
- The **Hyalite** Zoning District is located south of Bozeman at the southern border of the study area and includes areas designated for rural residential developments at varying densities as well as neighborhood commercial, agricultural, and parks/open space.
- **Middle Cottonwood, Wheatland Hills**, and **Zoning District #6** are located east and south of the East Gallatin district. They include areas designated for residential suburban, rural residential, agricultural, and conservation easements.
- **Bozeman Pass**, **Bridger Canyon**, and **Bear Canyon** Zoning Districts are located on the eastern edge of the triangle study area and include land zoned for residential, recreation, forestry, agriculture, light commercial, and public land/institutional uses.
- **Sypes Canyon** Zoning Districts #1 and #2 are located immediately south of the Middle Cottonwood district and adjacent to the study area. They include areas designated for residential suburban and agriculture suburban developments at varying densities as well as conservation easements and public lands.
- **Zoning District #1** is located within the Bozeman TMP boundary but includes county lands that are not annexed into the city. The lands are zoned primarily for residential use, but two locations are zoned for light business use.
- The **River Rock** Zoning District is located within the Belgrade LRTP boundary, immediately west of Belgrade city limits and Interstate 90 and includes designated areas for community business and a mixture of single family, town house, manufactured home, and apartment residential developments.

3.2.3. Other Developed Areas

Other areas within Gallatin County do not have formal zoning designations but do define desired land uses and zoning guidelines for the area. The land uses are assigned and administered through neighborhood or community plans and set a broad direction for how the community wants to develop in the future. While a neighborhood plan is not regulatory, it does provide greater specificity for development. These plans may influence formal zoning designations in the future.

- The **Gallatin Gateway** area currently does not have a designated zoning district, but land uses in the area are assigned and administered through the *Gallatin Gateway Community Plan*. The Gallatin Gateway neighborhood study area is located in the southwestern portion of the study area. Designated land uses include the primary central business district core, a mixture of commercial uses along the US 191 highway corridor, rural residential, and agricultural uses. Zoning is currently being considered in the Gallatin Gateway area.
- The **Gooch Hill West** area overlaps the western edge of the Gallatin County/Bozeman Area Donut zoning jurisdiction. It does not have a designated zoning district, but land uses in the area are assigned and administered through the *Gooch Hill West Neighborhood Plan*. In addition to identifying existing land uses, a future land use map identifies a community core, retail areas, mixed industrial/ commercial, and residential development at low, medium, and high densities.
- The **Triangle** area is loosely described as the area between Bozeman, Four Corners, and Belgrade. The PCC recently developed the *Triangle Community Plan* to coordinate land use development patterns in the Gallatin Valley. The triangle boundary overlaps the Four Corners, Gallatin County/Bozeman Area Donut, River Rock, and Zoning District #1 jurisdictions as well as the Bozeman TMP and Belgrade LRTP study areas. The PCC acts in an advisory nature only, without any authority over planning-related decisions in any of the participating jurisdictions.





Source: Draft Gallatin County Growth Policy (2021), https://envisiongallatin.com

Figure 3: Land Use Planning

Chapter 4:
Existing Transportation System

Current information about the transportation system was analyzed to establish the existing traffic conditions and to determine current problem areas. The following analysis of transportation conditions includes a planning-level examination of the roadway network within the GTATP study area based on existing traffic data, vehicle crash history, field observations, pavement and structure condition data, aerial imagery, and geographic information system data. Existing data were provided by MDT and Gallatin County. Additional data was collected by RPA in June 2021 to supplement the available information. Using a combination of the supplied and collected data, the existing operational characteristics of the transportation network were established. More detailed information about the existing transportation conditions can be found in ***Appendix C****.*

4.1. TRANSPORTATION NETWORK

A transportation network is made up of multiple connected road segments to facilitate vehicular movement, as well as public transportation, bicycles, pedestrians, freight, rail, and other modes of transportation. Gaining a thorough understanding of each component of the transportation network will help ensure that all modes of transportation are able to navigate the transportation network safely and efficiently.

4.1.1. Major Street Network

A transportation system is made up of a hierarchy of roadways classified according to certain parameters. The parameters include but are not limited to geometric configuration, traffic volumes, spacing in the community's transportation grid, speed, and adjacent land use. These characteristics help define the role that each segment of roadway plays within the overall network. The method by which these roles are defined is widely known as functional classification, which defines the nature of travel within the network in a logical and efficient manner by defining the objectives that any particular road or street should meet to effectively move trips through the entire network.

***Urban** roadways, like Jackrabbit Lane within the Belgrade Urban Area, typically include curb and gutter, bike lanes or bike boulevards, and sidewalks often separated by grassy boulevards.*

Included in the study area are roadways with the functional classifications of interstate principal arterial, other principal arterial, minor arterial, collector street, and local street. For this evaluation, emphasis was placed on roadways within the study area that are functionally classified as collectors, minor arterials, or principal arterials. Local streets, the lowest ranking roadways, were not examined in detail due to the assumption that if the major street network is functioning at an acceptable level, the local roadways should not be used beyond their intended function. However, if problems begin to occur on the major street network, then the resulting issues will begin to infiltrate the local road network. As such, the overall health of a community's transportation system can be characterized by the health of the major street network.

***Rural** roadways, such as South 19th Avenue pictured above, typically include paved shoulders instead of curb and gutter and rely on on-street bicycle facilities or separated paths for non-motorized use.*

For this plan, functional classifications are neither limited to nor defined by "urban" or "rural" settings, though some entities often make a distinction between urban and rural functional classes. Rural roadways in the study area generally carry a smaller volume than their urban counterparts. Although traffic volumes may differ between urban and rural sections of a roadway, it is important to still maintain coordinated right-of-way standards to allow for efficient operation and potential future urban development. **Figure 4** presents the existing major street network for the study area. Note that the functional classifications shown in the figure may not represent the federally approved functional classification system, rather, it shows the locally adopted classifications. These classifications are used for planning purposes and may not be representative of actual conditions. The following list provides general descriptions of functional classifications considered in the plan.

Interstate Principal Arterials

The main purpose of interstate principal arterials is to provide for both regional and interstate transportation of people and goods. Primary users range from local residents and commuters to long-distance travelers and freight operators. Interstate principal arterials characteristically have fully controlled access (provided by a limited number of interchanges), high design speeds, and a high priority on driver comfort and safety. The interstate system has been designed as a high-speed facility with all road intersections being grade separated. Interstate 90 (I-90) traverses the study area as a four-lane divided highway.

Principal Arterials

The purpose of a principal arterial is to serve the major activity centers, the highest traffic volume corridors, and the longest trip distances in an area. This classification of roadway carries a high proportion of the total traffic. Most of the vehicles entering and leaving the area will use principal arterials. Significant intra-area travel, such as between central business districts, outlying residential areas, and major suburban centers, is also typically served by principal arterials.

Minor Arterials

The minor arterial street system interconnects with and supplements the principal arterial system. Minor arterials accommodate trips of moderate length at a somewhat lower level of travel mobility, as compared to principal arterials. They distribute travel to smaller geographic areas in addition to providing some access to adjacent lands.

Collectors

The collector street network provides links from residential, commercial, and industrial areas to the arterial street network. This type of roadway differs from those of the arterial system in that collector roadways may traverse residential neighborhoods. The collector system distributes trips from the arterials to the user's ultimate destinations while also collecting traffic from local streets in the residential neighborhoods and channeling the traffic to the arterial system.

Local Streets

The local street network comprises all facilities not included in the higher functional classes. The primary purpose of local streets is to permit direct access to abutting lands and connections to higher systems. Most local streets also provide residential and commercial access. Usually, service to through-traffic movements is intentionally discouraged either through low speeds or other traffic calming measures.

*I-90 passes through the study area and provides both regional and **interstate** transportation.*

*The Four Corners Intersection is the junction of Jackrabbit Lane, Huffine Lane, and Gallatin Road, all **principal arterials** within the study area.*

*Bridger Canyon Road is functionally classified as a **minor arterial** within the study area.*

*Cottonwood Road is functionally classified as a **collector** street between South 19th Avenue and Gallatin Road.*

*East of Cottonwood Road, Johnson Road is functionally classified as a **collector**. West of Cottonwood Road, Johnson Road transitions to an unpaved **local** road.*

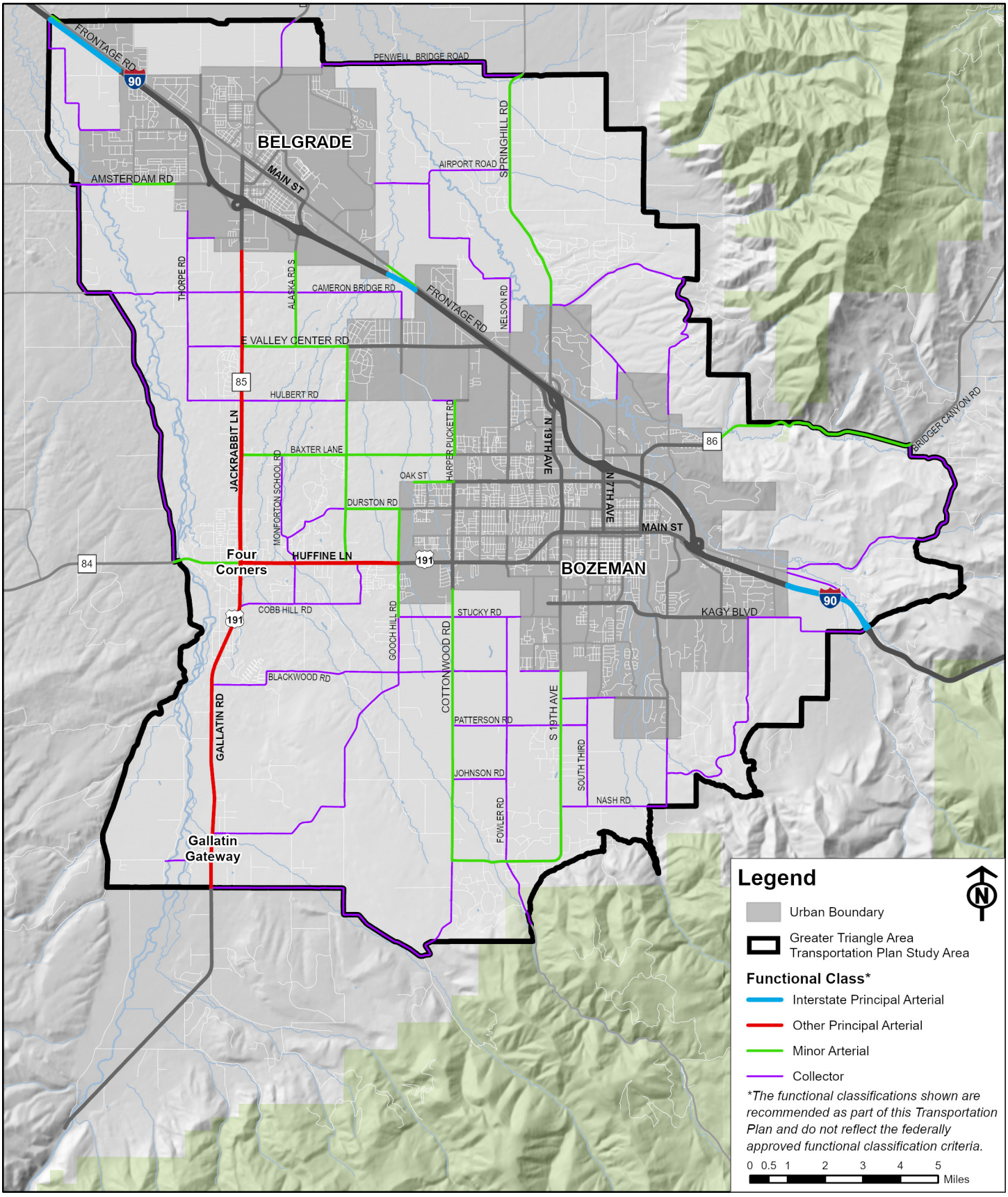


Figure 4: Existing Major Street Network

4.1.2. Multimodal Street Network

As awareness of the physical and environmental benefits of active transportation modes increases, communities have experienced a heightened demand for facilities that accommodate pedestrians, bicyclists, and public transportation choices. The focus of the multimodal transportation network will be on non-motorized mode choices, such as biking and walking, but will also include the public transportation options available to residents.

Bicycle and Pedestrian Facilities

In general, the study area has limited dedicated bike and pedestrian facilities due to its rural nature. As such, there are many opportunities for improvement to the non-motorized transportation network. Improved connectivity of such facilities to the robust non-motorized network in Bozeman and the developing non-motorized system in Belgrade, will be important to facilitate travel by active transportation modes. **Figure 54** shows the existing pedestrian and bicycle facilities in the study area.

Shared Use Paths

Shared use paths are off-street paved trails designated for the use of bicyclists, pedestrians, and other non-motorized users such as skateboarders and rollerbladers. The Gallatin Gateway shared use path is an asphalt path along the east side of US 191 beginning at Zachariah Lane and ending at Rabel Lane/Mill Street. Approximately four miles remain to complete the trail connection into Four Corners.

On-Street Bicycle Facilities

On-street bicycle facilities consist of bike lanes, bicycle boulevards, and widened shoulders. Bike lanes use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bicycle boulevards are streets with low motorized traffic volumes and speeds designated and designed with signs and pavement markings to give bicycle travel priority. In rural settings, widened roadway shoulders can offer many of the same benefits of bike lanes and bicycle boulevards without the same level of cost associated with striping and signing. There are several bike lanes and bicycle boulevards within Bozeman and Belgrade urban areas, but no existing on-street bicycle facilities within the triangle study area.

Natural Surface Trails

There are several natural surface trails in the study area. This type of facility can serve both transportation and recreational purposes. Within the study area, natural surface trails are primarily located near subdivisions and tend to serve more of a recreational purpose.

Sidewalks

Sidewalks occur alongside some of the main streets and within some of the subdivisions in the study area, however many existing pedestrian facilities lack connectivity. A current inventory of sidewalks is not available within the study area.

*The Gallatin Gateway **shared use path** is planned to provide a connection between Four Corners and Gallatin Gateway. Approximately four miles of trail remain to be completed.*

*In rural areas, **on-street bicycle facilities** are typically **widened shoulders**. In urban areas, on-street bicycle facilities may consist of **bike lanes** or **bicycle boulevards**.*

*While the trail network within Bozeman is very robust, connections to rural parts of the study area are lacking. Most **natural surface trails** within the study area are located near subdivisions.*

***Sidewalks** in the study area are primarily found in neighborhoods.*

*The **Streamline Bus** is the primary transit provider in Bozeman and Belgrade. Service to Four Corners was removed in August 2021 when new routes were implemented.*

GALAVAN

A PROGRAM OF HRDC

*Paratransit services in the study area are provided by **Galavan**.*

*The **Skyline Link to the Peak! Bus** provides transit services between Bozeman and Big Sky with stops in Four Corners and Gallatin Gateway.*

Heavy vehicles frequently travel to and from several gravel pits in the study area.

Transit Services

Some transit services are available within the GTATP study area, although the primary service area is Bozeman. The following operators provide transit services within the triangle area.

- **Streamline Bus:** Streamline provides daily fixed-route bus service in Bozeman, Belgrade, and Livingston. Both daytime and late-night routes are offered. On August 15, 2021, Streamline implemented new routes with new bus stops. Service to the county areas is greatly reduced on the new routes, with service to Four Corners being removed entirely. Service to Belgrade and Livingston continues.
- **Galavan:** In addition to Streamline, the Human Resource Development Council administers and operates Galavan, an on-call, door-to-door paratransit transportation service for seniors and individuals with disabilities.
- **Skyline Bus:** The Skyline bus provides transit services primarily in Big Sky but has expanded to serve areas of Bozeman, Four Corners, and Gallatin Gateway as well. The bus runs seven days a week, except during the off-season when it runs Monday through Friday. The Link Express buses run between Bozeman and Big Sky with stops in Four Corners and Gallatin Gateway.

Freight and Rail Network

Freight movement is critical to Montana's economy, providing access to important commodities, creating jobs, and encouraging investment and economic growth. Montana's location between midwestern and northwestern port markets and continued growth in consumer demand for goods has resulted in strong freight service demand. Understanding how freight and rail within the study area interact with the rest of the transportation network will help ensure that as the demand for goods and services fluctuates, other transportation modes can continue to move safely and efficiently through the transportation network.

Freight and Heavy Vehicles

Outside the Bozeman and Belgrade areas, the main freight routes within the study area include Montana Highway 85 (MT 85), which extends south from Belgrade and meets with US Highway 191 (US 191) connecting south to Gallatin Gateway and east to Bozeman. Additionally, Montana Highway 84 (MT 84) extends to the west from Four Corners. At the outer edges of the study area, I-90 connects to Livingston and Bozeman to the east and to Butte and Interstate-15 (I-15) to the west. These routes serve regional, national, and international trade, enabling freight vehicles to travel through the area in a safe and effective manner.

Figure 6 presents areas that generate truck activity within the study area such as lumber yards, industrial areas, and commercial businesses producing or receiving freight shipments. The figure also shows gravel pits, truck stops, and other truck destinations within the study area. The percentage of heavy vehicle traffic observed at the study intersections discussed in **Section 4.2.2** are also shown on the map.

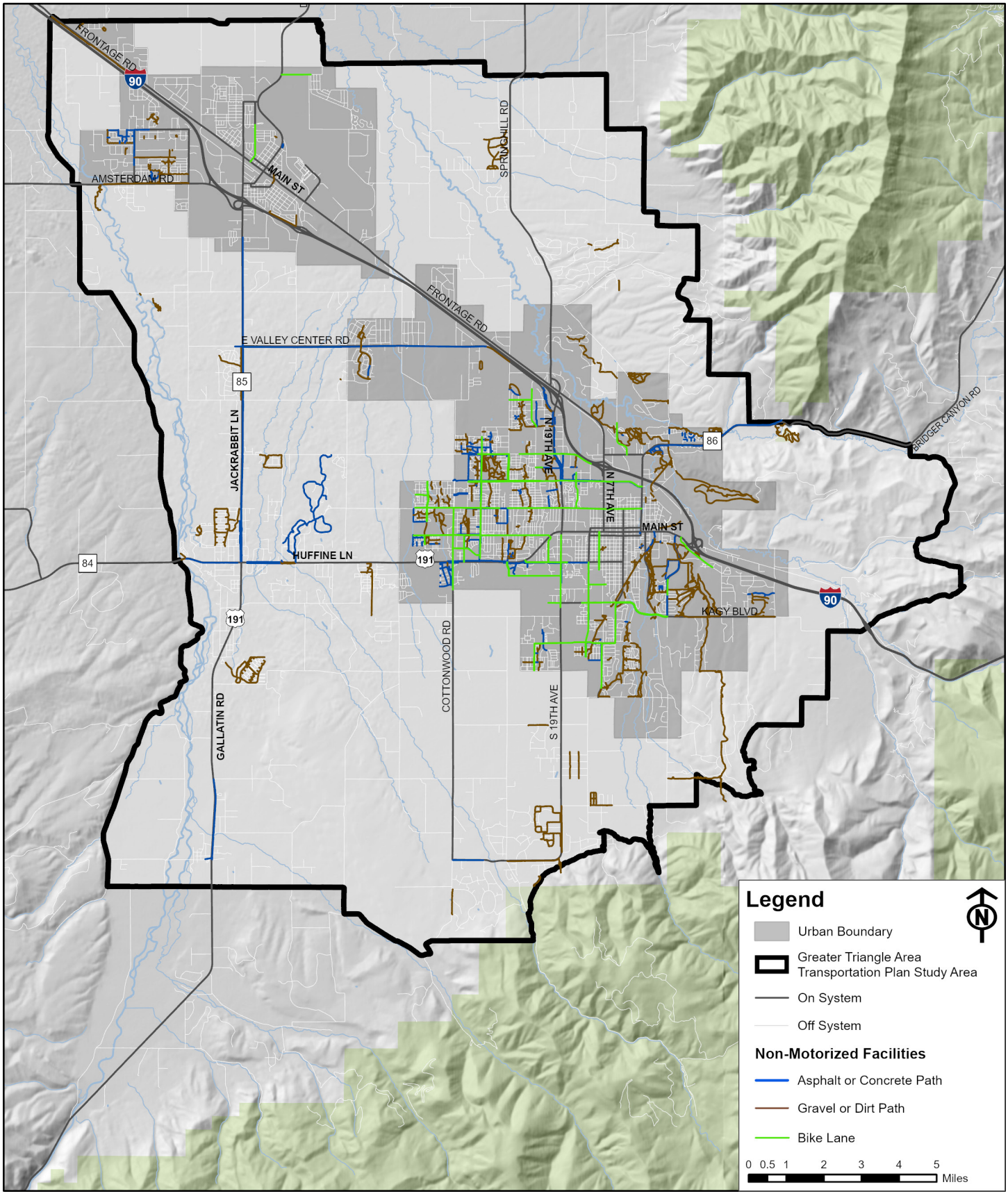


Figure 5: Existing Bicycle and Pedestrian Facilities

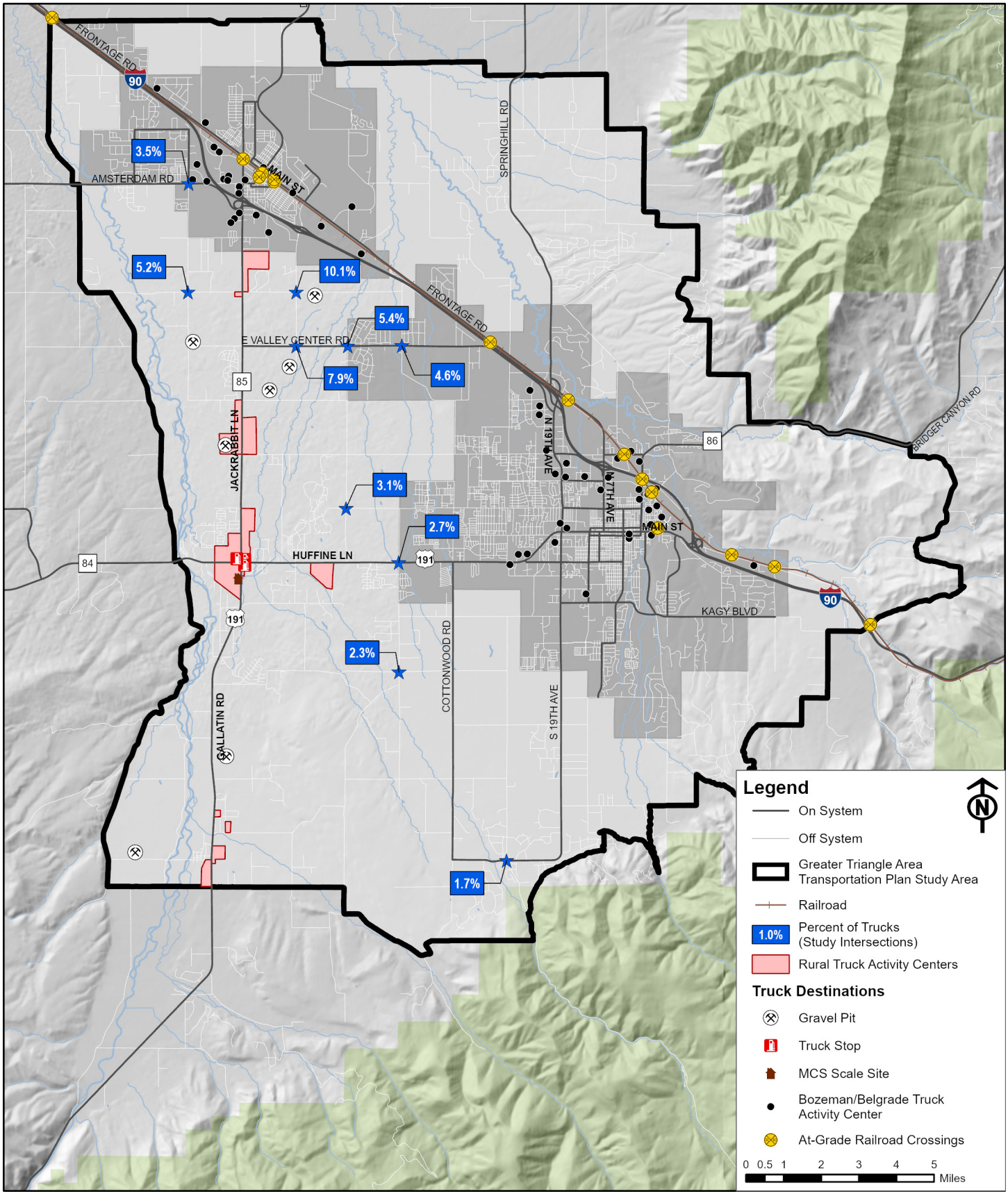


Figure 6: Freight and Rail Network

Rail

According to the 2010 *Montana State Rail Plan*, the majority of rail freight in the state by both tonnage and revenue is generated by through trips (i.e., passing through the state but not originating or terminating in Montana). The main rail line through the study area is currently owned by BNSF Railway. Speed limits range from 50 to 60 miles per hour on the main track.[4]

At-grade rail crossings within the Bozeman and Belgrade urban boundaries are located at Thorpe Road, Jackrabbit Lane, Broadway Street, Oregon Street, Valley Center Road, Red Wing Drive, Griffin Drive, Rouse Avenue, L Street/Wallace Street, Rocky Creek Road, and Kelly Canyon Road. At the edge of the study area, an at-grade rail crossing is located east of Bozeman at Moffit Gulch Road (refer to **Figure 6**).

The only at-grade rail crossing within the GTATP study area is located at Moffit Gulch Road.

4.1.3. Asset Condition

Effectively managing transportation assets is a vital part of ensuring good condition and performance for all transportation users. Two assets often monitored by transportation agencies include structures (such as bridges, culverts, stockpasses, and tunnels) and pavement. Condition and performance ratings for these assets are important to consider when planning preservation, rehabilitation, and reconstruction projects.

Structure Condition

MDT performs regular inspections of all in-service publicly owned structures to identify needed repairs and inform funding decisions. National Bridge Inventory item ratings are determined based on MDT inspections, and vary on a scale from 0 to 9, with 0 depicting an element that is out of service and beyond corrective action (repair) and 9 depicting an item that is new or in excellent condition. An overall structure rating is given based on the lowest sub- or superstructure rating.

When a structure is constructed, its structural elements are designed with a weight capacity to meet anticipated use. When a bridge is inspected, signs of deterioration or damage that might reduce capacity are noted and a load, or weight, restriction may be recommended to preserve the integrity of the structure.

Figure 7 shows the structures within the study area color coded based on their overall structural rating and notes load restricted structures. Of the 44 structures within the study area, 32 are owned and maintained by Gallatin County. The remaining 12 bridges are owned and maintained by MDT. Six of the structures, all county-owned, have posted load restrictions. Two of the county-owned bridges, Airport Road and Axtell Anceney Road, are rated Poor (element rating of 4 or less). All other bridges in the study area received a Fair (5-6) or Good (7-8) rating for all elements. None of the 44 structures received a New (9) rating.

Pavement Condition

The pavement condition index (PCI) is a numerical index between 0 and 100, which is used to indicate the general condition of a pavement section. PCI ratings are widely used by municipalities to measure the performance of their road infrastructure. The assessment is based on visual surveys performed by county staff. Each road segment is evaluated based on the number, type, and severity of distresses in the pavement. Asphalt pavement distress types include cracking, bleeding, swelling, raveling, rutting, potholes, patching, and ride quality, among others. A PCI score of 86-100 is rated as “good,” 71-85 as “satisfactory,” 56-70 as “fair,” 41-55 as “poor,” and 25-40 as “very poor.” Any PCI rating below 25 is considered failing.

The PCI history of pavement can help establish its rate of deterioration and identify future major rehabilitation needs. PCI values are also typically used in prioritizing, funding, and executing maintenance and repair efforts. **Figure 7** shows the 2020-2021 PCI values for select roads in the study area as provided by the Gallatin County Road and Bridge Department. The pavement within the study area is in generally good condition. A few segments, such as Cottonwood Road, Love Lane, South 19th Avenue, and Frank Road, are rated as fair and are candidates for pavement preservation. South 19th Avenue between Cottonwood Road and Cougar Drive has a PCI rating of 52.7 which indicates the pavement is poor and needs rehabilitation.

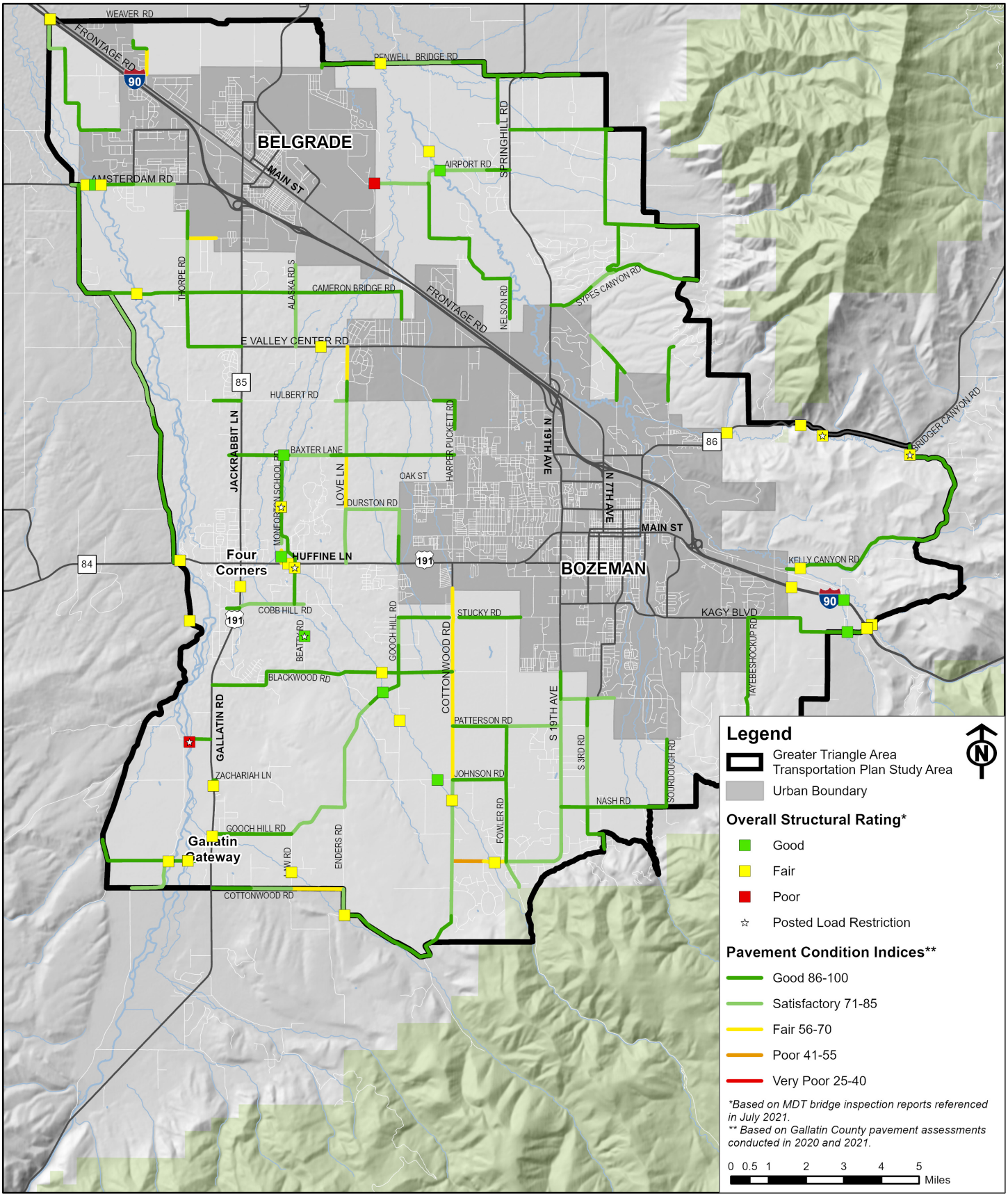


Figure 7: Asset Condition

4.2. TRANSPORTATION CONDITIONS

An evaluation of existing traffic conditions for the study area was completed using data provided by Gallatin County and MDT in addition to field-collected data. Turning-movement counts and mainline traffic volume data was bolstered by visual observations such as driver behavior, vehicle queuing, and other general traffic characteristics. This data aids in understanding how the existing road network operates and helps determine future planning needs.

4.2.1. Existing Roadway Volumes

Existing roadway traffic data was provided by MDT and Gallatin County with supplemental data collected in June 2021. The data was used to establish existing traffic conditions and provide historic traffic volumes.

The existing annual average daily traffic (AADT) volumes on the major street network are presented in **Figure 9.** Available AADT counts are provided for the years 2018 through 2021 on roadways within the study area. Where data is available for the same site from multiple sources, the most recently available count was used. Currently, high traffic volumes are experienced along the main principal arterials within the study area including Jackrabbit Lane between Four Corners and Belgrade, Huffine Lane between Four Corners and Bozeman, and on US 191 south of Four Corners. Increasingly high volumes are also experienced on the collector roadways connecting Belgrade, Four Corners, and Bozeman including South Alaska Road, East Valley Center Road, Love Lane, and Baxter Road.

4.2.2. Intersection Operations

Intersection performance is evaluated in terms of vehicle delay. The amount of vehicle delay experienced at an intersection correlates to a measure called level of service (LOS). LOS is used to identify intersections that are experiencing operational difficulties. The LOS scale ranges from A to F representing the full range of operating conditions. The scale is based on the ability of an intersection to accommodate the traffic using the intersection. LOS A indicates little, if any, vehicle delay, while F indicates significant vehicle delay and congestion. **Figure 8** shows the relationship between LOS and vehicle delay.

A total of 10 intersections were evaluated within the study area. Data was collected during June of 2021 at the study intersections (2 signalized and 8 unsignalized locations). Each intersection was counted over a 24-hour period to obtain turning movement counts during the AM (7:00 AM to 9:00 AM), noon (11:00 AM to 1:00 PM), and PM peak hours (4:00 PM to 6:00 PM), as well as overall AADT volumes for each intersection leg. The results of the LOS analysis are presented in **Figure 10.**

Intersection LOS defines intersection performance in terms of vehicle delay and does not factor in alternative travel modes or the health of the overall transportation system. Intersection LOS is often based on a single hour, or peak hours, for which the system is most congested. Rather than reducing peak hour delay at single intersections, a broad approach should be taken to improve the entire transportation system.

All of the study intersections are shown to operate at an acceptable LOS during the AM and Noon peak hours with the exception of the East Valley Center Road and South Alaska Road intersection which operates at LOS D in the AM peak hour. During the PM peak hour, half of the study intersections operate at a LOS D or worse. The poor operations can be attributed to traffic traveling between Bozeman and Belgrade.

Figure 8: Intersection LOS Descriptions

LOS	Signalized Delay (sec)	Unsignalized Delay (sec)	Description
A	<10	<10	• Free flow • Low volumes • <1 vehicle in queue
B	10 - 20	10 - 15	• Mostly free flow • Somewhat low volumes • Occassionally 1+ vehicles
C	20 - 35	15 - 25	• Smooth flow • Moderate volumes • Standing queue; >1 vehicle
D	35 - 50	25 - 35	• Approaching unstable flow • High volume:capacity ratios • Standing queue of vehicles
E	50 - 80	35 - 50	• Unstable flow • Volumes at/near capacity • Standing queue of vehicles
F	>80	>50	• Saturation condition • Volumes over capacity • Standing queue of vehicles

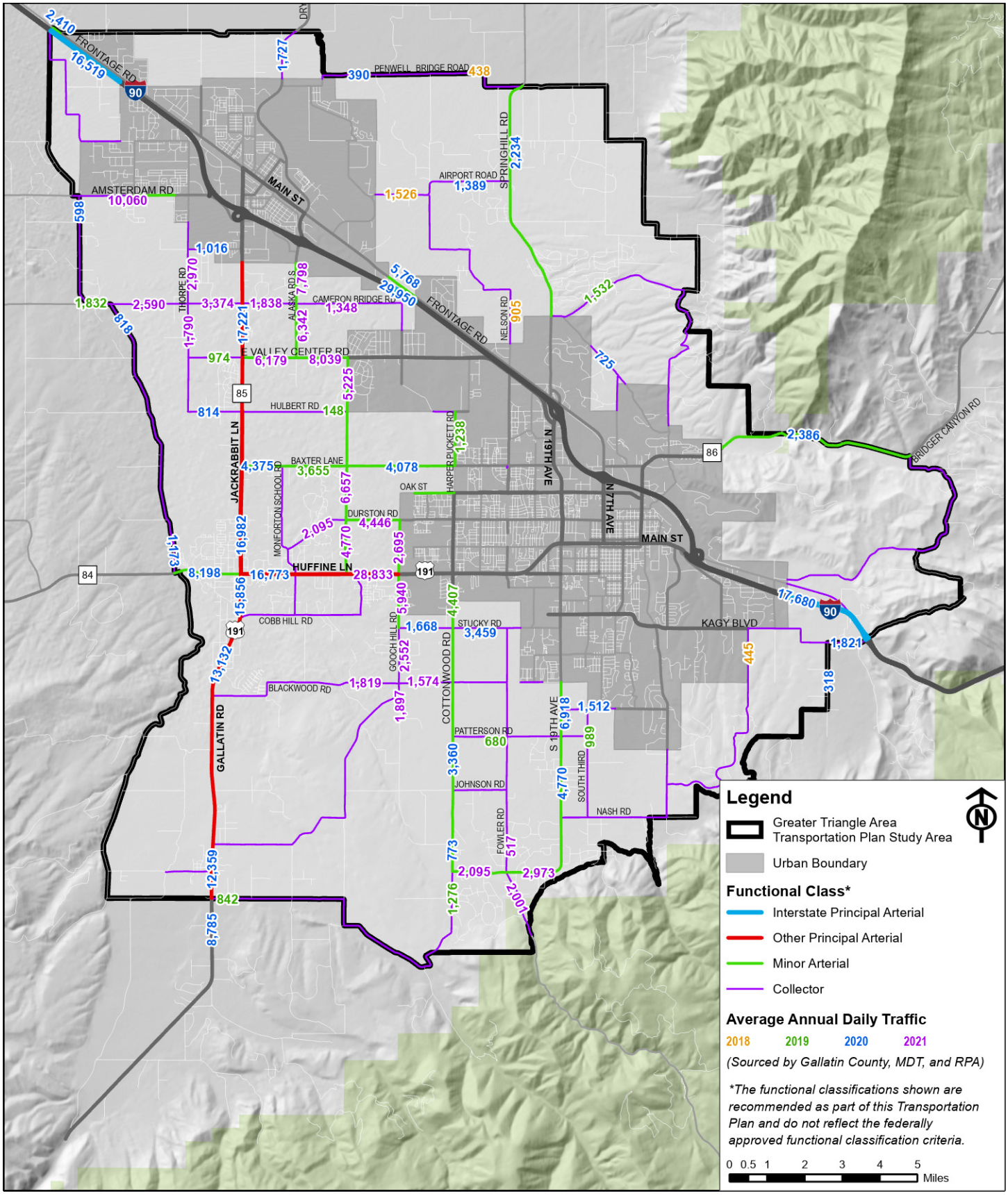


Figure 9: Existing AADT

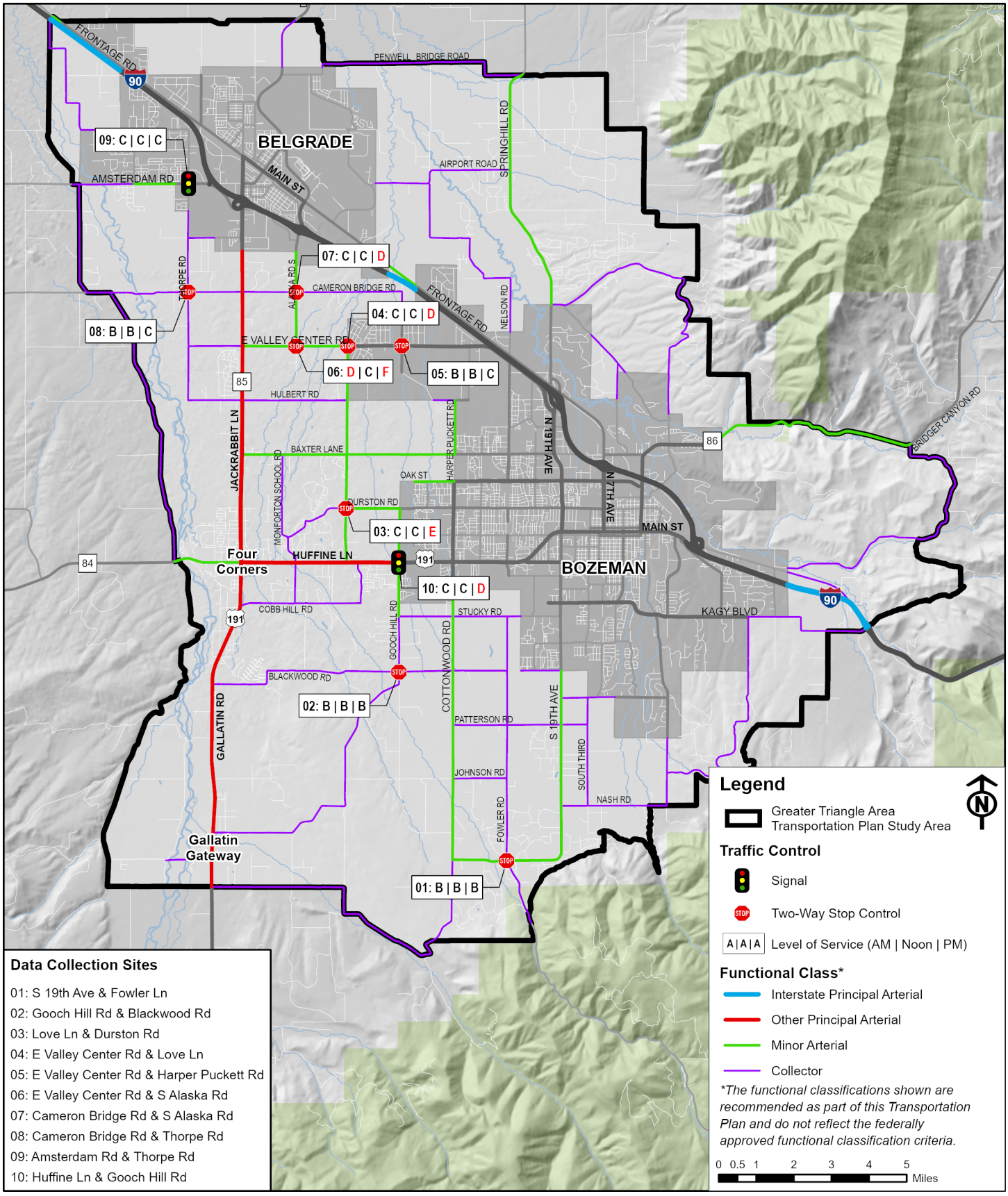


Figure 10: Existing Intersection Options

4.3. SAFETY

Crash data were provided by the MDT Traffic and Safety Bureau for the three-year period between January 1st, 2017, and December 31st, 2019. The crash reports are a summation of information from the scene of the crash provided by the responding officer. As such, some of the information contained in the crash reports may be subjective.

The spatial distribution of all crashes was plotted based on the reported crash locations. The density of crashes within the study area is displayed in **Figure 12**. Locations with higher traffic volumes appear to have a higher number of crashes.

According to the MDT crash database, 1,042 crashes were reported within the GTATP study area (outside of the Bozeman and Belgrade urban boundaries) during the three-year analysis period. The number of crashes per year decreased from 485 crashes in 2017 to 436 crashes in 2018. In 2019, the number of yearly crashes increased to 480 crashes. The number of crashes causing injury mimicked the same trend, decreasing from 96 to 79 then increasing to 94 in 2017, 2018, and 2019, respectively. Non-injury crashes followed the same trend decreasing from 389 crashes in 2017 to 357 in 2018 then increasing to 386 in 2019. **Figure 11** presents the total, injury, and non-injury crashes per year for the three-year period.

4.3.1. Crash Severity

Crash severity is categorized based on the most severe injury resulting from the crash. For example, if a crash results in a possible injury and a suspected serious injury, the crash is reported as a suspected serious injury crash. The locations of the severe (suspected serious and fatal injury) crashes are shown in **Figure 12**. A suspected serious injury is an injury, other than a fatality, that prevents the injured individual from walking, driving, or normally continuing the activities they were capable of performing before the injury.

During the three-year analysis period, there were 269 injury crashes, of which about 10 percent were severe. There were 3 fatal crashes, each resulting in 1 fatality, and 25 suspected serious injury crashes, resulting in 47 total injuries. As a result of multiple individuals being injured in a single crash, a total of 362 individuals were injured during the analysis period. The majority of crashes (79 percent) resulted in property damage only.

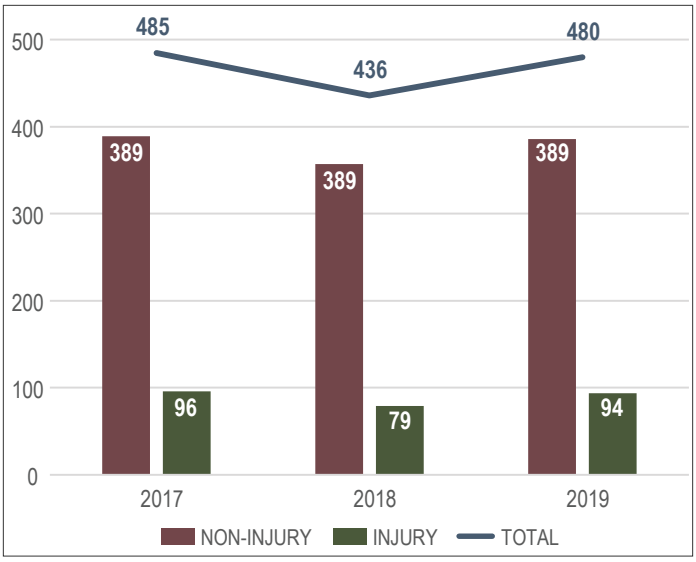


Figure 11: Number of Crashes per Year

4.3.2. Intersection Crashes

The 10 study intersections were analyzed to identify any crash trends. **Table 3** presents the crash and severity rates for the study intersections. Crash rates compare the number of crashes to daily traffic volumes and help determine relative safety compared to other similar intersections. The severity rate helps prioritize locations where the crash frequency may be lower, but the crash severity is higher.

Table 3: Intersection Crash and Severity Rates

Intersection	Total Crashes	Crash Rate	Severity Rate
S 19th Ave / Fowler Ln	8	2.52	3.78
Cameron Bridge Rd / S Alaska Rd	9	1.19	2.52
Love Ln / Durston Rd	15	1.73	2.19
Huffine Ln / Gooch Hill Rd	42	1.38	2.07
Cameron Bridge Rd / Thorpe Rd	6	1.14	1.90
Gooch Hill Rd / Blackwood Rd	5	1.18	1.65
Amsterdam Rd / Thorpe Rd	18	1.05	1.40
E Valley Center Rd / Love Ln	8	0.91	1.37
E Valley Center Rd / S Alaska Rd	7	0.73	1.15
E Valley Center Rd / Harper Puckett Rd	1	0.15	0.15

The South 19th Avenue / Fowler Lane intersection has a relatively high crash rate combined with a higher crash severity resulting in the highest severity rate of all study intersections. The Cameron Bridge Road / South Alaska Road intersection had the highest crash severity and a relatively high frequency of crash occurrences.

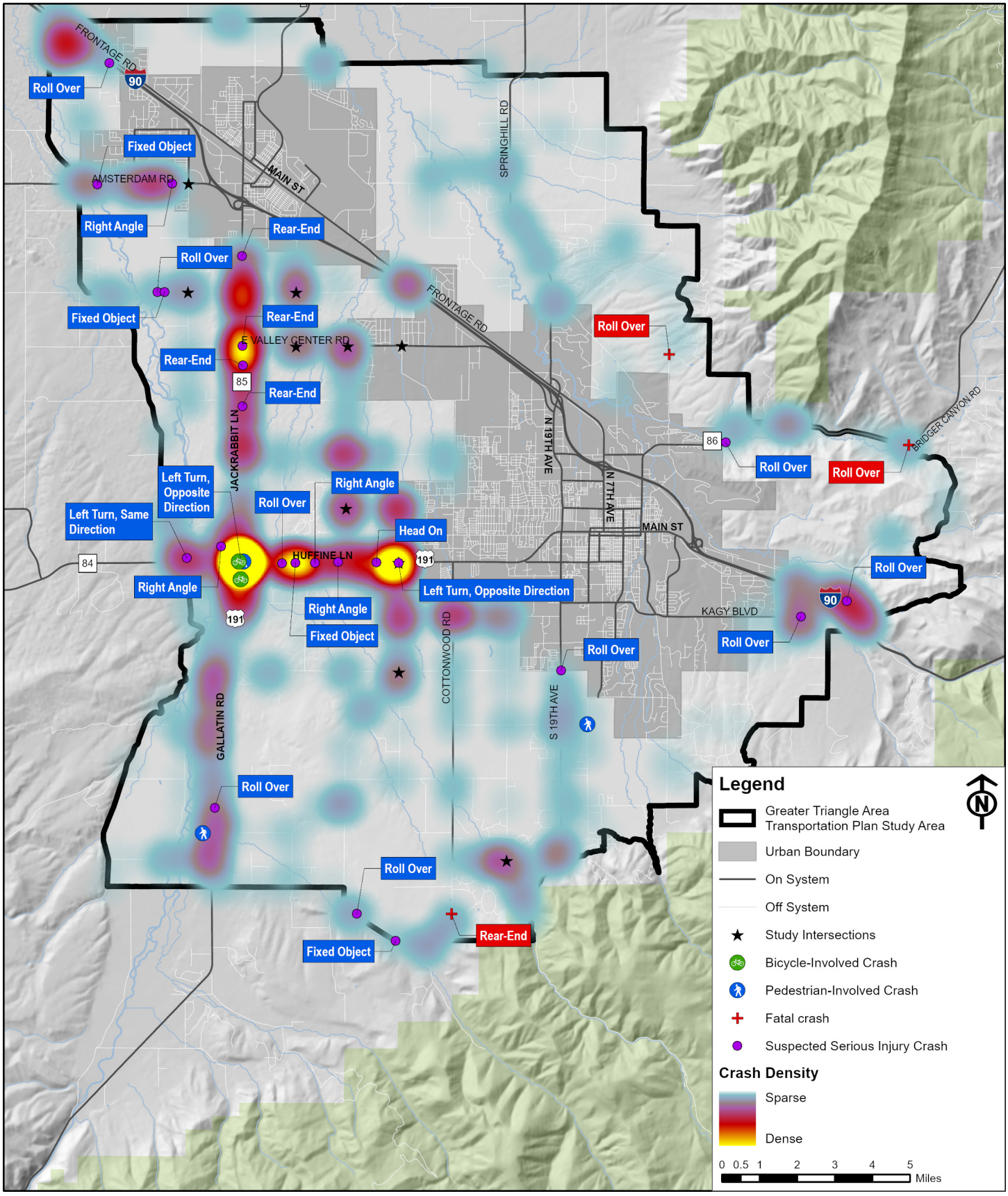
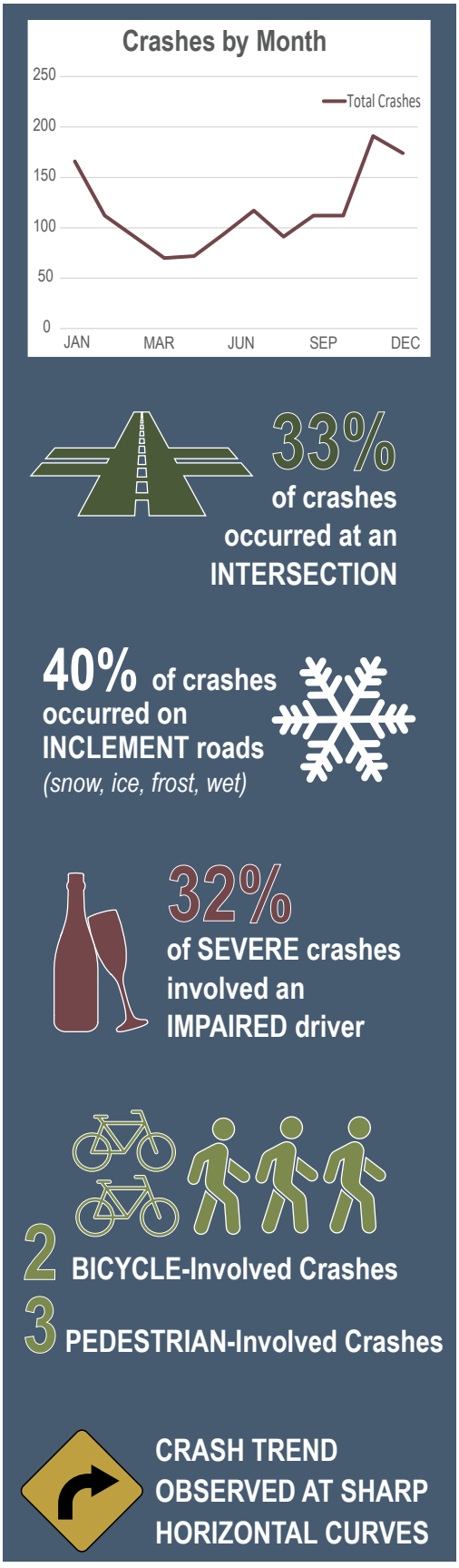


Figure 12: Crash Density



4.3.3. Crash Trends

Crash data within the study area were analyzed to determine problem areas, “hot-spot” crash locations, and behavioral characteristics. Observed crash trends and contributing factors are summarized below.

- **CRASH PERIOD:** There was an increase in crash occurrences between 7:00 and 9:00 AM (13 percent of crashes) and between 4:00 and 7:00 PM (24 percent of crashes). The highest number of crashes were reported during the winter months with another slight increase in crashes during the summer months.
- **CRASH TYPE:** The most common multi-vehicle crash types were rear-end and right angle crashes while the most common single-vehicle crash types were fixed object, rollover, and wild animal crashes.
- **CRASH LOCATION:** About 60 percent of crashes occurred at a non-junction and roughly 33 percent of crashes were at or related to an intersection. The greatest number of crashes occurred on non-interstate principal arterials where traffic volumes are greater. About 29 percent of the crashes occurred on local roads.
- **ENVIRONMENTAL CONDITIONS:** Crashes occurred most commonly on clear or cloudy days with dry roads and daylight. Approximately 40 percent of crashes occurred under inclement road conditions. About one-third of crashes occurred under dark lighting conditions.
- **IMPAIRMENT:** About one-third of severe crashes and 11 percent of all crashes involved an impaired driver.
- **VEHICLE TYPE:** Large trucks or buses were involved in about 3 percent of crashes while motorcycles were involved in less than 1 percent of crashes. There were 2 bicycle and 3 pedestrian crashes that occurred within the analysis period.
- **CRASH CLUSTERS:** Through spatial analysis, 13 intersections and segments of roadway experiencing higher numbers of crashes than anticipated were identified and analyzed for crash trends. Many of the crashes occurred on sharp horizontal curves.

Chapter 5: Growth, Travel Forecasts, and Needs

This chapter discusses the background and assumptions used to project growth in the triangle area to the year 2040. By using population, employment, and other socioeconomic trends as aids, the future transportation needs were projected. Information about future growth was used to allocate residential and employment development to project future conditions. An analysis of the projected transportation conditions was performed to estimate how traffic patterns and characteristics may change from existing conditions. Additional information pertaining to future forecasts and projected transportation conditions is provided in ***Appendices B*** *and* ***C****.*

GREATER TRIANGLE AREA TRANSPORTATION PLAN

5.1. FUTURE GROWTH AND DEVELOPMENT

Projections are estimates of various characteristics at future dates. They illustrate reasonable estimates of future conditions based on assumptions about current or expected trends. Population and employment projections, in the form of housing units and total jobs, are used to help predict future travel patterns and assess the performance of the transportation system. The projections are illustrated in **Figure 13**.

5.1.1. Population and Housing Projections

Population and housing totals are used to help determine where vehicle trips are originating within the study area. Residential growth is best represented by reporting housing units.

Gallatin County

Several sources of population projections for Gallatin County were examined to help understand potential growth within the county. These sources consisted of both published community planning documents and recognized sources for demographic projections. These projections are summarized in **Table 4**.

For purposes of the GTATP, the moderate growth projection (2.5 percent) from the *Gallatin County Growth Policy* was selected as the preferred population growth rate for the county. Input from the county suggests that population growth has historically outpaced projections and, therefore, a higher growth rate is preferred.

Greater Triangle Study Area

The share of the population living within the transportation plan study area was estimated using 2010 census population data. GIS analysis was used to identify the total population within all census blocks entirely within or crossed by the study area boundary. The census blocks within the Bozeman TMP and Belgrade LRTP boundaries were excluded from the analysis. This analysis established the triangle study area population to be 8,008 in 2010, accounting for about 9 percent of the county's total population.

The 2010 population totals were then increased to represent 2020 baseline conditions using the population estimate for Gallatin County provided by Woods & Poole Economics, Inc. (W&P) as well as the percent distribution of the county's population within

Table 4: Gallatin County Population Projections

Estimate or Projection Source	2010	2020	2030	2040	CAGR*
Greater Bozeman Area Transportation Plan *(2007)*					
Low Growth Projection	84,935	100,037	117,824	138,774**	1.65%
Moderate Growth Projection	87,406	109,023	135,986	169,618**	2.23%
High Growth Projection	90,727	121,930	163,863	220,218**	3.00%
Bozeman TMP *(2017)*	89,513	--	--	176,191	2.28%
Belgrade LRTP *(W&P Obtained in 2017)*	89,513	113,574	--	177,477	2.31%
Bozeman Community Plan *(EPS Obtained in 2018)*	89,631	111,741	133,081	151,228	1.76%
eREMI Model *(2019)*	89,603	120,342	149,582	163,460	2.02%
W&P *(Obtained in 2020)*	89,603	113,224	132,129	151,497	1.77%
U.S. Census Bureau Vintage 2020 Estimates* **	89,513	116,806	--	198,895**	2.70%
Gallatin County Growth Policy *(2021)*					
Low Growth Projection	89,513	111,876	133,100	151,200	1.76%
Moderate Growth Projection	89,513	114,584	146,677	187,760	2.50%
High Growth Projection	89,513	120,298	161,670	217,272	3.00%
Greater Triangle Area Transportation Plan	**89,513**	**114,584**	**146,667**	**187,760**	**2.50%**

** CAGR calculated using 2010 population totals and latest future population projections.*
***Estimated using CAGR applied to latest available population estimate.*
**** The Population Estimates Program revises and updates its series of population estimates from April 1 to July 1 of the current year (vintage year). The population estimate at any given time point starts with a population base (the last census or the previous point in the series), adds births, subtracts deaths, and adds net migration (international and domestic). Data accessed May 4, 2021.*

the study area (9 percent). Using the 2.5 percent growth rate, the 2020 baseline conditions were projected forward to 2040. **Table 5** shows the projected population of the study area through the year 2040, which is forecasted to be nearly 17,000 residents.

Housing units distribute people throughout the roadway network to their desired destinations. They represent the population and act as a hub for traffic within the network. According to the 2010 census, Gallatin County had 89,513 residents distributed among 42,289 housing units. Within the study area, GIS analysis shows a population of 8,008 distributed among 3,408 housing units. The number of occupants per housing unit under baseline conditions is 2.12 and 2.35, respectively, for Gallatin County and the study area.

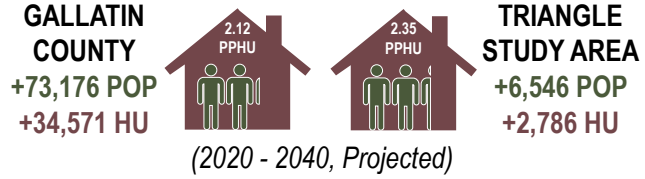
The number of housing units for the 2020 baseline condition and 2040 projection were calculated using the population totals discussed previously and the occupancy factors from the 2010 census. This results in a total of 88,704 housing units, an increase of 34,571 from 2020. For the study area, an increase of 2,786 housing units is projected from 2020 to 2040.

Table 5 provides the population and housing unit projections for the study area. For reference, the population and housing unit totals from the Bozeman TMP and Belgrade LRTP have also been provided. According to the 2010 census, the Bozeman and Belgrade areas accounted for about 56 and 17 percent of the Gallatin County's population, respectively. Identifying both the amount and the location of Bozeman and Belgrade growth can help provide a greater understanding of travel characteristics within the greater triangle study area.

Table 5: 2040 Population and Housing Projections

Area	2010 *(Census)*	2020 *(Baseline)*	2040 *(2.5% Growth)*	Net Change *(2020-2040)*
GALLATIN COUNTY TOTAL				
Population	89,513	114,584	187,760	73,176
Housing Units	42,289	54,133	88,704	34,571
			Population per Housing Unit	*2.12*
GREATER TRIANGLE STUDY AREA*				
Population	8,008	13,553	16,797	6,546
Housing Units	3,408	5,768	7,149	2,786
			Population per Housing Unit	*2.35*
BELGRADE LRTP STUDY AREA				
Population	15,722	20,125	32,978	12,853
Housing Units	6,373	8,158	13,368	5,210
			Population per Housing Unit	*2.47*
BOZEMAN TMP STUDY AREA				
Population	49,814	63,766	104,488	40,722
Housing Units	22,783	29,164	47,789	18,625
			Population per Housing Unit	*2.19*
OUTSIDE STUDY AREAS**				
Population	15,969	20,442	33,496	13,055
Housing Units	9,725	12,449	20,399	7,950
			Population per Housing Unit	*1.64*

** The Greater Triangle Study Area projections exclude the population and housing units within the Belgrade LRTP and Bozeman TMP boundaries.*
*** The Outside Study Areas projection includes all areas within Gallatin County except those areas that are within the Bozeman TMP, Belgrade LRTP, and triangle study areas.*



5.1.2. Employment Projections

Employment numbers are used to help determine where vehicle traffic is distributed within the roadway network. Places with high levels of employment will tend to generate high levels of vehicle traffic.

Gallatin County

Several sources of employment projections for Gallatin County were examined to help understand potential growth within the county. **Table 6** presents available employment data for Gallatin County over the 2010 to 2040 period. All of the projections clearly suggest Gallatin County will continue to see steady and significant job growth in the future.

Table 6: Gallatin County Employment Projections

Source	2010	2019	2020	2040	CAGR[1]
W&P *(Obtained in 2020)*	65,353	89,661	91,746	139,639	2.56%
W&P *(Obtained in 2017)*	65,399	86,651	88,706	133,962	2.42%
Economic Profile System (EPS) *(Obtained in 2018)*	65,399	--	85,597	115,845	1.92%
U.S. Bureau of Economic Analysis	65,353	92,248	--	206,175[2]	3.90%
Montana Department of Labor & Industry	50,768	68,760	--	139,554[2]	3.43%
GTATP	**65,353**	**89,661**	**91,746**	**139,639**	**2.56%**

[1] CAGR calculated using 2010 employment totals and latest projections.
[2] Estimated using CAGR applied to latest employment estimate.

For the purposes of the GTATP, the W&P projection obtained in 2020 was selected as the preferred employment projection for Gallatin County. The projections predict about 140,000 jobs in 2040 which translates into a 2.56 percent growth rate. This aligns well with the growth rate used for population projections (2.5 percent).

Greater Triangle Study Area

The total employment within the study area was extracted from a travel demand model (TDM) developed by MDT in 2014. Similar to the process followed to establish baseline population data, GIS analysis was used to identify the total employment within all census blocks entirely within or crossed by the study area boundary. This analysis found that about 8 percent of the total employment in the county occurred within the triangle study area in 2014.

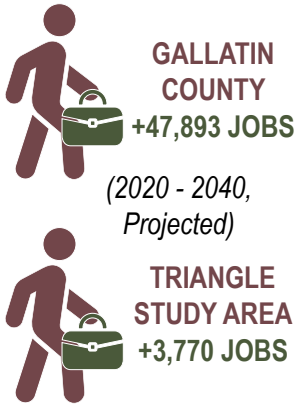
Again, 2020 baseline conditions were established. The current W&P employment estimate for Gallatin County was used to represent the total jobs in the county for the base year (2020). The proportions of jobs within each of the study areas from MDT's 2014 TDM was held constant to establish baseline conditions.

Table 7 presents employment projections for the year 2040 using the 2020 W&P projections. Future employment was projected using the 2.56 percent growth rate resulting in 139,639 jobs by the year 2040. A total of 3,770 new jobs is predicted to occur within the study area under these assumptions.

Table 7: 2040 Employment Projections

Area	2014 Jobs *(From TDM)*	% of County Jobs *(2014)*	2020 *(Baseline)*	2040 *(2.56%)*	Net Change *(2020-2040)*
Gallatin County	61,163	100%	91,746	139,639	47,893
Greater Triangle Study Area*	4,814	8%	7,221	10,991	3,770
Belgrade LRTP Study Area	7,175	12%	10,763	16,381	5,618
Bozeman TMP Study Area	38,387	63%	57,581	87,640	30,059
Outside Study Areas**	10,787	18%	16,181	24,627	8,447

** The Greater Triangle Study Area projections exclude the population and housing units within the Belgrade LRTP and Bozeman TMP boundaries.*
*** The Outside Study Areas projections include all areas within Gallatin County except those areas that are within the Bozeman TMP, Belgrade LRTP, and triangle study areas.*



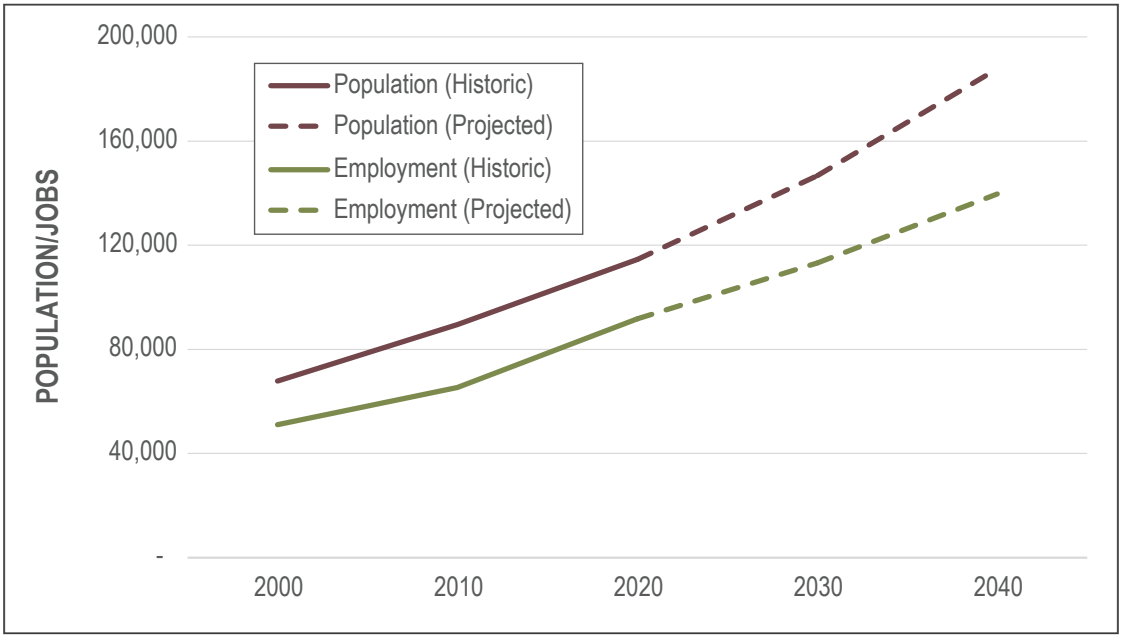


Figure 13: Population and Job Growth

5.2. PROJECTED TRANSPORTATION CONDITIONS

An analysis of the projected transportation system was performed to estimate how existing traffic patterns and characteristics may change in the future. The inputs for this analysis include the 2020 baseline conditions and the 2040 housing and employment forecasts for the GTATP, Bozeman, and Belgrade study areas. Anticipated housing and employment growth was allocated within the triangle area based on input from the AC as well as a review of existing land use and zoning maps for the county, growth policies, and other community planning documents. These projections were used to predict future traffic volumes on the roadways within the study area.

The following sections provide a description of the forecasting effort that was conducted to predict future travel conditions. The intent of this effort was to identify areas of the transportation system where growth and congestion may occur due to anticipated development.

5.2.1. Projected Development

To forecast 2040 future conditions, the planning team developed future socioeconomic projections for housing and employment, as discussed previously. The growth was then allocated within the GTATP forecasting area based on input from the AC as well as a review of existing county planning documents. The allocations were then combined with the future growth forecasts developed for the Bozeman TMP and Belgrade LRTP. An aggregate of the growth within the rural areas of the GTATP study area is shown in **Figure 14**. For simplicity, the areas are generalized and grouped into three categories defined as follows.

- **HIGH DENSITY GROWTH:** Dense commercial and mixed-use business parks and multi-level residential buildings with large numbers of units such as apartment buildings.
- **MODERATE DENSITY GROWTH:** Small retail and service businesses frequently required by neighborhood residents and residential buildings with a small number of units such as townhomes and condominiums.
- **LOW DENSITY GROWTH:** Small businesses with few employees and residential areas occupied primarily by single family homes with large lot sizes.

5.2.2. Projected Traffic Volume Growth

To visualize where growth is projected to occur within the GTATP study area, and to aid in the planning process, a map of the projected traffic volume growth on the transportation network was prepared. **Figure 14** shows where high traffic growth is expected to occur given the future land use assumptions made for the GTATP, Bozeman TMP, and Belgrade LRTP.

The corridor growth shown on the map is intended to represent additional traffic that could be added to the existing network should development occur in the manner projected. This visualization helps identify which roads may need additional investment to accommodate growth. While some roads currently have low traffic volumes and do not currently have capacity issues, future growth may greatly increase traffic volumes and could cause capacity issues if road improvements are not made. The following descriptions explain the corridor growth categories.

- **HIGH GROWTH:** Higher density developments are anticipated to occur near the corridor and are expected to have greater impacts on the adjacent transportation facilities.
- **MODERATE GROWTH:** A mix of both high- and low-density developments is anticipated near the corridor. Moderate impacts to the adjacent transportation system are anticipated.
- **LOW GROWTH:** Lower density developments are anticipated to occur near the corridor. Minimal impacts to the adjacent transportation system are anticipated.

As shown in **Figure 14,** high residential growth is anticipated near the Belgrade and Bozeman urban boundaries. High commercial growth is projected to occur along the major highways in the study area such as Jackrabbit Lane and Huffine Lane. Moderate growth is anticipated in the Four Corners and Gallatin Gateway areas, while low growth is anticipated to occur in the more rural areas. If development occurs in the manner projected, this growth is anticipated to have a high impact on the transportation system, especially on the corridors connecting the Belgrade and Bozeman areas.

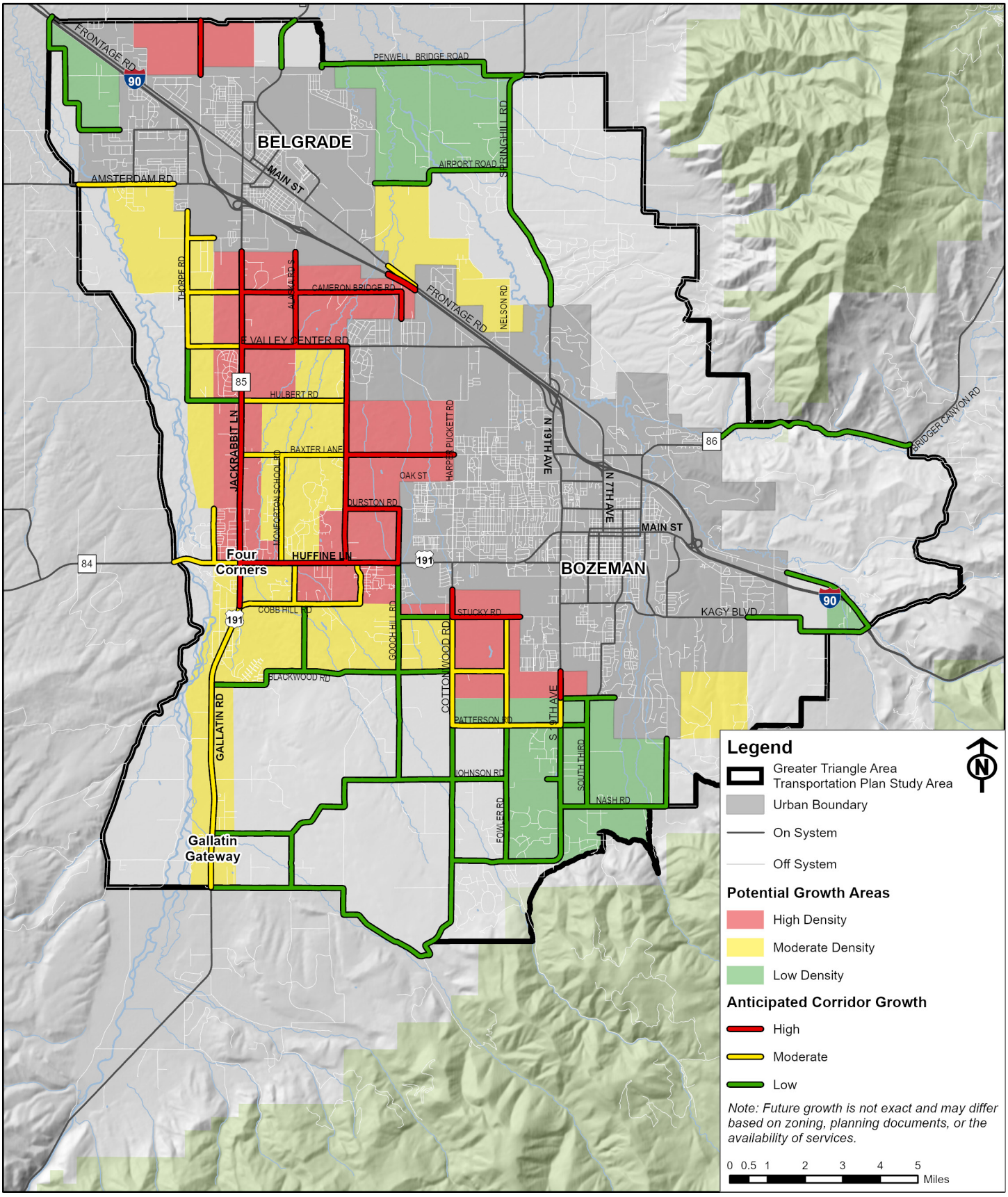


Figure 14: Anticipated Growth

Corridors anticipated to experience high growth include Jackrabbit Lane, Huffine Lane, East Valley Center Road, South Alaska Road, Cameron Bridge Road, Love Lane, Baxter Lane, and Durston Road. Other high growth corridors located on the perimeters of the urban boundaries include Stucky Road, Bollinger Road, Cottonwood Road, and South 19th Avenue.

As growth continues south and west of the urban areas, into Four Corners, Gallatin Gateway, Amsterdam, and Manhattan, there are several corridors that can be expected to experience low to moderate traffic growth. These corridors include Blackwood Road, Gooch Hill Road, Beatty Road, Fowler Lane, Johnson Road, Thorpe Road, and Amsterdam Road. Less growth is anticipated to occur north and east of the study area.

5.2.3. Projected Intersection Operations

Projections for intersection traffic operations were made for the 10 intersections analyzed previously in **Section 4.2.2**. These projections were based on the projected population growth rate, 2.5 percent, determined previously in **Section 5.1**. The growth rate was applied to each intersection as a whole. The results of this analysis are presented in **Figure 15**. Detailed results for the intersections are provided in **Appendix C**.

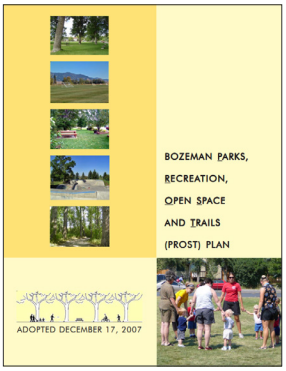
All but two of the study intersections are projected to operate with poor LOS during one or more peak hour. The South 19th Avenue/Fowler Lane and Gooch Hill Road/Blackwood Road intersections are both projected to operate at LOS B and C during all peak hours. Contrarily, the Love Lane/Durston Road, East Valley Center Road /Love Lane, and East Valley Center Road/ South Alaska Road intersections demonstrate failing (LOS F) intersection operations during all projected peak hours. The remaining five intersections are projected to operate under poor to failing conditions during one or more peak hour.

Note that traffic growth may not follow the same trend as the projected population growth, especially in areas where dense development could potentially occur. Likewise, revised intersection configurations, changes in travel patterns and traffic volumes, and new development could influence intersection operations. The LOS values presented in **Figure 15** are intended to provide an estimate for planning purposes. Intersections should be reevaluated as development occurs and when improvements are needed.

5.2.4. Projected Multimodal Growth

It is important to also consider the future needs of multimodal transportation users including bicyclists, pedestrians, and transit riders. As the triangle area population continues to grow, there will likely be an increased demand for facilities and services to accommodate these users. Increased use of these transportation modes may contribute to a shift in mode share and have an impact on future roadway performance in the triangle area. The following sections summarize projected needs for multimodal users from other planning documents.

Bicycle and Pedestrian Growth



The *Bozeman PROST (Parks, Recreation, Open Space, and Trails) Plan*[5] states that the city should aim to provide 1.5 miles of trail per 1,000 people. By applying this recommended service standard to the 2040 population projection for the greater triangle study area (16,797 residents), approximately 25 miles of trails and paths will be needed in the triangle area by 2040, including existing trails and paths. Note, this value does not include the population or facilities within the Bozeman and Belgrade urban boundaries.

The *Belgrade Parks and Recreation Master Plan*[6] provides recommendations for future bicycle and pedestrian recreational facilities over the next 10 years. To accommodate future growth, facilitate regional non-motorized travel, and provide recreational access, trails and shared use paths connecting to the Gallatin River, Madison River, Bridger Mountain trailheads, and nearby communities (Four Corners, Manhattan, and Bozeman) are proposed. The plan also discusses the Great American Rail Trail, (proposed to run from Washington D.C. to the state of Washington), which is currently planned to go through the Bozeman/ Belgrade areas but the exact route is not finalized. Collaboration with community partners suggest a route

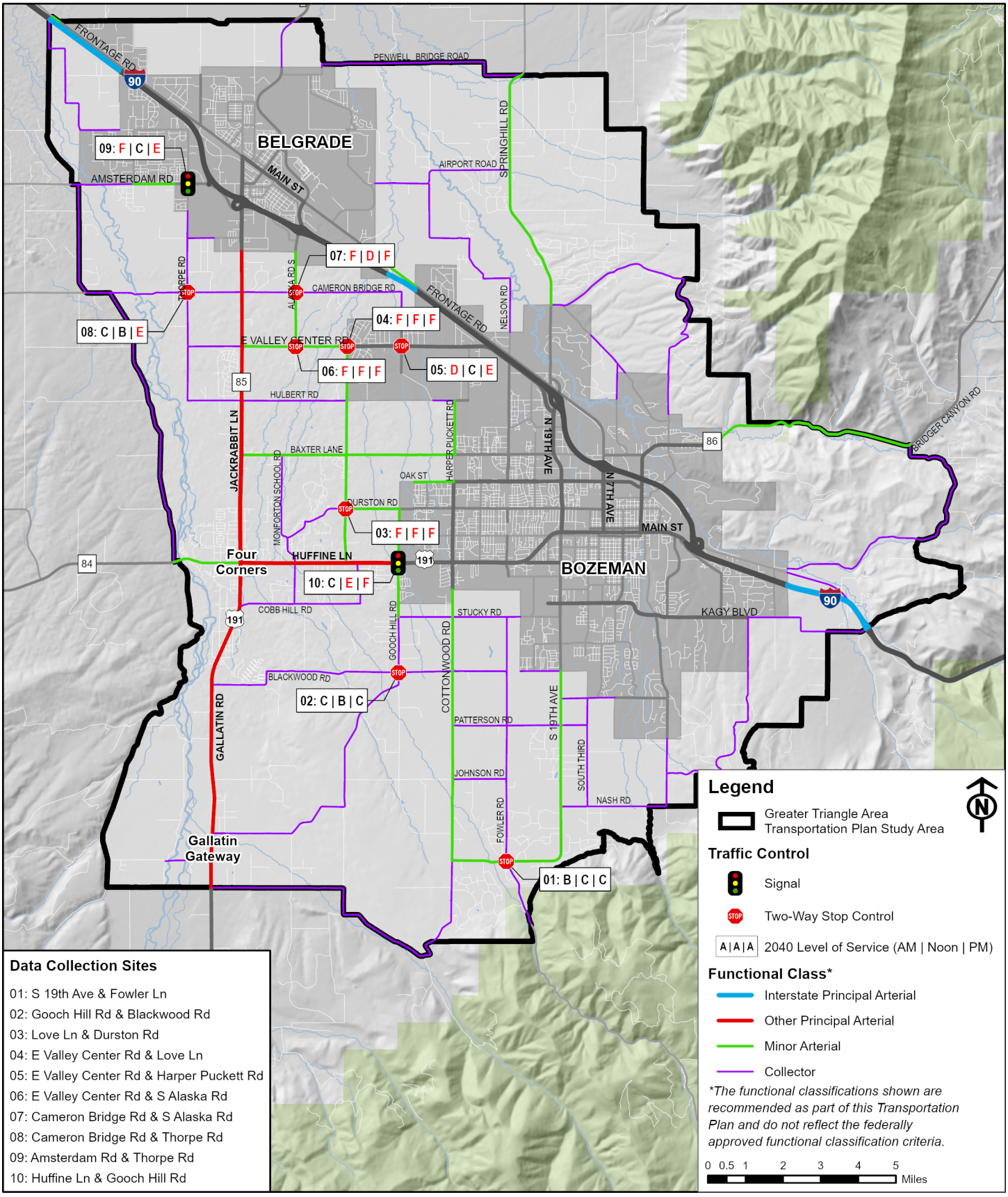


Figure 15: Projected Intersection Operations

along Jackrabbit Lane to Amsterdam Road towards the Gallatin River, heading north.

The *Triangle Trails Plan* serves as an extension and complement to the existing Bozeman and Belgrade parks and recreation plans discussed previously, ensuring future trail development and connectivity within the triangle area. The plan recognizes that a coordinated effort between Gallatin County, Bozeman, Belgrade, stakeholders, and private landowners and developers will be needed to complete and maintain the proposed bicycle and pedestrian networks. The future network should connect neighborhoods to destinations such as schools, employment and shopping centers, recreation opportunities, public transit, and other services. The proposed network is based on anticipated future growth patterns, although changes may be needed if growth is realized in a manner different from what is anticipated.

Transit Growth

The Streamline *Transit Development Plan*[7] (TDP) used the most recent version of the Bozeman TDM to generate 2040 population and employment projections to determine future transit needs. The model found that population density is expected to increase most notably along the west and south boundaries of Bozeman, as well as in the core of Belgrade and just west of Belgrade. Modest job growth is projected for Belgrade, but the vast majority of growth is expected to occur on the outer edges of the City of Bozeman. These changes may warrant additional service investment in Belgrade, the west side of Bozeman, and between the two cities.

The TDP notes that the combination of fast job growth and a growing share of the population in the retirement age bracket has led to very low levels of unemployment in Gallatin County in recent years. Transit service should be developed around market demand and the travel patterns of the labor market, students, and retirees must all be considered, especially as students and retirees will continue to make up such a large share of the population of the Streamline service area.

Additionally, the need for transit service to the Bozeman-Yellowstone International Airport is discussed briefly in the TDP. Although service to the airport on Route D is not recommended in the short term due to convenience and timing, the long-term plan suggests that Streamline could serve the airport once the route begins operating seven days per week. However, it is recommended that Route D would only serve the airport in one direction (toward Belgrade in the morning and toward Bozeman in the evening) to maintain connections with other routes and maintain a 60-minute frequency.

The *US 191 Corridor Study*[8] discusses the need for transit services from the airport. Specifically, the study discusses the need for service between the airport and Big Sky. While charter transportation services to shuttle seasonal visitors between the airport and Big Sky currently exist, more frequent service is desired. Although the airport currently does not allow fixed-route transit services, the possibility could be explored through future discussions. Skyline anticipates the need for five to six scheduled airport pick up times to transport visitors and residents between the airport and Big Sky.

The corridor study also discusses the need for increased transit service between Bozeman and Big Sky. With the continued growth in Big Sky, and the lack of affordable housing, more and more employees are expected to commute on a daily basis from the greater Bozeman area to Big Sky. To accommodate these passengers and offer more frequent service, Skyline anticipates the need for 18 roundtrip buses each day during the winter season, 8 roundtrip buses during the summer season, and 4 roundtrip buses during the shoulder seasons.

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Chapter 6:
Improving the System

Recommended improvements were developed through a combination of public process, project solicitation from partnering agencies, traffic engineering analysis of existing and projected conditions, and crash trend analysis. In most cases, the recommended projects are needed to bring roadways up to current standards, address existing operational concerns, improve safety, or meet anticipated traffic demands for the year 2040. Refer to ***Appendix D*** *for more detailed explanations of the recommendations.*

There are two categories of transportation improvement projects: facility recommendations and non-motorized network recommendations. Facility recommendations primarily address the needs of the vehicular network while the non-motorized network recommendations address the needs of pedestrians and bicyclists. These two categories are consistent with past transportation planning efforts completed for Gallatin County, Bozeman, and Belgrade.

Each of the following sections contains planning-level descriptions of the recommendations along with preliminary project cost estimates. Planning-level estimates include construction, design, construction administration, utilities and contingencies for heavily variable costs, such as right-of-way, utilities, and traffic management, which are unknown at this time. The cost estimates were developed based on recent projects constructed in the area. The costs are in 2022 dollars with no inflation factor for anticipated construction year. In some cases, it may be appropriate to combine project recommendations. For example, combining a project to construct on-street bicycle facilities with full roadway reconstruction may be more efficient than implementing the projects individually.

6.1. FACILITY RECOMMENDATIONS

A list of recommendations for facility improvements to the transportation system was developed to address current and anticipated future transportation needs. The project recommendations made as part of this transportation plan were specifically aimed at improving issues identified along the major street network. The recommendations are focused on areas currently experiencing issues, as well as areas expected to need improvements to accommodate future growth. **Figure 16** at the end of this section shows the location of the facility recommendations.

System deficiencies and needs are often not fundable in the foreseeable future. However, funding opportunities often arise over time and sometimes from unexpected sources. To be prepared to take advantage of such opportunities, the following lists of projects is provided. At this time, no funding sources have been committed and there is no schedule for construction/ implementation of the recommended projects. It is likely that some projects will become funded at some point during the planning horizon even though a current source may not be known.

6.1.1. Committed Projects

A project is deemed committed if construction is likely to occur within five years and a funding source has been identified and assigned to the project. Committed projects in the study area include improvements that improve traffic and safety, as well as maintenance projects to rehabilitate or replace deficient assets. **Table 8** lists the projects which are committed within the GTATP study area.

6.1.2. Transportation System Management (TSM) Improvements

Transportation System Management (TSM) projects are typically lower cost safety improvements, smaller intersection improvement projects, or planning studies that can typically be implemented within a few years. In some instances, these recommendations may

Table 8: Committed Projects

ID	Name	Description	Estimated Cost
COM-1	Turnbay – N of Gallatin Gateway	Install a two-way left-turn lane on US 191 between Gooch Hill Road and Zachariah Lane (MDT)	$2.7M
COM-2	SF 179 Durston Road Curves	Flatten curves on Durston Road between Westgate Avenue and Gooch Hill Road (MDT)	$1.5M
COM-3	Four Corners – East	Chip seal on Huffine Lane from Reference Post (RP) 81.9 to 88.1 (MDT)	$700,000
COM-4	SF189 D2 HT Median Cable Rail	Install high tension cable guardrail in the median on I-15 and I-90. Within the triangle area, on I-90 from RP 275 to 314 (MDT)	$11.2M
COM-5	I-90 Incident Management – Phase 1	Install advance warning devices on I-90 between Three Forks and Billings	$2.5M
COM-6	Airport Road – Hyalite/Middle Creek Bridge	Replace existing structure (Gallatin County)	$125,000
COM-7	Axtell Anceney Road – Gallatin River	Replace existing structure (MDT, Gallatin County)	$4.23M
COM-8	SF 189 Amsterdam Rd Intersection Improvements	Safety improvements and intersection upgrades on Amsterdam Road at the Green Belt Drive & River Rock Rd intersections (MDT, Gallatin County)	$600,000
COM-9	Cottonwood Road (Oak Street to Baxter Lane)	Extend Cottonwood Road from Oak Street to Baxter Lane with improvements to Cottonwood Road/Baxter Lane intersection	$8.1M
COM-10	S. 19th Avenue (Cottonwood Road to Cougar Drive)	Pavement rehabilitation (Gallatin County)	$80,000

be combined with larger-scale improvement projects. **Table 9** lists the TSM improvements that were identified to improve safety and operations within the greater triangle area and are not listed in any particular order with respect to priority. Some improvements discuss curve signing recommendations which are discussed in more detail in **Section 7.3**.

Table 9: Transportation System Management Improvements

ID	Name	Description	Estimated Cost
TSM-1	Blackwood Road (Beatty Road to Gooch Hill Road)	Curve signing upgrades	$1,600
TSM-2	Blackwood Road (Elk Grove Lane to Kimber Court)	Curve signing upgrades (short-term); curve flattening (long-term)	$1,400 (short-term); $2.3M (long-term)
TSM-3	Cameron Bridge Road (Powl Lane to Gallatin River)	Curve signing upgrades, widened shoulders, vegetation trimming, evaluate speed limit	$3,800 (signing); $2.3M (shoulder widening)
TSM-4	Cottonwood Road (Derek Way to Enders Road)	Curve signing upgrades	$7,500
TSM-5	Gooch Hill Road / Enders Road Intersection	Curve signing upgrades	$2,200
TSM-6	Gooch Hill Road / Gant Road S-Curves	Curve signing upgrades	$3,600
TSM-7	S. 19th Avenue (Balsam Drive to Hodgeman Canyon Drive)	Curve signing upgrades	$3,000
TSM-8	S. 19th Avenue (Fowler Road to Cougar Drive)	Curve signing upgrades, wild animal crossing signs	$3,200
TSM-9	Thorpe Road (Rottweiler Lane to Frontage Road)	Curve signing upgrades (short-term); curve flattening (long-term)	$5,700 (short-term); $5.9M (long-term)
TSM-10	Bozeman Trail Road (Mount Ellis Lane to Fort Ellis Road)	Curve signing upgrades (short-term); curve flattening (long-term)	$1,500 (short-term); $2.1M (long-term)
TSM-11	Weaver Road (Spooner Road to Bolinger Road)	Retroreflective tape (short-term); curve flattening with roadway improvements (long-term)	$100 (short-term); $1.1M (long-term)
TSM-12	Penwell Bridge Road / Stimson Lane Intersection	Reconfigure as a T-intersection	$170,000
TSM-13	S. 19th Avenue / Fowler Lane / Hyalite Canyon Road Intersection	Trim vegetation, overhead flashers, update advance signing, block/ remove parking area in northeast quadrant	$13,000
TSM-14	Love Lane / E. Valley Center Road Intersection	Evaluate intersection for additional traffic control	$1.9M (signal); $5.2M (roundabout)
TSM-15	Love Lane / Durston Road Intersection	Enhanced advance intersection warning (short-term); reconfigure intersection as a roundabout (long-term)	$6,700 (short-term); $6.1M (long-term)
TSM-16	S. Alaska Road / Cameron Bridge Road Intersection	Reconfigure intersection as a roundabout	$2.6M
TSM-17	S. Alaska Road / E. Valley Center Road Intersection	Evaluate intersection for additional traffic control	$1.8M (signal); $2.6M (roundabout)
TSM-18	Blackwood Road / Gooch Hill Road Intersection	Enhanced advance intersection warning	$3,700
TSM-19	Hulbert Road / Jackrabbit Lane Intersection	Signalize intersection when warranted	$420,000
TSM-20	Gallatin Road / Mill Street / Rabel Lane Intersection	Coordinate with MDT to install additional traffic control when warranted	$970,000
TSM-21	Gallatin Road / Cottonwood Road / Jays Way Intersection	Evaluate intersection for additional traffic control	$1.6M (signal); $5.0M (roundabout)
TSM-22	Amsterdam Road / Royal Road Intersection	Evaluate intersection for additional traffic control	$1.1M (signal); $2.2M (roundabout)
TSM-23	Transit Coordination	Coordinate with Streamline and Skyline to provide increased transit service to Four Corners, Gallatin Gateway, and other rural parts of the study area. Also consider coordination to provide expanded services to Big Sky, Bridger Bowl, the airport, and other high-use destinations. Consider infrastructure needs to accommodate increased services.	UNKNOWN
TSM-24	I-90 Corridor Study (Belgrade to Bozeman)	Complete a pre-NEPA/MEPA Corridor Planning Study	$225k - $275k

6.1.3. Major Street Network (MSN) Improvements

Major street network (MSN) projects are those that require substantial roadway reconstruction and are typically more expensive and may take many years to develop. The MSN improvements are envisioned as long-term improvements needed to address network demands and existing or projected capacity issues. **Table 10** lists the MSN improvements that were identified for the GTATP study area and are not listed in any particular order with respect to project priority.

Functional classification upgrades are needed to accommodate increasing traffic volumes and improve pavement condition.

Table 10: Major Street Network Improvements

ID	Name	Description	Estimated Cost
MSN-1	Cottonwood Road (Urban Boundary to S. 19th Avenue)	Reconstruct roadway to urban principal arterial standards between the Bozeman urban boundary and Goldenstein Lane, rural principal arterial standards south to Johnson Road, and rural minor arterial standards south to S. 19th Avenue	$31.0M
MSN-2	Love Lane (Huffine Lane to E. Valley Center Road)	Reconstruct roadway to urban principal arterial standards	$42.4M
MSN-3	S. Alaska Road (Frank Road to E. Valley Center Road)	Reconstruct roadway to urban minor arterial standards	$19.3M
MSN-4	Baxter Lane (Harper Puckett Road to Jackrabbit Lane)	Reconstruct roadway to urban minor arterial standards	$16.2M
MSN-5	Durston Road (Gooch Hill Road to Jackrabbit Lane)	Reconstruct roadway to urban minor arterial standards and complete connection between Parklands Trail and Jackrabbit Lane	$26.8M
MSN-6	Oak Street (Cottonwood Road to Love Lane)	Reconstruct roadway to urban principal arterial standards and complete connection between Forest Glen Drive and Love Lane	$22.0M
MSN-7	Hulbert Road (Love Lane to Jackrabbit Lane)	Reconstruct roadway to urban minor arterial standards	$18.1M
MSN-8	Hulbert Road (Harper Puckett Road to Love Lane)	Construct roadway to urban minor arterial standards	$18.6M
MSN-9	Cameron Bridge Road (S. Alaska Road to Jackrabbit Lane)	Reconstruct roadway to urban minor arterial standards	$10.1M
MSN-10	Cameron Bridge Road (Harper Puckett Road to S. Alaska Road)	Reconstruct roadway to urban minor arterial standards	$21.1M
MSN-11	Harper Puckett Road / Gooch Hill Road (Cameron Bridge Road to Durston Road)	Reconstruct roadway to urban minor arterial standards and complete connection between Durston Road and Harper Puckett Road	$32.7M
MSN-12	Gooch Hill Road (Durston Road to Huffine Lane)	Reconstruct roadway to urban minor arterial standards	$8.3M
MSN-13	Gooch Hill Road (Huffine Lane to Stucky Road)	Reconstruct roadway to urban minor arterial standards	$10.8M
MSN-14	Cottonwood Road (Oak Street to Hulbert Road)	Reconstruct roadway to urban principal arterial standards	$10.9M
MSN-15	Cobb Hill Road / Elk Lane (Gallatin Road to Red Mountain Drive)	Reconstruct roadway to urban minor arterial standards	$19.7M
MSN-16	Stucky Road (Gooch Hill Road to Elk Lane)	Extend Stucky Road between Gooch Hill Road and Elk Lane/Red Mountain Drive intersection as urban minor arterial	$9.3M
MSN-17	Stucky Road (S. 19th Avenue to Gooch Hill Road)	Reconstruct roadway to urban collector standards	$30.0M
MSN-18	S. 19th Avenue (Goldenstein Road to Hyalite Canyon Road)	Reconstruct roadway to rural principal arterial standards from Goldenstein Road to Johnson Road and rural minor arterial standards to Hyalite Canyon Road	$10.1M
MSN-19	Amsterdam Road (Royal Road to Thorpe Road)	Reconstruct roadway to urban minor arterial standards	$9.5M

6.1.4. Future Road Connections

The major street network consists of all interstate principal arterial, non-interstate principal arterial, minor arterial, and collector routes. Expansion of the major street network will occur in the future as the area develops. The future connections shown in **Figure 16** are conceptual in nature and may vary based on factors such as topography, wetlands, land ownership, and other unforeseen factors. The purpose of the connections is to illustrate the anticipated build-out of the major street network. It is likely that many of the corridors shown will not be developed into roads for many years to come. On the other hand, if development occurs in the area, the recommended road network will ensure that the arterial and collector roads will be established in a fashion that produces an efficient and logical future road system.

The future road connections are not intended as project recommendations, rather, they are intended to be built as development occurs and needs arise in the future. **Figure 16** shows the anticipated future road connections as dashed lines. Note, some of the future road connections extend into the Bozeman and Belgrade urban areas. These connections are shown as recommended in previous planning documents. Gallatin County has jurisdiction in all county areas outside of city boundaries and may be responsible for implementing these connections. Additional connections and/or changes to the future road connections may be necessary and should be assessed as future development occurs. A full visionary major street network is discussed in **Chapter 8**.

Extension of Durston Road is recommended to provide enhanced connectivity between Bozeman and Four Corners.

Table 11 contains the list of future road connections to complete the network over the foreseeable planning horizon. Some future roadways should be built to urban standards, while others may be constructed to rural design standards, as denoted in **Table 11** and shown later in **Figure 19**. Where applicable, references to relevant TSM or MSN projects that may be coordinated, or reliant on, future connections are also provided. Planning-level cost estimates are also presented in **Table 11**. Representative costs per mile were developed using recent roadway cost estimates. The estimates include design, construction, and contingencies for unknown factors. The basis of planning cost estimates for the future connections are as follows:

- Urban Collector - 2/3 Lane ($8.2M - $9.1M)
- Urban Minor Arterial – 2 Lane ($8.4M - $9.3M)
- Urban Minor Arterial – 3 Lane ($10.2M - $11.2M)
- Urban Principal Arterial – 4/5 Lane ($11.1M - $12.2M)
- Rural Collector ($2.5M - $2.7M)
- Rural Minor Arterial ($2.8M - $2.7M)
- Rural Principal Arterial ($3.1M - $3.4M)

Table 11: Future Connections

Road Segment	Begin	End	Project Reference (if applicable)	Approximate Length (ft)	Estimated Cost
Principal Arterials					
Bozeman Trail Road	Fort Ellis Road	Mount Ellis Road	--	3,500	$2.1M -$2.3M
Johnson Road	Fowler Avenue	Private Approach	--	4,050	$2.4M - $2.7M
Kagy Boulevard*	S. 19th Avenue	Cottonwood Road	--	9,400	$19.8M - $21.8M
Oak Street*	Forest Glen Road	Love Lane	MSN-6	6,500	$13.7M - $15.1M
Love Lane*	E. Valley Center Road	S. Alaska Road	TSM-14	13,050	$27.5M - $30.2M
Cottonwood Road*	Oak Street	Baxter Lane	COM-9	2,600	$5.5M - $6.1M
Minor Arterials					
Goldenstein Lane	Sourdough Road	Tayebeshockup Road	--	7,700	$4.1M - $4.6M
Goldenstein Lane*	Cottonwood Road	S. 19th Avenue	--	10,650	$17.0M - $18.8M

Road Segment	Begin	End	Project Reference (if applicable)	Approximate Length (ft)	Estimated Cost
Fowler Road*	Garfield Street	Stucky Road	--	4,000	$7.8M - $8.5M
Gooch Hill Road*	Durston Road	Hulbert Road	MSN-11	10,600	$16.9M - $18.7M
Hulbert Road*	Love Lane	Harper Puckett Road	MSN-8	8,450	$13.5M - $14.9M
Durston Road*	Parklands Trail	Monforton Drive	MSN-5	5,250	$8.4M - $9.3M
Love Lane*	Huffine Lane	Cobb Hill Road	--	4,000	$7.8M - $8.5M
Love Lane	Cobb Hill Road	Gooch Hill Road	--	11,900	$6.4M - $7.0M
Elk Lane*	Red Mountain Drive	Gooch Hill Road	MSN-16	4,200	$8.2M - $9.0M
Blackwood Road	Elk Grove Lane	Beatty Road	TSM-2	4,700	$2.5M - $2.8M
Zachariah Lane	Three Feathers Trail	Beatty Road/Law Road	--	4,000	$2.2M - $2.4M
Kent Spur Road	Gooch Hill Road	Enders Road	--	10,600	$5.7M - $6.3M
Collectors					
Fort Ellis Road	Southern Terminus	Goldenstein Road	--	2,700	$1.3M - $1.4M
Goldenstein Road	Tayebeshockup Road	Bear Canyon Road	--	12,850	$6.1M - $6.6M
Johnson Road	S. 19th Avenue	Sourdough Road	--	10,350	$5.0M - $5.3M
N/S Connector	Goldenstein Lane	Nash Road	--	10,650	$5.1M - $5.5M
S. 11th Avenue	Alder Creek Drive	Goldenstein Lane	--	4,050	$2.0M - $2.1M
Blackwood Road*	Fowler Avenue	S. 31st Avenue	--	1,350	$2.1M - $2.4M
Blackwood Road*	S. 3rd Avenue	Parkway Avenue	--	5,900	$9.2M - $10.2M
S. 27th Avenue*	Blackwood Road	Goldenstein Lane	--	2,650	$4.2M - $4.6M
S. 27th Avenue	Goldenstein Lane	Patterson Road	--	2,650	$1.3M - $1.4M
Sir Arthur Drive	Subdivision Access	Nash Road	--	5,500	$2.7M - $2.9M
Nash Road	S. 19th Avenue	Fowler Road	--	5,300	$2.6M - $2.8M
Ferguson Avenue*	Huffine Lane	Goldenstein Lane	--	13,250	$20.6M – 22.9M
Ferguson Avenue	Goldenstein Lane	Johnson Road	--	7,950	$3.8M - $4.1M
Graf Street*	S. 27th Avenue	Cottonwood Road	--	7,950	$12.4M - $13.8M
Babcock Street*	Gooch Hill Road	Love Lane	--	5,250	$8.2M - $9.1M
Laurel Parkway*	Oak Street	Hulbert Road	--	7,950	$12.4M - $13.8M
Cattail Street*	Cottonwood Road	Private Approach	--	8,450	$13.2M - $14.6M
Cattail Street*	Love Lane	Jackrabbit Lane	--	10,200	$15.9M - $17.6M
S. Alaska Road*	E. Valley Center Road	Baxter Lane	TSM-17	10,900	$17.0M - $18.8M
Zoot Way	Durston Road	Hulbert Road	--	10,600	$5.1M - $5.5M
Baxter Lane	Private Approach	Zoot Way	--	1,300	$620k - $670k
Thorpe Road	Rottweiler Lane	Thorpe Road	TSM-9	11,100	$5.3M - $5.7M
Patterson Road	Cottonwood Road	Gallatin Road	--	23,750	$11.3M - $12.2M
Chapman Road	Johnson Road	Kent Spur Road	--	10,600	$5.1M - $5.5M
Pasha Lane	Vandyke Road	Enders Road	--	7,950	$3.8M - $4.1M
Beatty Road	Blackwood Road	Gooch Hill Road	--	16,400	$7.8M -$8.4M
Dollar Drive*	Terminus	Jetway Drive	--	8,050	$12.6M - $13.9M
Unnamed Road	Nelson Road	Frontage Road	--	5,800	$2.8M - $3.0M
Unnamed Road	Nelson Road	Dollar Drive	--	5,550	$2.7M - $2.9M

**Denotes roadway segment recommended to be constructed to urban design standards.*

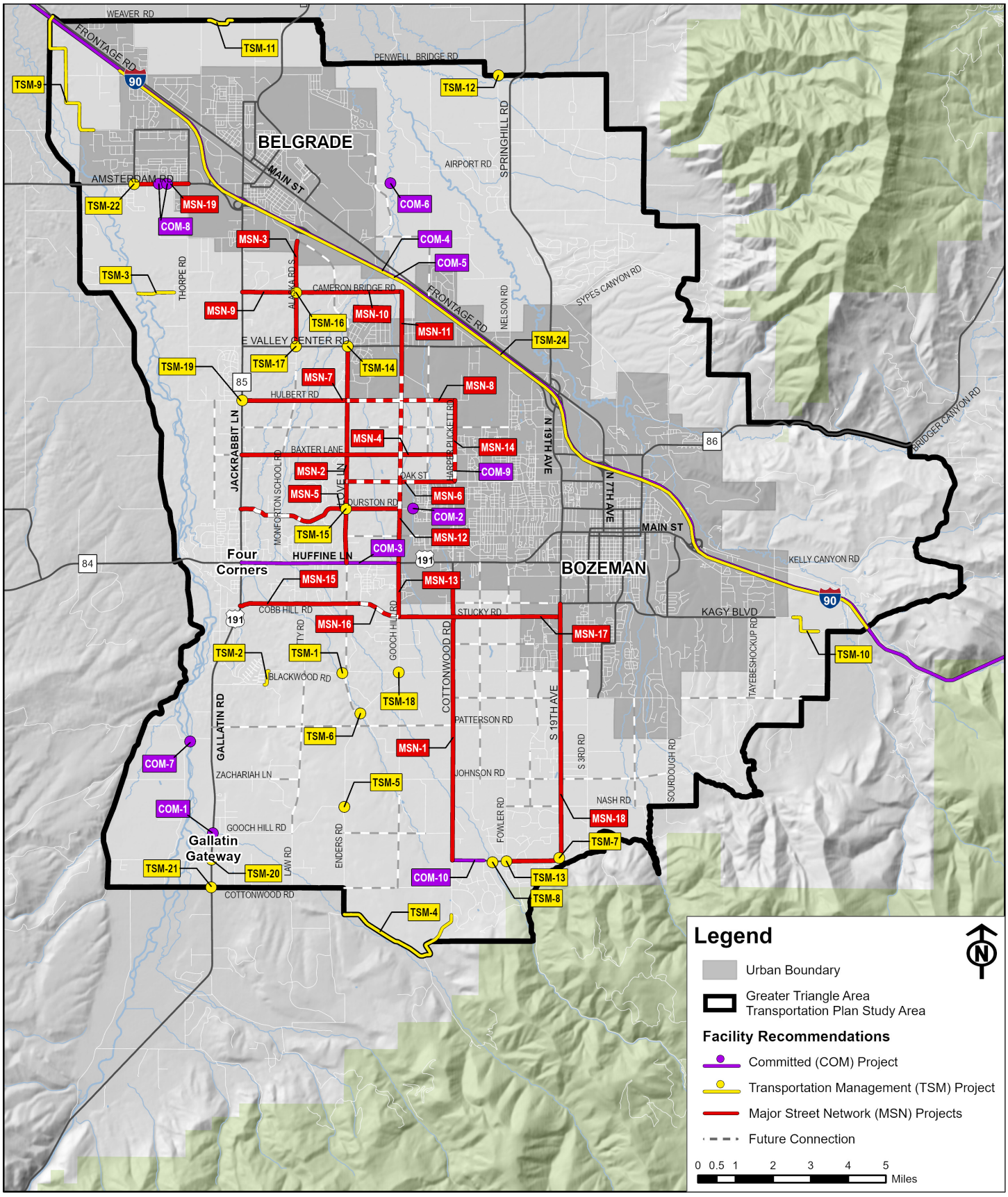


Figure 16: Facility Recommendations

6.2. NON-MOTORIZED NETWORK RECOMMENDATIONS

This section presents recommendations for non-motorized network improvements. While many non-motorized facilities are likely to be constructed in conjunction with other transportation projects, some may be completed as stand-alone projects. Some improvements are specific to either pedestrians or bicycles, others may benefit many transportation modes. The identified recommendations are intended to address previously identified gaps in connectivity and are meant to compliment the major street network. All non-motorized recommendations are illustrated in **Figure 17**.

Funding for the recommended non-motorized improvements will likely come from primarily local and private funding sources. It is recommended that non-motorized facilities be implemented in coordination with future development in the study area. For non-motorized facilities located on state facilities, other federal and state funding sources may apply. At this time, no funding sources have been committed and there is no schedule for construction/implementation of the recommended projects. It is likely that some projects will become funded during the planning horizon even though a current source may not be known.

6.2.1. E-Bikes, E-Scooters, and Other Mobility Devices

Electric bikes (e-bikes), electric scooters (e-scooters), and other electrically assisted mobility devices are becoming more common for utilitarian and mobility purposes. Policies and regulations pertaining to these devices, however, are not well defined. Under 23 U.S. Code § 217(h), motorized vehicles are not permitted on trails or pedestrian walkways with the exception of motorized wheelchairs and e-bikes (if permitted by state or local regulations). Additionally, e-scooters are not permitted on trails and pedestrian walkways funded with federal funds. Montana state law [MCA 61-8-102 (2)(g)] defines, but does not regulate, the use the e-bikes on trails or walkways but states that e-scooters are illegal to ride on sidewalks within the state. At the time of writing, no local laws exist pertaining to e-bikes, e-scooters, or other mobility devices.

People with disabilities use many kinds of devices for mobility, including power wheelchairs, e-bikes, e-scooters, segways, and golf carts. Under Title II of ADA, individuals with mobility disabilities must be permitted to use wheelchairs and manually powered aids in any areas open to pedestrians. Additionally, public and private entities must make reasonable modifications in their policies, practices, or procedures to permit individuals with mobility disabilities to use other power-driven mobility devices unless the entity can demonstrate that the device(s) cannot be operated in accordance with legitimate safety requirements.

When planning, building, and operating the non-motorized network, consideration should be given to how these emerging transportation modes will be accommodated and how potential user conflicts can be mitigated. It is recommended that Gallatin County and the Cities of Belgrade and Bozeman develop unified standards and policies for the use of e-bikes, e-scooters, and other mobility devices in order to create consistent expectations and enhance safety through the non-motorized network.

6.2.2. Shared Use Paths

Shared use paths are typically asphalt paved paths that restrict use to non-motorized travel modes. Both pedestrians and bicyclists may use these paths. Given the mixed environment, it is recommended that the paths be a minimum of 10-feet in width. These paths generally, but are not required to, run parallel to existing motorized transportation facilities. **Table 12** lists the shared use paths identified to provide non-motorized connections within the triangle area. Projects are not listed in any particular order with respect to priority.

Note that any shared use paths constructed within MDT right-of-way is subject to all existing MDT policies including, but not limited to, *POL 8.03.001 Shared Use Paths In MDT R/W.*

Separated shared use paths can be constructed adjacent to rural roadways to safely accommodate pedestrians and bicyclists.

Table 12: Shared Use Paths

ID	Name	Description	Approximate Length (ft)	Estimated Cost
SUP-1	Gallatin Road (Four Corners to Gallatin Gateway)	Extend the existing shared use path from Zachariah Lane to the Four Corners intersection (Huffine Lane) and from Mill Street to Cottonwood Road	22,200	$2.3M - $3.8M
SUP-2	Huffine Lane (Monforton Drive to Love Lane)	Extend the existing shared use path from Monforton Drive to Love Lane. Path could be built on one or both sides of Huffine Lane depending on funding availability and safety needs.	6,350 (one side) 12,700 (two sides)	$700k - $1.1M (one side) $1.3M - $2.2M (two sides)
SUP-3	Huffine Lane (Love Lane to Fowler Avenue)	Extend the existing shared use path from Fowler Avenue to Love Lane. Path could be built on one or both sides of Huffine Lane depending on funding availability and safety needs. (Some segments between Fowler Avenue and Advance Drive have already been completed with development.)	11,050 (one side) 25,450 (two sides)	$1.2M - $1.9M (one side) $2.6M - $4.3M (two sides)
SUP-4	Love Lane (Huffine Lane to E. Valley Center Road)	Install a shared use path adjacent to Love Lane	21,120	$2.2M - $3.6M
SUP-5	Baxter Lane (Love Lane to Harper Puckett Road)	Install a shared use path adjacent to Baxter Lane	10,560	$1.1M - $1.8M
SUP-6	Baxter Lane (Love Lane to Jackrabbit Lane)	Install a shared use path adjacent to Baxter Lane	10,200	$1.1M - $1.8M
SUP-7	Durston Road (Black Bull to the Lakes Subdivision)	Extend the existing facilities between the Black Bull and Lakes Subdivisions	9,250	$1.0M - $1.6M
SUP-8	Oak Street (Cottonwood Road to Love Lane)	Extend existing shared use path from Cottonwood Road to Love Lane when future connection is completed	10,560	$1.1M - $1.8M
SUP-9	S. Alaska Road (E. Valley Center Road to Frank Road)	Construct a shared use path along roadway	10,300	$1.1M - $1.8M
SUP-10	S. 19th Avenue (Cougar Drive to Hyalite Canyon Road)	Extend the existing shared use path from Cougar Drive to Hyalite Canyon Road	2,250	$300k - $400k
SUP-11	S. 19th Avenue (Hyalite Canyon Road to Kirk Hill Trailhead)	Construct a shared use path from Hyalite Canyon Road to Kirk Hill Trailhead	5,280	$600k - $900k
SUP-12	S. 19th Avenue (Kirk Hill Trailhead to Nash Road)	Construct a shared use path from Kirk Hill Trailhead to Nash Road	5,100	$600k - $900k
SUP-13	S. 19th Avenue (Nash Road to Kagy Boulevard)	Construct a shared use path from Nash Road to Kagy Boulevard	19,800	$2.0M - $3.4M
SUP-14	Cottonwood Road (Loyal Drive to Anderson School)	Extend the existing shared use path from Loyal Drive to Anderson School	23,760	$2.4M - $4.0M
SUP-15	Amsterdam Road (Royal Road to Fishing Access)	Extend the existing shared use path from Royal Road to Erwin Bridge Fishing Access Site	3,550	$400k - $600k
SUP-16	Monforton School Road (Baxter Lane to Monforton School)	Install a shared use path adjacent to Monforton School Road	7,920	$800k - $1.4M
SUP-17	Frontage Road (Airway Boulevards to I-90 WB On/Off Ramp)	Construct a shared use path along the north side of Frontage Road between Belgrade and Bozeman	31,680	$3.2M - $5.3M

6.2.3. On-Street Bicycle Facilities

On-street bicycle facilities help to improve safety and mobility for bicycle users. On-street facilities may consist of formal, striped/signed bicycle lanes or widened roadway shoulders. Generally speaking, bicycle lanes should be provided in urban settings where curb and gutter is present along the roadway. In rural settings, on roadways with lower traffic volumes, widened roadway shoulders can offer many of the same benefits of bike lanes without the same level of infrastructure cost associated with striping and signing of bike lanes.

The minimum width for a bike lane is four feet for roadways without curb and gutter and/or on-street parking. For all other roadways, the recommended bike lane width is five feet. Bike lanes should be constructed in both directions along the listed route. Additional care must be given to intersection treatments for bicycle lanes due to the possible conflict points between bicyclists and motorists.

For widened shoulders used as bicycle facilities, the usable shoulder width (paved area outside of rumble strips) should be a minimum of four feet wide. When possible, greater widths are desirable to allow side-by-side riding or passing maneuvers and increase user comfort, especially on higher speed and higher volume roadways (reference **Section 7.1.2** for width recommendations). In areas where there is a roadside barrier, such as guardrail, a minimum shoulder width of five feet should be provided.

On rural roads with low traffic volumes, signage alerting drivers to the potential for bicyclists on the roadway may be beneficial.

Table 13 lists the routes within the triangle area that were identified for on-street bicycle facilities. The facilities may be bike lanes or widened shoulders, depending on the setting (urban vs. rural), roadway facility type, and design standards used. It is envisioned that most of the on-street bicycle facility recommendations would be completed as part of future reconstruction projects. Since the existing pavement width on the roadways named in the recommendations is not currently wide enough to be reconfigured to allow for dedicated bicycle facilities, considerable construction costs would be required to widen the roadway. It is estimated that it would cost $1.3 to $1.8 million per mile to widen the roadway to accommodate five-foot on-street bicycle facilities. Prior to reconstruction of the roadway, it may be cost effective to identify the routes for bicycle use through signing and striping. Bicycle Warning Signs with Share the Road supplemental plaques could be used to alert road users of the potential for bicyclists.

Table 13: On-Street Bicycle Facility Recommendations

ID	Name	Description	Estimated Cost
BIKE-1	Durston Road (Westgate Avenue to Love Lane)	Extend existing on-street bicycle facilities from Westgate Avenue to Love Lane	N/A - *Include with roadway reconstruction*
BIKE-2	Oak Street (Cottonwood Road to Love Lane)	Extend existing on-street bicycle facilities from Cottonwood Road to Love Lane when future connection is completed	N/A - *Include with roadway reconstruction*
BIKE-3	Gooch Hill Road / Chapman Road (Durston Road to Patterson Road)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*
BIKE-4	Stucky Road (S. 19th Avenue to Love Lane)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*
BIKE-5	Blackwood Road (Gallatin Road to S. 19th Avenue)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*
BIKE-6	Nash Road (S. 19th Avenue to Sourdough Road)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*

ID	Name	Description	Estimated Cost
BIKE-7	Tayebeshockup Road / Triple Tree Road (Kagy Boulevard to Sourdough Road)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*
BIKE-8	Sourdough Road (Nash Road to Goldenstein Road)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*
BIKE-9	Goldenstein Road (S. 19th Avenue to Sourdough Road)	Widen roadway to accommodate on-street bicycle facilities	N/A - *Include with roadway reconstruction*

6.2.4. Spot Improvements

Non-motorized spot improvements are intended to address specific concerns or challenges found within the study area. These projects are intended to address safety concerns in the existing non-motorized network or to improve existing facilities that may not be performing as desired. Spot improvements are presented in **Table 14**.

Spot improvements are recommended to improve safety, mobility, and connectivity of non-motorized facilities.

Table 14: Recommended Spot Improvements

ID	Location	Description	Estimated Cost
SPOT-1	**Amsterdam Road** *Near Clovehitch Road*	Uncover the existing buried pedestrian tunnel under Amsterdam Road near Clovehitch Road to connect the north and south sides of Amsterdam Road.	N/A
SPOT-2	**Cottonwood Road/ Pasha Lane Intersection**	Reconstruct the Cottonwood Road and Pasha Lane intersection to accommodate turning movements of a fire truck. Pedestrian facilities with Americans with Disabilities Act (ADA) accommodations should also be included, primarily on the western side of the intersection. This may be completed in coordination with reconstruction of Cottonwood Road (MSN-1).	$275,000 - $300,000
SPOT-3	**Cottonwood Road/ S. 19th Avenue Intersection**	Minor intersection reconstruction to address geometrics and pedestrian accommodations. The intersection should be modified to accommodate bus turning movements at a minimum. Appropriate ADA treatments should also be included at the crosswalk. This may be completed in coordination with reconstruction of Cottonwood Road (MSN-1).	$250,000 - $275,000
SPOT-4	**Cottonwood Road** *S. 19th Avenue to Enders Road*	Due to the limited sight distance and frequent bicyclist presence on this segment of Cottonwood Road, install warning signage along the roadway indicating to drivers the potential for bicyclists on the road (Bicycle Warning Signs with Share the Road plaques). This may be completed in coordination with safety improvements identified in TSM-4.	$3,500
SPOT-5	**W. Valley Center Road** *Jackrabbit Lane to Path*	The shared use path on E. Valley Center Road terminates at the intersection with Jackrabbit Lane. A path adjacent to Jackrabbit Lane on the west side terminates at W. Valley Center Road approximately 100 feet from the intersection. A path constructed as part of the Gallatin Heights Subdivision continues west along W. Valley Center Road from this terminus. Construct an approximately 100-foot section of shared use path to strengthen the connectivity of the non-motorized facilities at this intersection.	$10,000

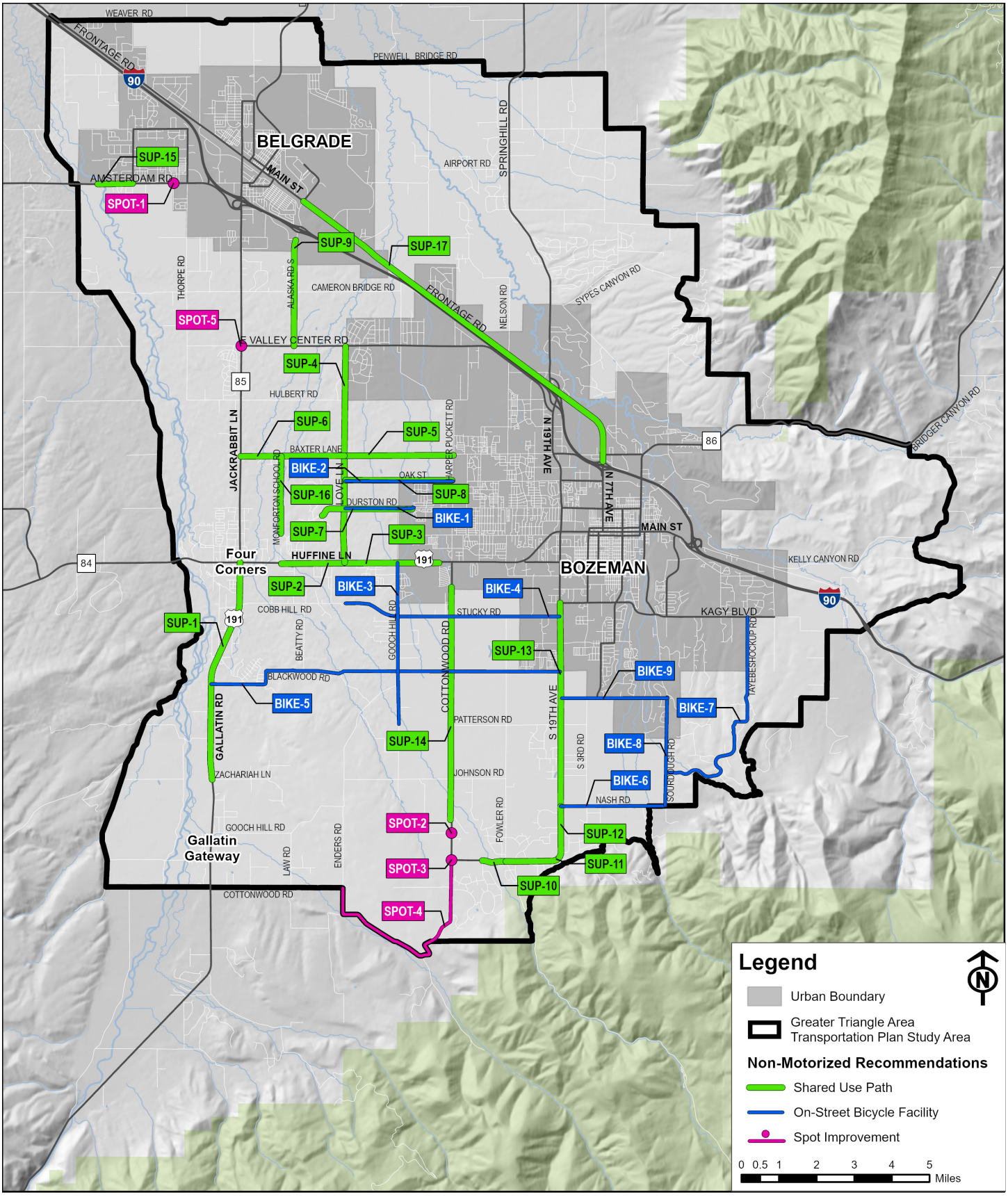


Figure 17: Non-Motorized Network Recommendations

Chapter 7: Implementation Strategies

This chapter addresses several strategies for the GTATP that provide broader guidance for implementation of the recommended transportation improvement projects. Strategies discussed in this chapter include roadway design standards, coordinated development considerations, preservation and maintenance best practices, systematic safety improvements, and other planning considerations. These considerations are intended to support and supplement the short- and long-term improvements recommended as part of this transportation plan to provide a cohesive, multimodal transportation system that facilitates the efficient movement of people and goods. Refer to **Appendix D** *for a complete discussion on each of topics in this section.*

7.1. TRANSPORTATION DESIGN STANDARDS

It is important to establish standards that identify the overall character of various roads within a community. These standards should identify the anticipated amount of right-of-way necessary at full build-out. They should also include all of the design elements necessary such as sidewalks, bicycle facilities, landscaping, and space for utilities and snow storage. The standards should reflect the uses for each type of road and the applicable traffic volumes anticipated. Design standards may vary by jurisdiction (state, county, or city); however, it is important to coordinate planning and design efforts to ensure a predictable driving environment.

Gallatin County design standards apply to all unincorporated areas of the county. For transportation facilities or rights-of-way within incorporated cities or towns, the standards of the respective jurisdiction apply. MDT's *Geometric Design Standards*[9] apply to all MDT on-system routes and at all intersections which intersect with MDT on-system routes (see **Figure 22** for a map of MDT routes).

7.1.1. Gallatin County Transportation Design and Construction Standards

The *Gallatin County Transportation Design and Construction Standards*[10] establish policies and procedures and define standards for transportation design and construction within the county.

Roadway Facility Standards

The county transportation design standards provide minimum design criteria for all county roads. The standards specify that all roads shall be designed in accordance with American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets*[11], AASHTO *Guidelines for Geometric Design of Low-Volume Roads*, and the U.S. Access Board's *Public Right-of-Way Accessibility Guidelines*[12] (PROWAG) standards while also satisfying the county's minimum criteria as presented in **Table 15**.

Pedestrian, Bicycle, and Transit Facility Standards

The county road design standards also provide guidance for including non-motorized facilities adjacent to roadways. In addition to the minimum standards provided, facilities should also be constructed in accordance with the *ADA Accessibility Guidelines*[13] and any applicable AASHTO pedestrian and bicycle guidelines.

Pedestrian facilities, specifically sidewalks, should be five feet in width and separated from the roadway with a minimum four-foot-wide boulevard. The facilities should be located within the dedicated county right-of-way or public road or trail easement. Additionally, the surface should be usable year-round and maintenance responsibility should be established.

The county generally requires developers to include bicycle and trail improvements consistent with adopted planning documents. Trail corridors can either be established through a dedicated right-of-way or public easement. Like sidewalks, maintenance responsibility should also be established for bicycle and trail facilities.

A developer may also be required to dedicate an area of land for a transit stop when a transit route exists or is proposed adjacent to a development. When necessary to reasonably mitigate impacts from the proposed development on existing transit infrastructure, the developer may also be required to provide necessary facilities such as a shelter or signage, for a transit stop. Coordination with transit providers is needed to determine if transit feature improvements are necessary based upon established transit agency guidelines.

Table 15: Gallatin County Roadway Design Criteria

Functional Class	Arterial and Collector		Local	
*Terrain**	*Ordinary*	*Mountain*	*Ordinary*	*Mountain*
Minimum Design Speed	45-55 MPH	35-45 MPH	25 MPH	
Right-of-Way Width	90' – 120'	60'	60'	
Pavement Road Width	34'	30'	24'	
Gravel Road Width	N/A		26'	

**Mountainous terrain is defined as terrain which has cross slope exceeding fifteen (15%) percent, existing on at least one half of the applicable land area.*

Right-of-Way Standards

Per the *Gallatin County Transportation Design Standards*, all access roads and interior roads within a development shall be dedicated to the public. While roads dedicated to the public are accepted for public use, the county accepts no responsibility for maintenance of the roads.

In cases where a development abuts or contains an existing or proposed arterial or collector road, the county may require the developer to provide additional rights-of-way, frontage roads, reverse frontage with a reservation prohibiting access along the rear property line (no access strip), screen planting, or other treatments as necessary to protect residential properties and separate through and local traffic. The county may require that additional road rights-of-way be dedicated as a condition of development approval, in accordance with long term transportation goals and any requirements defined by the county transportation design standards, subdivision regulations, zoning regulations, adopted transportation and trails plans, growth policies, and capital improvements plans. Required right-of-way widths for arterials and collectors within the county were shown previously in **Table 15**.

7.1.2. Recommended Minimum Design Standards

Recommended minimum design standards have been developed for the rural functional classes of roads found within the triangle area. These rural design standards can be used to develop roadway profiles during the design and project development phases. Recommended minimum standards for right-of-way, pavement, travel lane, and shoulder widths are given in **Table 16**. Deviations from the minimums may be desirable on roadways with large traffic volumes, high percentage of heavy trucks, substantial non-motorized use, safety concerns, and system continuity.

Road design standards help provide a uniform and predictable driving environment and help provide safe accommodations.

Table 16: Recommended Minimum Transportation Design Standards (Rural)

Rural Functional Class *Minimum Standards*	Local	Collector		Minor Arterial		Principal Arterial	
AADT (vehicles per day)	≤500	500-1,500	1,500-3,500	3,500-5,000	5,000-8,500	8,500+	
Design Speed (mph)	25	35	45	45	55	55	70
Right-of-Way Width (feet)	60’	90’		100’		120’	
Paved Road Width[1] (feet)	24’	30’	34’	40’		44’	
Travel/Turn Lane Width (feet)	10’	11’	12’	12’		12’	
Shoulder Width[2] (feet)	2’	4’	5’	8’		10’	
Median/TWLTL[3] (feet)	N/A	N/A		14’		16’	
Foreslope (Width – feet)	6:1 (6’)	6:1 (10’)	6:1 (14’)	6:1 (16’)	6:1 (20’)	6:1 (22’)	6:1 (30’)
Shared Use Path Width (feet)	N/A	10’		10’		10’	
Shared Use Path Separation[4] (feet)	N/A	5’		6.5’		16.5’	

[1] Increase to include turn lanes or median where warranted.
[2] Minimum useable shoulder width should be 4 feet where widened shoulders are recommended, 5-foot useable shoulders are desirable.
[3] TWLTL = Two-Way Left Turn Lane, if needed
[4] Alta Planning + Design, Small Town and Rural Design Guide Facilities for Walking and Biking: Sidepaths, https://ruraldesignguide.com/physically-separated/sidepath

7.1.3. Coordinated Planning and Design

Coordinated transportation planning and design across city, county, and state jurisdictions is important to ensure development of a comprehensive transportation system that supports local, regional, and statewide transportation goals. Developing an efficient transportation system that effectively accommodates travel demands requires a long-term strategy. This includes establishing a future vision and developing and carrying out policies that support implementation of the long-term vision.

Coordinated Right-of-Way Standards

As the triangle area develops, it is important for the county to coordinate with the Cities of Bozeman and Belgrade to develop consistent right-of-way standards and approaches to acquiring new right-of-way for existing and future road corridors. The Gallatin County, City of Bozeman, and City of Belgrade transportation design standards and transportation plans all identify the amount of right-of-way that is necessary to accommodate the full build-out of each type of roadway facility. While some minor discrepancies exist, the most current standards for each jurisdiction state that the desired right-of-way for principal arterials is 120 feet, 100 feet for minor arterials, 90 feet for collectors, and 60 feet for local roads.

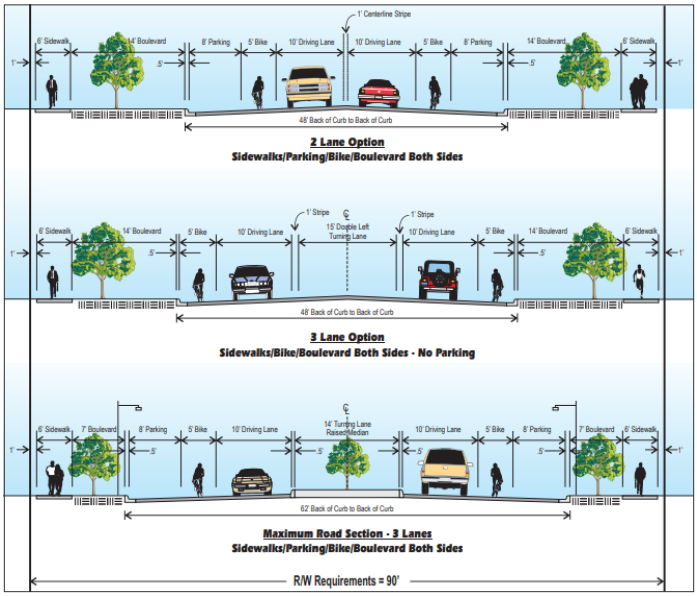
It is recommended that the county review all existing roadways and identify roads that are located within right-of-way corridors with less than the desirable width and acquire additional right-of-way as required by the design standards. The county, in coordination with Bozeman and Belgrade, should attempt to acquire right-of-way for both existing and future roads where the opportunity exists. It is recommended that the right-of-way necessary for all future road segments be acquired through the development process. Acquiring right-of-way for important transportation corridors where development has not yet occurred may be more challenging. Additional funding sources, such as impact fees, may be required for the county to purchase needed right-of-way. Even though the road may initially be only a two- or three-lane facility, securing the full amount of right-of-way for the visionary functional class will enable the corridor to be expanded at a later date while avoiding an expensive and disruptive land acquisition process in the future.

Urban Versus Rural Design

Within incorporated city limits, the design standards of the respective city apply to roadways under city jurisdiction. Outside of city limits, roadways are designed to county standards. MDT facilities are designed according to MDT's *Geometric Design Standards*[13] which specify standards for both rural and urban settings. Rural standards apply to roadways outside the boundaries of urban areas. Urban standards apply within designated urban boundaries set by state and local officials or a within an area that has urbanized characteristics as defined by the following subcategories:

- **Urbanized Areas:** Those areas with a population greater than 50,000, as designated by the U.S. Census Bureau.
- **Small Urban Areas:** Those areas with a population greater than 5,000 and not within any urbanized areas.
- **Transitional Areas:** Those areas providing connections between urban and rural areas.

While standards may vary between city, county, and state jurisdiction, it is important to ensure coordinated right-of-way widths to facilitate future improvements, such as upgrading from a rural to urban design standard. It is also important to consider using urban design standards in transitional areas in preparation for future city annexations.



Although the roadway may be configured in a variety of ways, it is important to maintain consistent right-of-way to accommodate full build-out of roadway facilities.

Multimodal Network Coordination

A robust and connected multimodal network, accommodating transit users, bicyclists, and pedestrians, promotes the use of transportation modes other than private vehicles and delivers important socio-cultural, public health, and environmental benefits. Much like the vehicular network, the multimodal network should connect residents to places they want to go with continuous routes and convenient connections. This includes destinations such as home, school, employment, shopping, recreation, and public services. To achieve this the multimodal network should connect seamlessly to the greater regional major street network.

When planning a regional multimodal network, it is important to choose direct routes that are easy to navigate with minimal conflicts. This means planning pedestrian and bicycle facilities that provide access to desirable locations, connect to non-motorized facilities on other routes, are well marked, and minimize conflicts with other traffic both on the roadway and at crossings.

When designing a regional multimodal network, consistent standards should be used across all jurisdictions. Facilities should employ principals of universal design and, at a minimum, meet ADA standards to ensure that the facilities are accessible to all people, regardless of age, disability status, or other factors. Design of non-motorized facilities may differ between urban and rural areas, but facilities should still be cohesive across jurisdictions to provide a predictable and safe environment for all users. To ensure consistency the minimum standards contained in **Table 16** should be used and supplemented as necessary with AASHTO's pedestrian and bicycle guidelines. Similarly, transit stops and transit vehicles should both meet minimum ADA standards and be constructed with consistent design elements and amenities. Consistent and regular facility maintenance should also be performed to ensure all facilities are safe and accessible.

Within the triangle area, the multimodal network should be an extension of the networks in Bozeman and Belgrade and provide inter-city connections on moderate to high use corridors. Due to the rural nature of the triangle area, a less dense non-motorized network with facilities spanning longer distances is appropriate in order to preserve these areas as dispersed and rural.

Non-motorized facilities should be carefully planned and constructed to connect pedestrians and bicyclists to meaningful and high-use destinations.

Separated shared use paths should serve an explicit purpose, being constructed adjacent to roadways with higher traffic volumes that connect pedestrians and bicyclists to meaningful and high-use destinations (neighborhoods, shopping and employment centers, transit services, and trailheads). For roadways on the major street network with lower volumes that do not directly connect to these high-use destinations, widened shoulders that allow safe on-street bicycling may be more appropriate. As these areas continue to develop, the shoulders could be striped as designated bike lanes. The future triangle area transit network should connect to regional demand centers, such as the airport, connect to the transit networks serving neighboring communities, such as Streamline (Bozeman, Belgrade, and Livingston), and Skyline (Big Sky, Four Corners, and Bozeman), and serve as an extension of local services providing access to more rural and underserved areas.

To strategically plan and design a multimodal network, consideration must be given to user types based on activity type (transportation or recreation), ability and comfort levels, and mode choice. Identifying and understanding the wide-ranging uses, differing abilities, and a variety of modes inform facility location, typology, design standards, associated amenities, and required maintenance. It is important to plan a diverse network that provides accommodations that suit all users.

7.2. NON-MOTORIZED FACILITY MAINTENANCE

The needs of non-motorized users should be considered in roadway planning, management and maintenance. Prioritizing maintenance of non-motorized facilities is just as important as maintenance of motorized roadway facilities. Note, a discussion of roadway maintenance practices is contained in the county's previous transportation plan (2007 *Greater Bozeman Area Transportation Plan*).

7.2.1. Shared Use Path Maintenance

Shared use paths are typically asphalt paved paths, and like paved roadways, shared use paths require on-going pavement preservation and maintenance. General maintenance typically requires monitoring and evaluating path conditions, mowing, cleaning drainage structures, sweeping and cleaning, and snow removal. For preservation of asphalt paved paths, there are four general treatments including crack sealing, patching, fog sealing, and pavement overlays. Generally, a crack seal is recommended every four years, a fog seal every eight years and a pavement overlay every 25 years.

Maintenance Plans and Agreements

In addition to establishing minimum maintenance requirements for shared use paths, it is critical to identify who is responsible for the work, coordinate efforts when possible, and secure funding sources. To help ensure proper maintenance is funded and performed, a maintenance plan should be developed. Gallatin County generally requires developers or homeowner associations to establish corridors for paths through dedicated right-of-way or public easement. These private entities generally also assume responsibility for path maintenance and improvements. For shared use paths within MDT right-of-way, MDT requires a formal maintenance agreement with the affected local government.

Shared Use Path Design

Good initial planning and design of shared use paths are crucial to reduce future maintenance problems (such as erosion, water or edge deterioration) and maximize the life of the path. Sometimes larger initial costs and more conservative designs can reduce long-term maintenance needs. However, designers should also be careful not to over-design a facility in favor of lower long-term costs.

When selecting surfacing materials, long-term durability, safety, availability, initial cost, and maintenance needs are important to consider. For example, while asphalt is the most common surface type for shared use paths and less expensive than concrete, paths constructed with concrete have proven to be more durable with significantly reduced maintenance costs over the long term.

For paved paths, a subbase of compacted aggregate or structurally suitable soil is important to ensure the long-term durability of the pavement. Thicker subbases are recommended especially if the path needs to support occasional maintenance or emergency vehicles. It is also important to consider the site-specific soil, environmental, and use characteristics of the path when determining the appropriate pavement design.[14]

Where landscaping or natural vegetation is located near a path, root barriers can help prevent pavement buckling or other surface distortion as a result of root intrusion. Path shoulders should also provide a smooth area that resists erosion, root intrusion, debris, and other undesirable effects. Grassed shoulders are common along shared-use paths in Montana but require mowing and other regular maintenance. Appropriate drainage design is also needed to prevent erosion, surface deterioration, water pooling, and ice formation.

Good initial planning, proper design, and regular maintenance can help extend the life of shared use paths.

7.2.2. On-Street Bicycle Facility Maintenance

On-going maintenance of on-street bicycle facilities is important to consider when implementing either widened shoulders or striped bike lanes. Formal bike lanes tend to require more maintenance due to the need for striping and signing. In general, satisfying bicycling maintenance requirements only requires slight modifications to current maintenance procedures. As with shared use paths, having defining maintenance responsibilities for facilities is important to ensure all maintenance needs are met. The following are some common maintenance practices to keep on-street bicycle facilities safe and useable.

- Sweep bike lanes and paved shoulders with sufficient care.
- Patch surfaces in an expeditious manner and as smoothly and evenly as possible.
- Ensure pavement overlay projects feather the new surface into the existing surface.
- Replace or relocate hazards in the travel way.
- Trim encroaching vegetation.
- Perform regular inspections to ensure signs are well-maintained.
- Bicycle lane striping should be replaced in conjunction with other pavement markings.
- Ensure bicycle facilities are clear of snow. Avoid piling snow in the travel way.
- Use de-icing materials to improve safety for bicyclists.

Debris on the roadway can be hazardous to bicyclists causing loss of control or damage to bike tires. Regular sweeping helps reduce the risk of incidents.

In addition to regular maintenance, implementing the following maintenance-friendly design and construction techniques can reduce the need for costly repairs later.

- Use edge treatments, shoulder surfaces, and access controls that reduce the potential for debris accumulation.
- Use thermoplastic pavement markings. Recessed markings may be beneficial especially where heavy snow plowing occurs.
- Provide bicycle facilities that are wide enough to accommodate small snow removal vehicles.
- Provide enough right-of-way for snow storage.

7.3. SPEED MANAGEMENT

Speeding is often observed on rural roadways due to lower traffic volumes. In some locations, the geometry of the roadway, such as tight curves or narrow shoulders, may help self-regulate speeds. In other locations, such as in flat, open areas, roadway characteristics may encourage higher speeds. Because enforcement activities may be sporadic in rural areas, speeding may go undetected until a severe crash occurs. Oftentimes, agencies' immediate reaction is to lower the posted speed limit. However, studies have shown that lowering the speed limit without proper engineering justification does not effectively reduce vehicle speeds. Instead, a coordinated approach to managing speeds based on engineering, enforcement, and education countermeasures is recommended.

Traffic calming is a common engineering-based strategy to address speeding concerns, especially in developed urban areas where the roadway speed is 30 mph or less. Traditional traffic calming devices such as those discussed in the Chapter 8 of the *2007 Greater Bozeman Area Transportation Plan*[1] can be effective on low speed, high volume roadways, but may be inappropriate on higher speed roadways such as those found in rural areas. On higher speed arterials with lower volumes, strategies such as transverse rumble strips, variable speed display boards, pavement markings, and warning signs may be more effective at reducing travel speeds.

Speed education and enforcement can also be effective strategies to reduce vehicle speeds, especially when paired with traditional traffic calming devices. However, staffing and funding needs for on-going enforcement and education programs should also be considered.

7.4. CURVE SIGNING

Warning signs call attention to unexpected conditions on a roadway that might not be readily apparent to roadway users such as substandard horizontal curves, intersecting roadways, or other hazards. To provide uniformity, the *Gallatin County Transportation Design and Construction Standards* state that all road signs on county roads shall be compliant with the *Manual on Uniform Traffic Control Devices* (MUTCD).[15]

Warning for horizontal curves can range from simple horizontal alignment signs to more advanced enhanced warning devices. However, elaborate signage and the use of enhanced countermeasures is not always appropriate. The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs.

To provide consistent and uniform signing throughout the GTATP study area, and to assist the county in selecting appropriate countermeasures for problematic curves, a three-tier system, as summarized in **Table 17,** was developed. Tier 1 signage is the most basic and is applicable in most cases. Tier 2 signage should be used as a secondary measure for curves that violate basic driver expectancy and where a safety concern has been identified. Tier 3 signage is typically more expensive to both implement and maintain and it therefore only recommended when Tier 1 and Tier 2 countermeasures have failed to address an identified safety problem or in locations with high crash rates, especially involving severe injuries. In extreme cases when signing proves to be ineffective at addressing safety concerns, reconstruction of the roadway may be needed to flatten the curves. An example of Tier 1 and Tier 2 curve signing is shown in **Figure 18**.

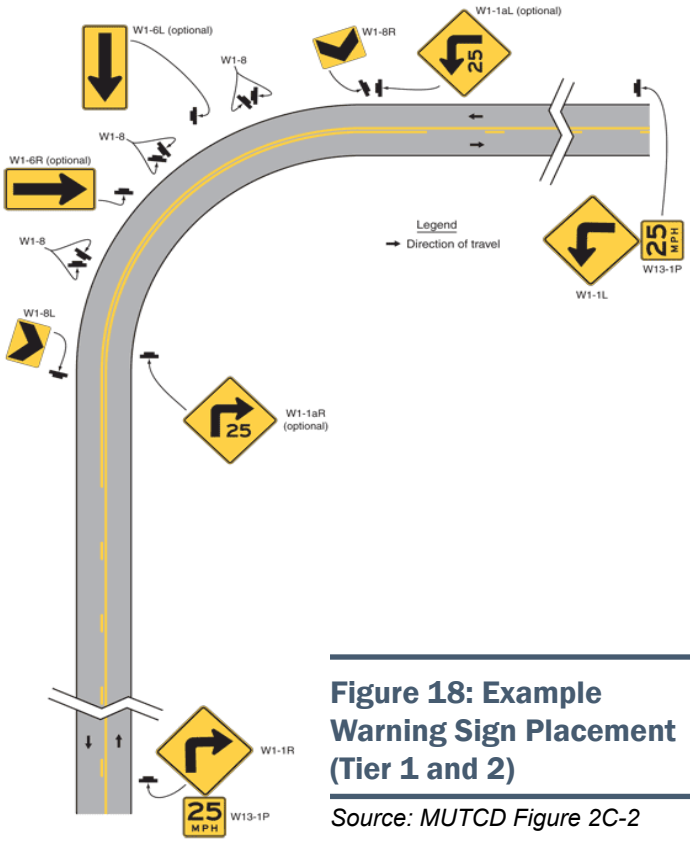


Figure 18: Example Warning Sign Placement (Tier 1 and 2)

Source: MUTCD Figure 2C-2

Table 17: Curve Signing Tiers

Tier	Description/Applicability	Strategies
Tier 1 – Horizontal Alignment Warning Signs	Used in advance of horizontal curves on roadways that are functionally classified as either arterials or collectors and have more than 1,000 AADT when the difference between the speed limit and the advisory speed meets standards given by MUTCD. Should be used in most cases.	• Horizontal Alignment Warning Signs • Speed Advisory Plaques
Tier 2 – Supplemental Curve Warning Signs	Use additional traffic control devices within the curve to help guide motorists through curves that violate driver expectancy. Should be used in addition to, and sometimes in place of, Tier 1 signs.	• Combination Curve/Intersection Signs • Combination Horizontal Alignment/Advisory Speed Sign • Chevron Alignment Sign • One-Direction Large Arrow Sign
Tier 3 – Enhanced Signing Countermeasures	Enhanced signage countermeasures used increase the number of drivers who perceive and react to basic curve warning devices. Should be used in combination with Tier 1 and Tier 2 signage.	• Larger Devices • Retroreflective Strip on Sign Post • Highly Retroreflective and Fluorescent Sheeting • Doubling-Up Devices • Flashing Beacons • Dynamic Curve Warning System

7.5. METROPOLITAN PLANNING ORGANIZATION PLANNING REQUIREMENTS

A Metropolitan Planning Organization (MPO) is a federally mandated and federally funded transportation policy-making organization in the United States that is made up of representatives from local government and governmental transportation authorities. MPOs were introduced by the Federal-Aid Highway Act of 1962, which required the formation of an MPO for any urbanized area with a population greater than 50,000. Federal funding for transportation projects and programs are channeled through this planning process. Congress created MPOs in order to ensure that existing and future expenditures of governmental funds for transportation projects and programs are based on a continuing, cooperative, and comprehensive ("3C") planning process. Statewide and metropolitan transportation planning processes are governed by federal law (23 U.S.C. §§ 134–135). Transparency through public access to participation in the planning process and electronic publication of plans is required by federal law.

The federal government mandates MPOs to ensure that federal transportation funds are spent in a manner that has a basis in metropolitan region-wide plans developed through intergovernmental collaboration, rational analysis, and consensus-based decision making. Accordingly, MPOs are essential to ensure that:

- Scarce federal and other transportation funding resources are allocated appropriately;
- Planning reflects the region's shared vision for its future;
- A comprehensive examination of the region's future and investment alternatives has occurred; and
- Facilitation of governments, interested parties, and residents occur in a collaborative manner in the planning process.

Results of the 2020 census indicate that Bozeman has surpassed the 50,000-resident threshold to be a MPO. The new urban boundary is expected to be finalized in 2023 and will be developed in coordination with the local jurisdiction(s), MDT, and the Federal Highway Administration (FHWA).

Discussions between the Cities of Bozeman and Belgrade as well as Gallatin County indicate that the future MPO boundary may stretch to include parts of the triangle area to facilitate coordinated transportation planning. MPOs are designated by agreement between the governor and local governments that together represent at least 75 percent of the affected population (including the largest incorporated city, i.e., Bozeman, based on population) or in accordance with procedures established by applicable state or local law.

Implementation of MPO jurisdiction agreements is required no later than one year after the date the U.S. Census Bureau releases its notice of Qualifying Urban Areas following the 2020 census. Four years after the notice is published, new MPOs must have a formally adopted *Metropolitan Transportation Plan* and *Transportation Improvement Program*.

7.5.1. Organizational Structure

Typically, an MPO governance structure includes a variety of committees as well as a professional staff. The Transportation Policy Coordinating Committee (TPCC) is the top-level decision-making body for the planning organization. In most MPOs, the TPCC comprises:

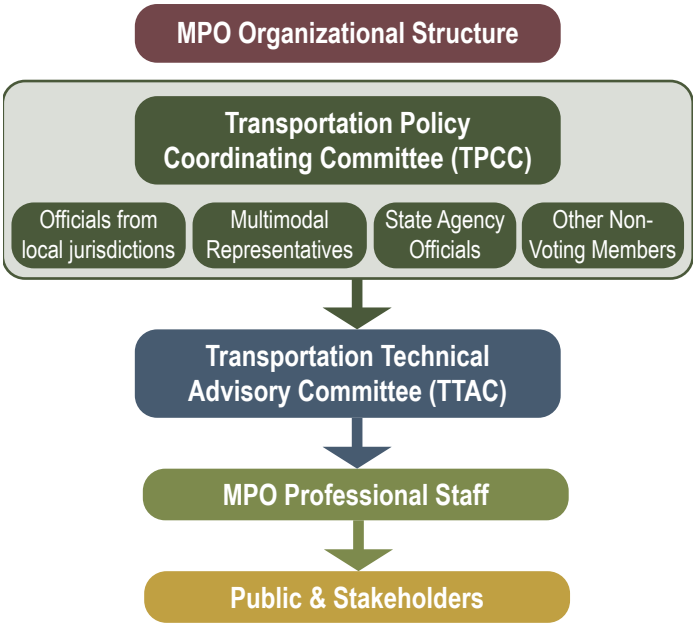
- Elected or appointed officials from local governmental jurisdictions;
- Representatives of different transportation modes;
- State agency officials; and
- Non-voting members such as federal agencies and advisers from state Departments of Transportation

A TPCC member typically is an elected or appointed official of one of the MPO's constituent local jurisdictions. The TPCC member thus has legal authority to speak and act on behalf of that jurisdiction in the MPO setting. Federal law, however, does not require members of an MPO TPCC to be representatives of the metropolitan areas' populations. The TPCC's responsibilities include debating and making decisions on key MPO actions and issues, including adoption of the metropolitan long-range transportation plans, transportation improvement programs, annual planning work programs, budgets, and other policy documents. The TPCC also may play an active role in key decision points or milestones associated with MPO plans and studies, as well as

conducting public hearings and meetings. An appointed Transportation Technical Advisory Committee (TTAC) develops the recommendations for consideration by the TPCC and establishes a ranked proposal for work plans.

The TTAC acts as an advisory body to the TPCC for transportation issues that primarily are technical in nature. The TTAC interacts with the MPO's professional staff on technical matters related to planning, analysis tasks, and projects. Through this work, the TTAC develops recommendations on projects and programs for TPCC consideration. The TTAC typically comprises staff-level officials of local, state, and federal agencies. In addition, a TTAC may include representatives of interest groups, various transportation modes, and local citizens.

Usually, MPOs retain a core professional staff in order to ensure the ability to carry out the required metropolitan planning process in an effective and expeditious manner. The size and qualifications of this staff may vary by MPO, since no two metropolitan areas have identical planning needs. Most MPOs, however, require at least some staff dedicated solely to MPO process oversight and management because of the complexity of the process and need to ensure that requirements are properly addressed.



MPOs are generally organized in the manner illustrated above. Specific organizational structures may vary by jurisdiction based on planning needs.

7.5.2. MPO Functions

The following lists highlights a some of the primary functions of an MPO.

- **Establish a setting.** Establish and manage a fair and impartial setting for effective regional decision-making in the metropolitan area.
- **Evaluate alternatives.** Evaluate transportation alternatives, scaled to the size and complexity of the region, to the nature of its transportation issues, and to the realistically available options.
- **Maintain a Regional Transportation Plan.** Develop and update a fiscally constrained long-range transportation plan covering a planning horizon of at least 20 years that fosters mobility and access for people and goods, efficient system performance and preservation, and quality of life.
- **Develop a Transportation Improvement Program.** Develop a fiscally constrained program based on the long-range transportation plan and designed to serve the metropolitan area's goals, while using spending, regulating, operating, management, and financial tools.
- **Involve the public.** Involve the general public and all the significantly affected sub-groups in the four essential functions listed above.

If the metropolitan area is designated as an air quality non-attainment or maintenance area, then the MPO must also protect air quality (i.e., transportation plans, programs, and projects must conform with the air quality plan, known as the "state implementation plan," for the state within which the metropolitan area lies).

Presently, most MPOs have no authority to raise revenues such as to levy taxes on their own, rather, they are designed to allow local officials to decide collaboratively how to spend available federal and other governmental transportation funds in their urbanized areas. The funding for the operations of an MPO comes from a combination of federal transportation funds and required matching funds from state and local governments.

Chapter 8:
Achieving the Long-Term Vision

This part of the GTATP details the long-term vision for the greater triangle area transportation system as well as strategies for achieving the vision. Implementation of the envisioned transportation system will require extensive coordination with various agencies, many years of execution, and substantial funds.

Transportation improvements can be implemented using federal, state, local and private funding sources. Historically, federal and state funding programs have been used almost exclusively to construct and upgrade the major roads in the county. Considering the current funding limits of these traditional programs, the extensive list of recommended road projects, and the ambitious visionary network, additional funding from local and private sources may be required to meet the transportation needs of the community over the planning horizon.

8.1. VISIONARY TRANSPORTATION NETWORK

An established plan for the future transportation system within the triangle area is an essential component to community planning and future land development. It ensures that planners, landowners, and developers know the intent and location of the future road network and facilitates a long-term planning strategy. It enables the community to enhance the transportation network with, or ahead of, development rather than being caught behind development with no financial means to accommodate the associated travel demands.

All of the recommended improvements discussed previously have been compiled to make up the "visionary transportation network." The visionary network is meant to serve as guidance for future transportation projects and may be changed or adapted to fit the county's changing needs.

Figure 19 presents the visionary major street network which consists of all interstate principal arterial, non-interstate principal arterial, minor arterial, and collector routes. Local streets are not included on the visionary major street network. **Figure 19** also shows roadways which should be constructed to urban design standards. These roadways are generally between Bozeman, Belgrade, and Four Corners (bounded by Jackrabbit Lane, Cobb Hill Road, Cottonwood Road, and Goldenstein Lane). These roadways are found in areas where high density growth is expected to occur. All other major street network roadways may be constructed to rural design standards. Typically, urban roadways include curb, gutter, grassy boulevards, and sidewalks whereas rural roadways include shoulders and separated non-motorized facilities, as appropriate.

Figure 20 presents the visionary non-motorized network including the recommendations for shared use paths and on-street bicycle facilities. The Bozeman TMP, Belgrade LRTP, *Triangle Trails Plan*[16], and *Belgrade Parks and Recreation Master Plan*[17] were consulted to establish a cohesive long-term vision for accommodating non-motorists within the greater triangle area. To maintain consistency between these plans, more than one facility type may be recommended for a single roadway corridor. The recommended facilities are intended to provide continuity throughout the Gallatin Valley and facilitate convenient connections to meaningful destinations such as schools, trailheads, parks, and commercial areas.

All future alignments shown in **Figure 19** and **Figure 20** are conceptual in nature and may vary based on factors such as topography, wetlands, land ownership, and other unforeseen factors. The purpose of these figures is to illustrate the visionary transportation network at full build-out. It is likely that many of the corridors shown will not be developed for many decades to come. However, if development occurs in a particular area, the visionary transportation network will ensure facilities are established in a fashion that produces an efficient and logical future transportation system. Presenting the visionary transportation network herein is an effort to help plan for the future development of the transportation system.

VISIONARY TRANSPORTATION NETWORKS...

- Establish a **LONG-TERM VISION** for the transportation network
- Serve as a **GUIDE** for future land development and transportation projects
- Are **CONCEPTUAL** and may vary based on a variety of outside factors *(topography, wetlands, land ownership, etc.)*
- Help ensure that future roads are developed in an **EFFICIENT AND LOGICAL** fashion
- Help ensure that **ALL MODES** are considered with new transportation facilities
- Maintain **CONSISTENCY** with community planning goals
- May take **MANY DECADES** to fully develop

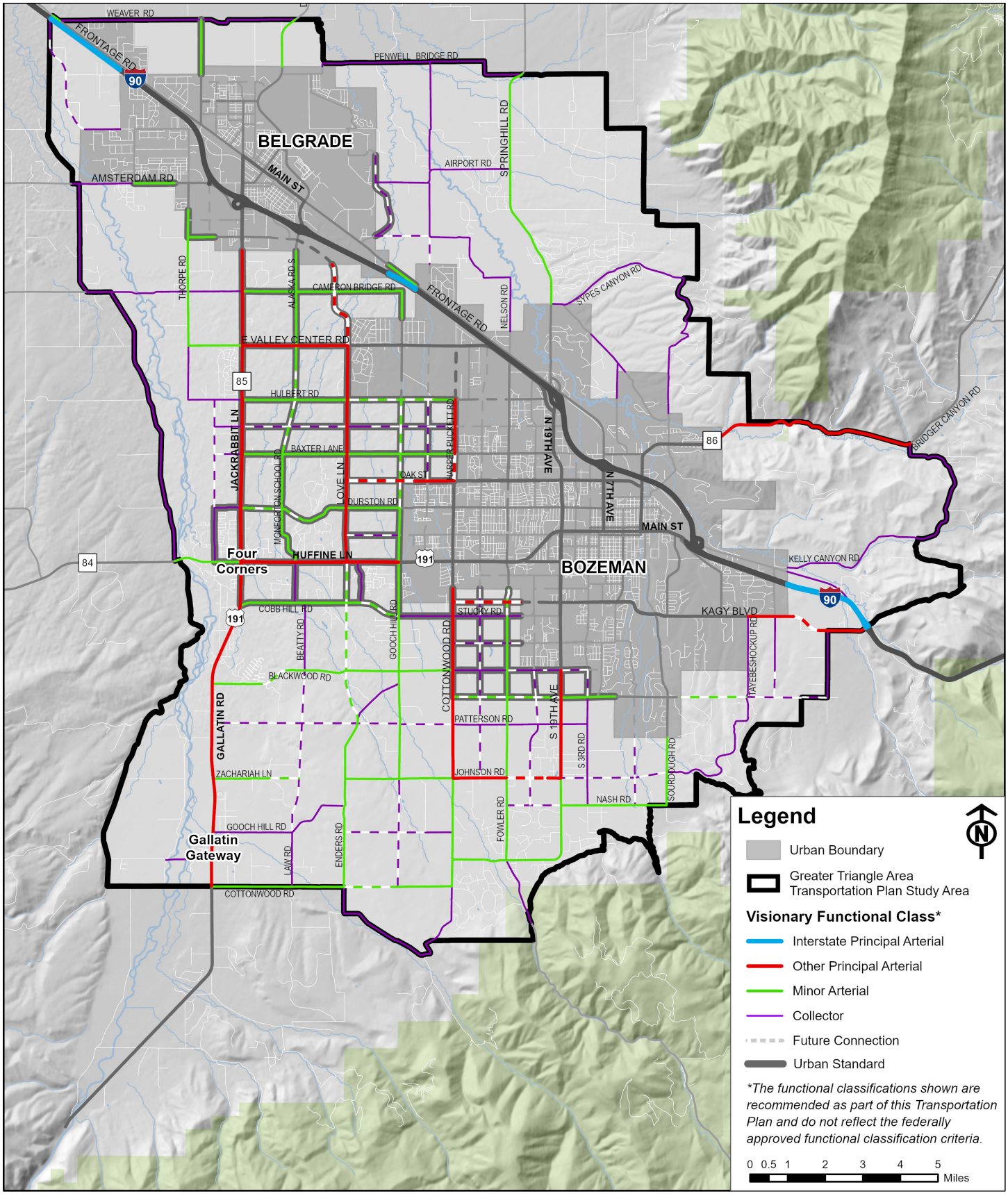


Figure 19: Visionary Major Street Network

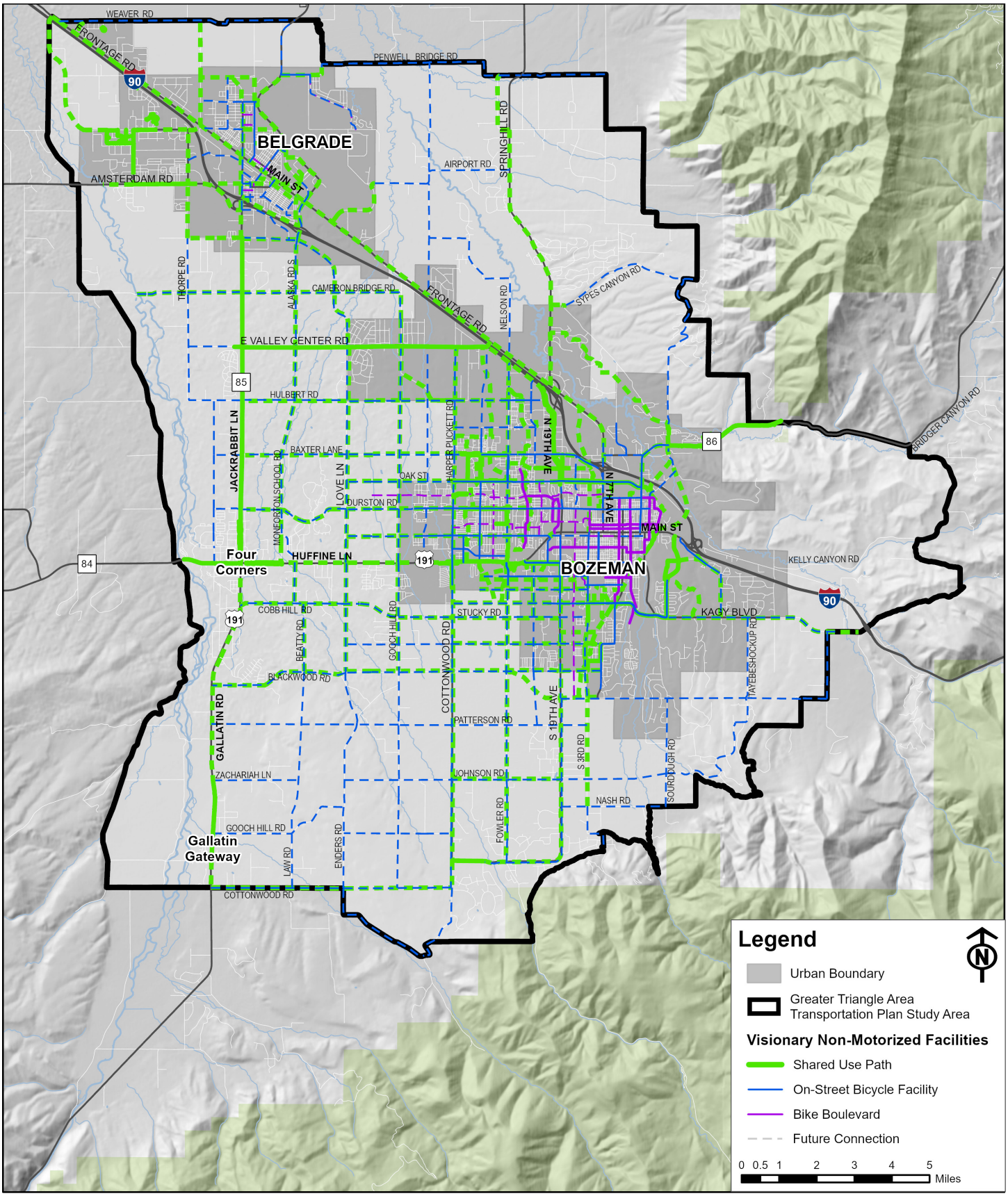


Figure 20: Visionary Non-Motorized Network

8.2. FUNDING STRATEGIES

Transportation improvements can be implemented using federal, state, local and private funding sources. Each funding source is constrained by different elements including system eligibility, funding allocations, and matching requirements. Considering the current funding limits of these traditional programs, and the extensive list of recommended projects, more funding will be required from local and private sources if all transportation needs are to be met over the planning horizon. A summary of the various programs is provided in **Table 18**, and detailed information about each source is contained in **Appendix E**.

Depending on their intended purpose, some of the funding sources may not be entirely available for construction of capital improvements. Several of the sources listed allocate money for routine and/or deferred maintenance activities. Many of the federal funding sources are also constrained to use for improving specific route systems including National, Primary, Secondary, or Urban Highway Systems, and Off-system as shown in **Figure 21** at the end of this section.

Table 18: Funding Sources Summary

Funding Program	Source	Subprograms	Description
Discretionary Programs	Federal	• Bridge Investment Program • Nationally Significant Multimodal Freight and Highway Projects Program (INFRA) • Rebuilding American Infrastructure Sustainably and Equitably (RAISE) Grants • National Infrastructure Project Assistance (MEGA) • Rural Surface Transportation Grant Program (RURAL)	New funding opportunities for roadways, bridges, and other major projects authorized under the Bipartisan Infrastructure Law in addition to reauthorization of surface transportation funding programs under the Fixing America's Surface Transportation (FAST) Act. Eligibility, allocations, and matching requirements vary by program.
Carbon Reduction Program	Federal	N/A	Formula funding to reduce transportation emissions or the development of carbon reduction strategies.
Bridge Formula Program	Federal	N/A	Formula funding to replace, rehabilitate, preserve, protect, and construct bridges on public roads. 15% of funding reserved for off-system bridge projects.
Promoting Resilient Operations for Transformative, Efficient, And Cost-Saving Transportation (PROTECT)	Federal	N/A	Formula funding for PROTECT may be used for both planning and capital improvements to protect surface transportation assets by making them more resilient and protecting communities through resilience strategies that allow for the continued operation of rapid recovery of transportation systems.
National Highway Performance Program	Federal	• Interstate Maintenance (IM) • National Highway (NH) • NHPP Bridge (NHPB)	Provides funding for the National Highway System (NHS), including the Interstate System and NHS roads and bridges.
Surface Transportation Block Grant Program (STBG)	Federal	• Primary (STPP) • Secondary (STPS) • Urban (STPU) • Bridge (STPB) • Off-System Routes (STPX) • Urban Pavement Preservation Program (UPP) • Transportation Alternatives Program (TA)	Funds available for projects on state-designated Primary, Secondary, and Urban Highway Systems. Bridge Program funds are primarily used for bridge rehabilitation or reconstruction activities on primary, secondary, urban, or off-system routes.
National Highway Freight Program (NHFP)	Federal	N/A	This program was created by the FAST Act to invest in freight projects on the National Highway Freight Network. This program provides funding for construction, operational improvements, freight planning, and performance measures.

Funding Program	Source	Subprograms	Description
Highway Safety Improvement Program (HSIP)	Federal	• Railroad Crossing Improvements (RRP/RRS)	Funds are apportioned for safety improvement projects included in the State Strategic Highway Safety Plan. Projects must correct or improve a hazardous road location or feature or address a highway safety problem.
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Federal	• CMAQ (formula) • Montana Air & Congestion Initiative (MACI)-Guaranteed & Discretionary Programs	Federal funds available under this program are used to finance transportation projects and programs to help improve air quality and meet the requirements of the Clean Air Act. At the project level, the use of CMAQ funds is not constrained to a particular system (i.e. Primary, Urban, and NHS).
Federal Lands Access Program (FLAP)	Federal	N/A	This program funds improvements to transportation facilities that provide access to, are adjacent to, or are located within federal lands.
Congressionally Directed Funds	Federal	• Nationally Significant Freight and Highway Projects	Congressionally directed funds may be received through either highway program authorization or annual appropriations processes. This is a discretionary freight-focused grant program for projects that improve safety and improve critical freight movements.
Transit Capital and Operating Assistance Funding	Federal	• Urbanized Area Formula Grants (Section 5307) • Formula Grants for Rural Areas (Section 5311) • Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310) • Bus and Bus Facilities (Section 5339)	The MDT Transit Section provides federal and state funding to eligible recipients through federal and state programs. All funded projects must be derived from a locally developed, coordinated public transit-human services transportation plan (a “coordinated plan”).
Montana Rail Freight Loan Program (MRFL)	State	N/A	Revolving loan fund administered by MDT to encourage projects for construction, reconstruction, or rehabilitation of railroads and related facilities in the state.
TransADE	State	N/A	The TransADE grant program offers operating assistance to eligible organizations providing transportation to the elderly and persons with disabilities.
State Funds for Transit Subsidies	State	N/A	Provides funds to offset expenditures of a municipality or urban transportation district for public transportation. The allocation to operators of transit systems is based on the ratio of its local support for public transportation to the total financial support for all general-purpose transportation systems in the state.
State Fuel Tax	State	• Fuel Tax Formula Distributions • Bridge and Road Safety and Accountability Act (BARSAA)	The State of Montana assesses a tax on each gallon of gasoline and clear diesel fuel sold in the state and used for transportation purposes. State law also establishes that each city and county be allocated a percentage of the total tax fund. Funds may be used for National, Primary, Secondary or Urban Highway Systems as well as local roads.
General Fund	Local	N/A	Accounts for all financial resources except those required to be accounted for in another fund. The General Fund is the county’s primary operating fund.
Special Revenue Funds	Local	• County Road Fund (2110) • County Road Impact Fees (2111) • County Bridge Fund (2130) • Rural Improvement District Maintenance Districts (2500) • Special Bond Funds (Not in Use) • Specialized Transportation Fund (Not in Use)	Account for the proceeds of specific revenue sources that are legally restricted to expenditures for specified purposes (other than for major capital projects).

Funding Program	Source	Subprograms	Description
Debt Service Funds	Local	• Rural Improvement District Bonds	The county may issue debt through Rural Improvement District Bonds or other instruments to enhance the transportation system throughout the county. Individual projects will be reviewed, and debt will be issued if it is in the best interest of the county.
Capital Improvement Program	Local	• Bridge Replacement Plan (BRP)	Gallatin County maintains its capital infrastructure through the Planned Maintenance Projects list and the county's Capital Improvement Program. Capital improvements are financed through a variety of funding sources.
Private Funding Sources	Private	• Cost Sharing • Private Ownership • Transportation Corporations • Road Districts • Private Donations • Privatization • Tax Increment Financing (TIF) • General Obligation Funds • Multi-Jurisdictional Service District • Local Improvement District • User Fees	Private financing of roadway improvements, in the form of right-of-way donations and cash contributions, has been successful for many years. In recent years, the private sector has recognized that better access and improved facilities can be profitable due to increase in land values and commercial development possibilities.
Future Potential Funding Sources	Local	• Local Sales Tax • Wheel Tax • Local Options Motor Fuel Tax • Excise Taxes • Value Capture Taxes	Various other sources of funding may be available in the future, pending legislation and other political decisions made by governing entities.

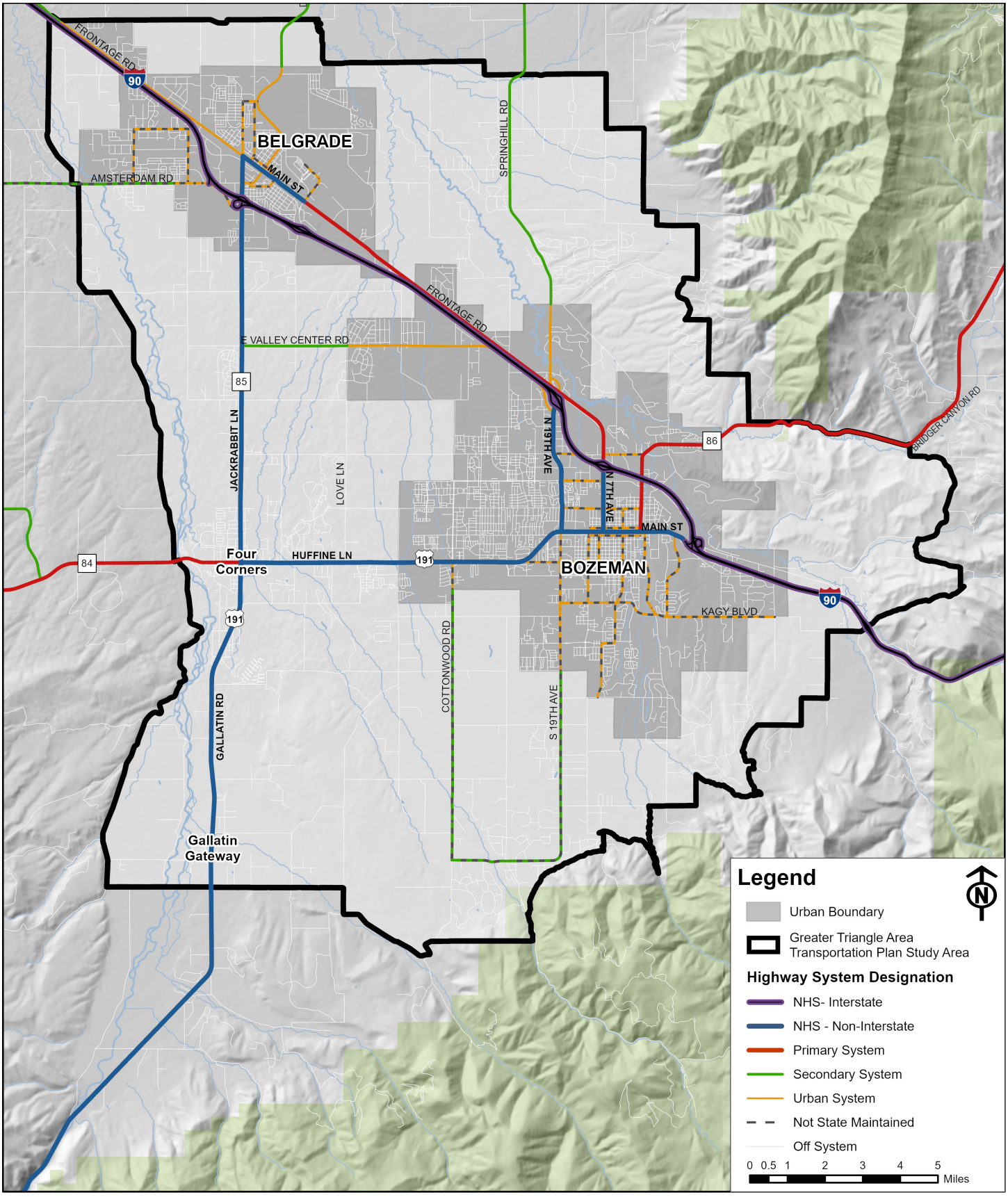


Figure 21: Highway System Designations

8.3. NEXT STEPS

The GTATP is a planning document that helps identify potential improvements to be completed as funding becomes available. At this time, no funding or timeframe for construction of the recommended projects has been identified. **Figure 23** illustrates the project implementation process. After the GTATP is complete, a project advances from the planning stage into the project development and eventual construction phases. Public involvement should occur throughout all phases. The general next steps for implementation are also listed to the right.

1. A funding source(s) is identified and secured.
2. The project is nominated for implementation by the Gallatin County Commission (or other implementing agency).
3. Feasibility studies, environmental investigations, and other development processes are completed as applicable.
4. A design is completed for the project and approved by responsible agency(ies) as needed.
5. Right-of-way is acquired for the project if necessary.
6. The project is constructed.

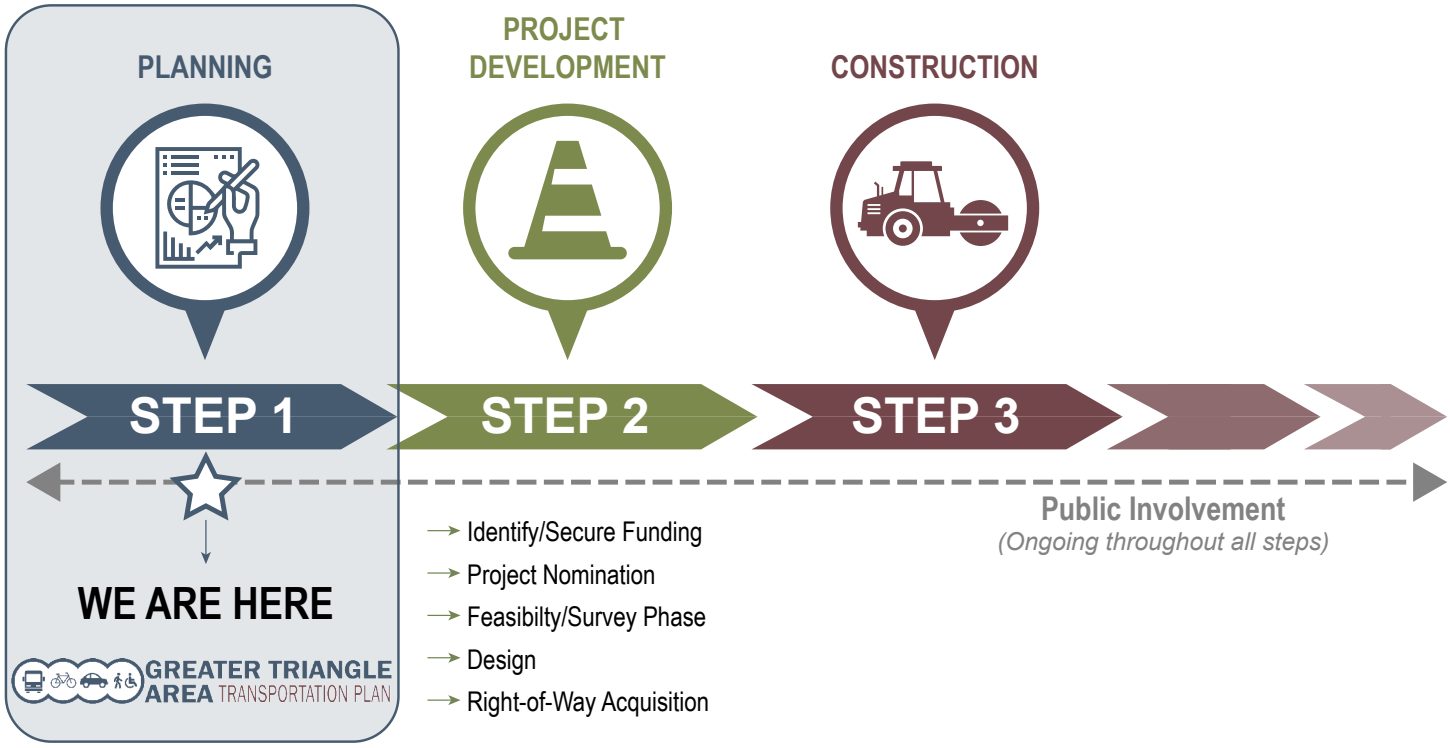


Figure 22: Project Implementation Process

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