
# Shelby Master Transportation Plan

FINAL REPORT

Shelby, MT

May 2014

KLJ

# TABLE OF CONTENTS

# LIST OF FIGURES

## LIST OF FIGURES (continued)

# LIST OF TABLES

Shelby, MT is the county seat of Toole County in north central Montana. Shelby is located on the I-15 corridor and is the center of commerce and health care for the county. Shelby is also the home of the Burlington Northern Santa Fe (BNSF) Railway Company's Intermodal Terminal, which is a regional rail hub.

Population growth and economic growth are anticipated in the coming years, partly due to the proposed Northern Montana Multimodal Hub Center near Shelby.

As Shelby and the surrounding area grows, a well-functioning transportation network is key in maintaining a high quality of life in Shelby, and is also critical for promoting economic growth as a result of the proposed Multimodal Hub Center.

This report has been prepared to aid local and state officials in prioritizing transportation infrastructure improvements.


## STUDY AREA

The study area for this plan is a 32 square mile area which includes the city of Shelby and rural areas surrounding the city. The surrounding rural areas include farmland, grasslands and shrublands. There is also some rough, barren terrain in the study area. The study area can be seen in **Figure 1-1**.

### Existing Land Use

Land use and transportation are fundamentally connected. Land use patterns will impact transportation needs, and the transportation network will affect land use patterns. An example of land use patterns impacting transportation needs is the construction of industrial sites which may require roadway improvements to handle increased heavy vehicle traffic. An example of the transportation network impacting land use patterns is commercial land uses being attracted to more highly traveled roadways.

The existing land use in the study area can be seen in **Figure 1-2**.

*Figure 1-1 – Study Area*

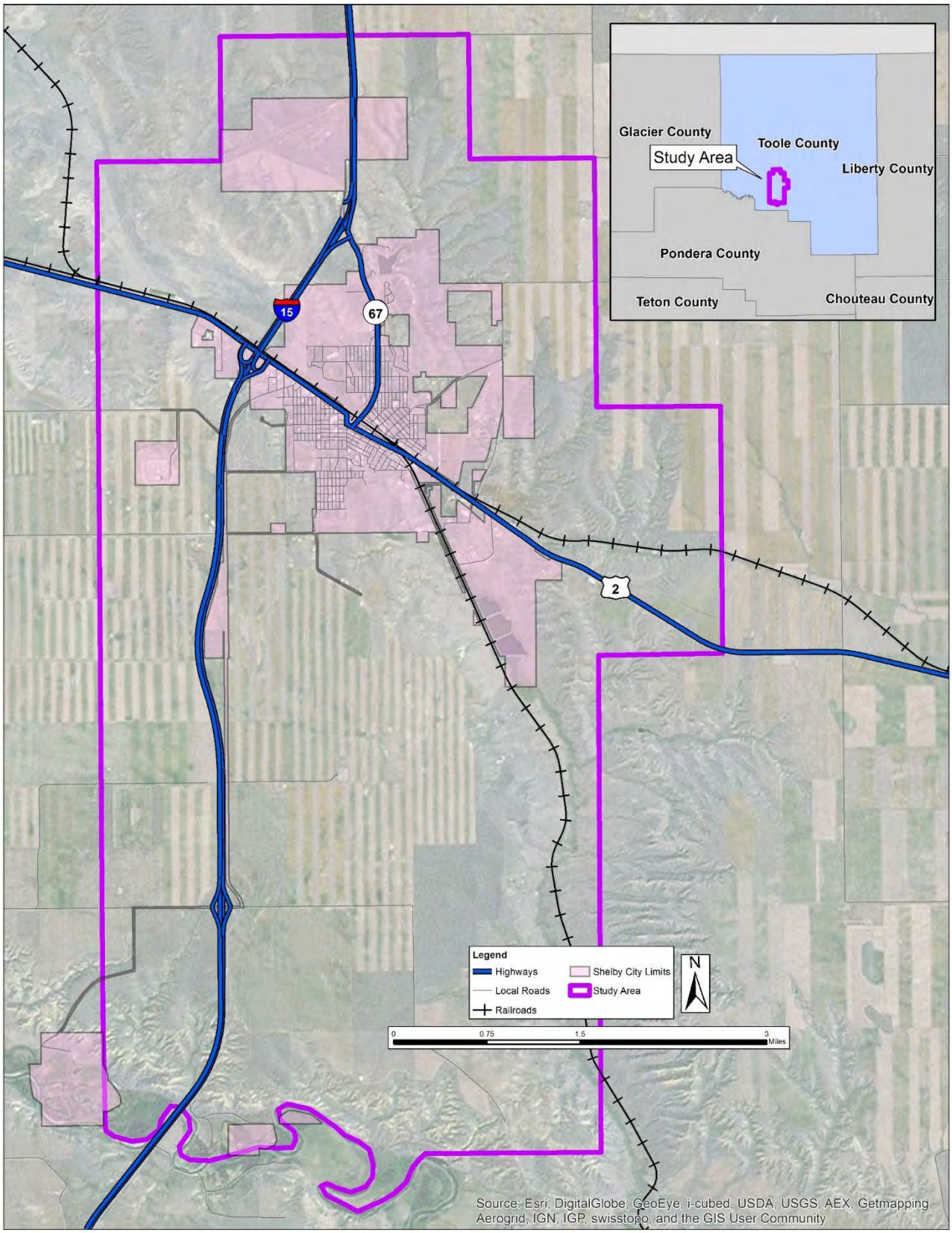
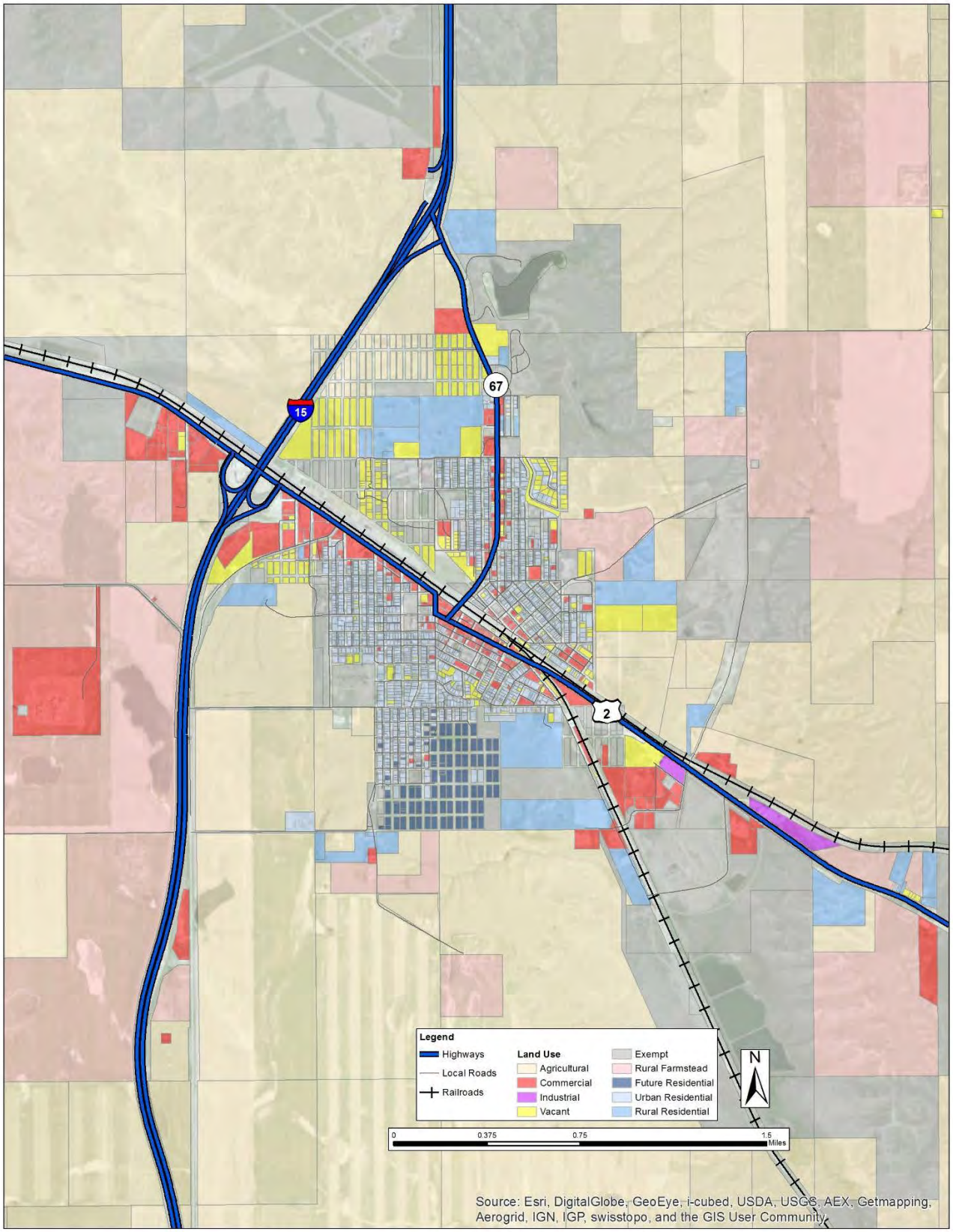


*Figure 1-2 – Existing Land Use*



## CITY DEMOGRAPHICS

The city of Shelby has a population of 3,376 (2010 Census), which makes up approximately 63% of the population of Toole County. The study area population is 3,539 (2010 Census), which is an approximate 5% increase from the 2000 population of 3,372.

### Historic Population Growth

Population changes over the past 40 years for both Shelby and Toole County can be seen in **Table 1-1**.

The populations of both Shelby and Toole County have both fluctuated over the past 40 years, which is primarily a result of varying levels of oil and gas activity in the area. However, the trend over the past 20 years indicates that Shelby and Toole County are both growing. Shelby is growing at a faster pace than Toole County overall, which is to be expected given the services and amenities present in Shelby that are not available elsewhere in the county.

*Table 1-1 – Historic Study Area Population*

| Year | Total Population | |
|---|---|---|
| | Shelby | Toole County |
| 1970 | 3111 | 5839 |
| 1980 | 3142 | 5559 |
| 1990 | 2763 | 5046 |
| 2000 | 3216 | 5267 |
| 2010 | 3376 | 5324 |
| Growth 2000-2010 | 5.0% | 1.1% |

### Households and Household Size

Household information was obtained from 2000 and 2010 US Census data. Both Shelby and Toole County have seen increases in the number of households, with the household growth in Toole County overall exceeding the household growth in Shelby. However, Shelby has seen a higher population increase than Toole County overall due to reduced household sizes in Toole County. Household sizes have been decreasing nationwide for decades due to societal changes. **Table 1-2** below shows household and household size information for 2000 and 2010 for both Shelby and Toole County.

*Table 1-2 – Household Information*

| Year | Number of Households | | Household Size | |
|---|---|---|---|---|
| | Shelby | Toole County | Shelby | Toole County |
| 2000 | 1196 | 1962 | 2.69 | 2.68 |
| 2010 | 1371 | 2336 | 2.46 | 2.28 |
| Change 2000-2010 | 14.6% | 19.1% | -0.23 | -0.41 |

The 2010 population density throughout the study area can be seen in **Figure 1-3**.

### Employment

It is estimated that there are approximately 1,382 jobs in the study area, with nearly all jobs located in Shelby. Since Shelby is the economic center of Toole County, there is a diverse mix of employment types, with health care/social services, public administration, accommodation/food services and retail being the most prevalent job types in the area.

The 2010 employment density throughout the study area can be seen in **Figure 1-4**.

*Figure 1-3 – 2010 Population Density*

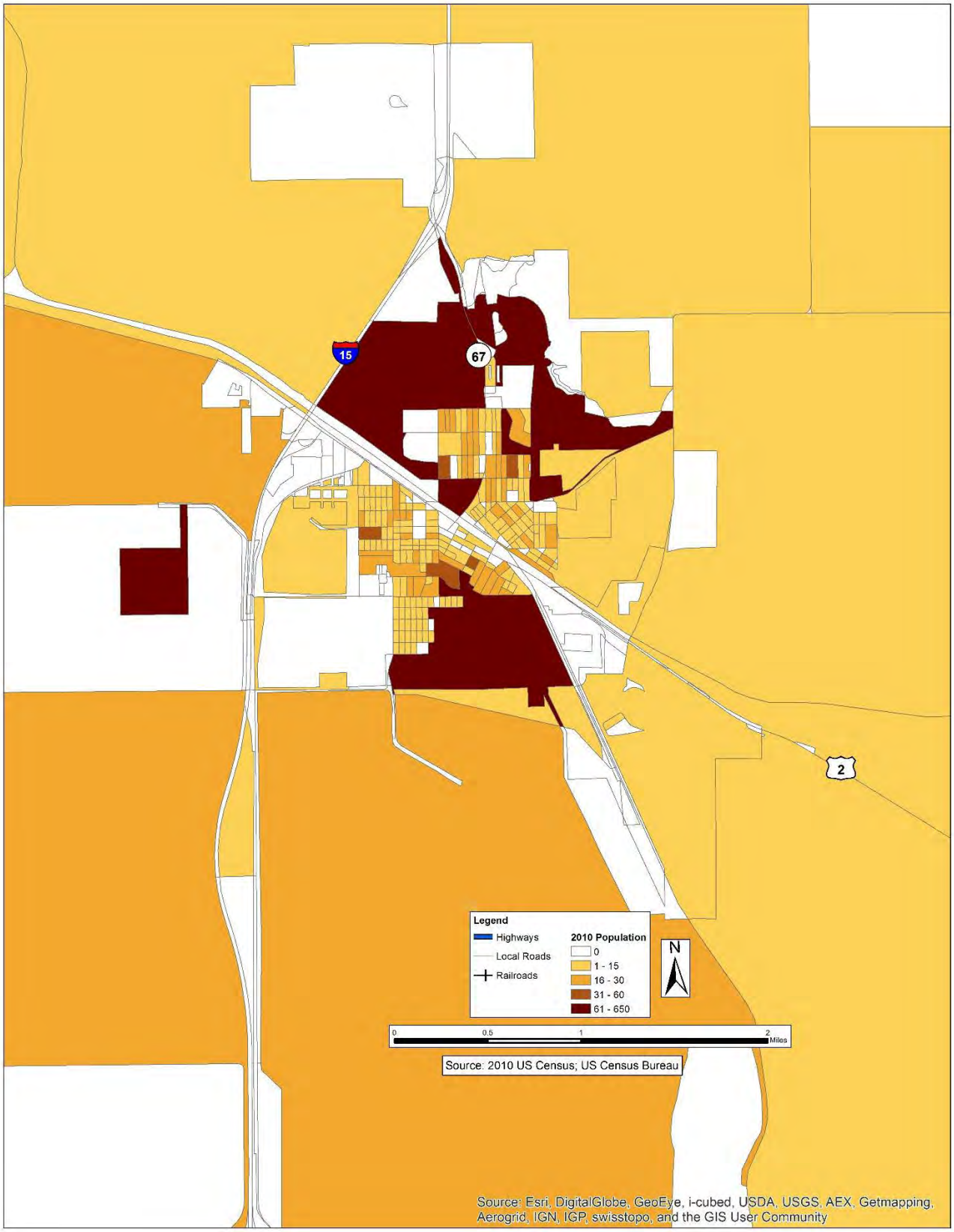
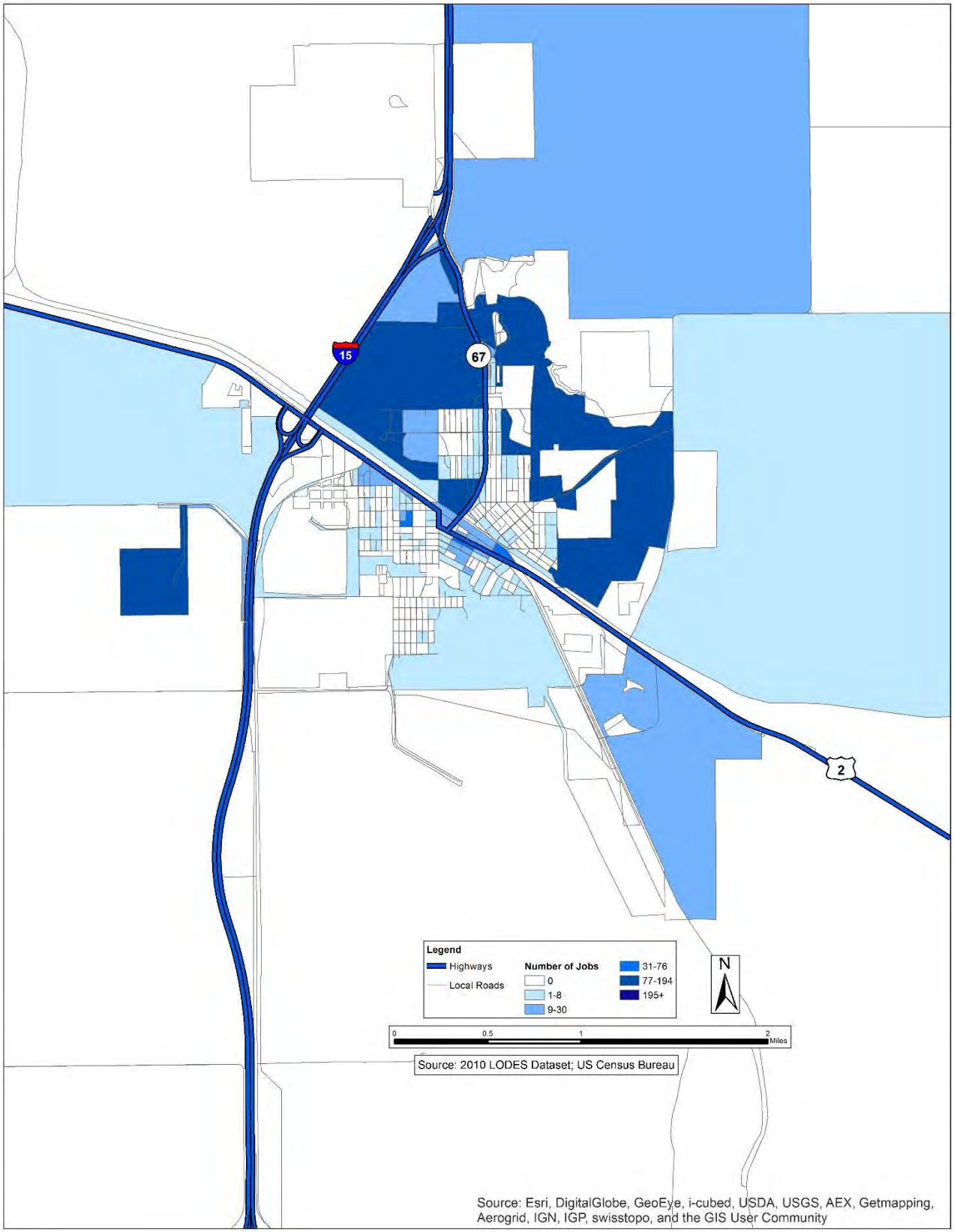


*Figure 1-4 – 2010 Employment Density*



## Means of Transportation to Work

US Census data was obtained to determine the transportation modes that Shelby residents use to commute to work. The most common means of transportation to work is driving alone, which makes up 75% of trips to work. This is very close to the Montana state average of 74%. See **Figure 1-5** for a breakdown of modes used in Shelby.

*Figure 1-5 – Means of Transportation to Work in Shelby*

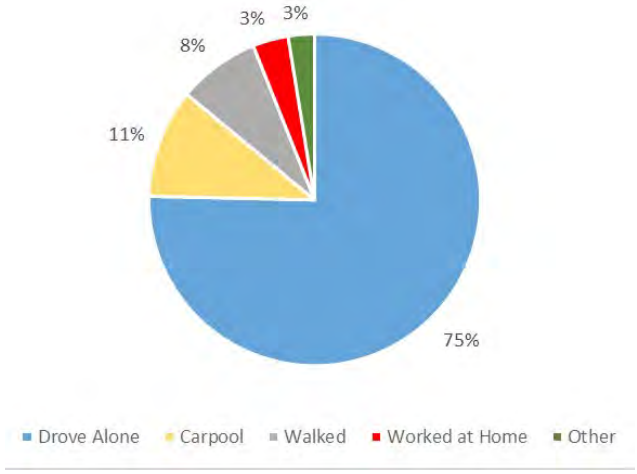
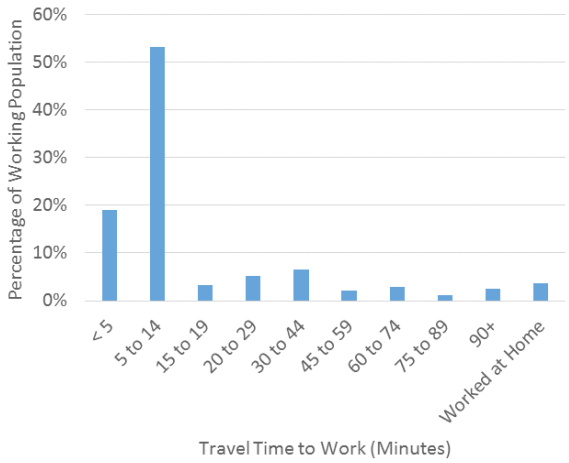



*Figure 1-6 – Travel Time to Work in Shelby*




## Travel Time to Work

US Census data was also obtained to determine how long it takes residents to travel to work. Approximately 72% of Shelby workers commute less than 15 minutes to work, compared to only 47% of Montana workers that commute less than 15 minutes to work. See **Figure 1-6** for travel time to work cohorts in Shelby.

# Forecast Population and Employment Growth

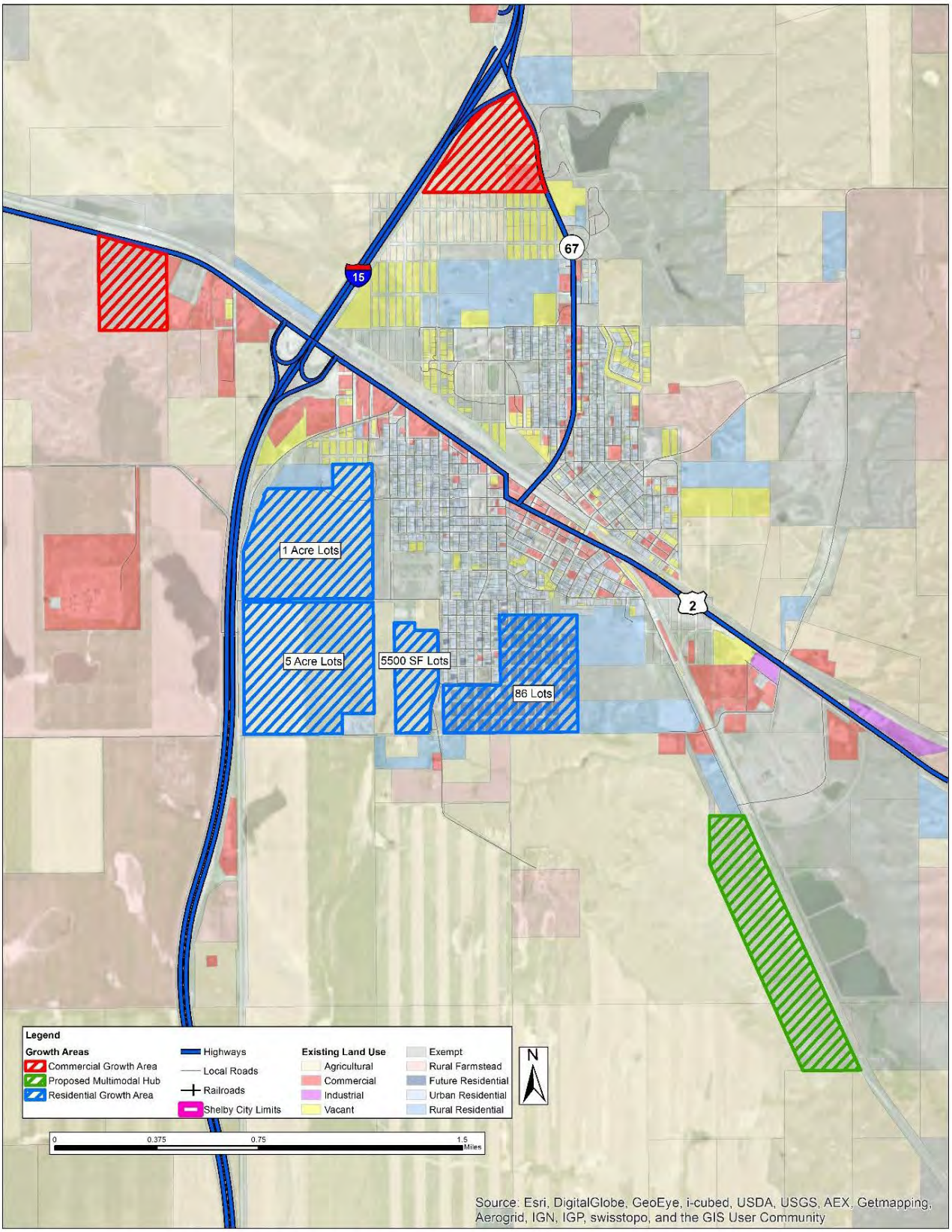
Population and employment forecasts for 2040 were developed using future residential and commercial development densities based on input from local staff. By 2040, it is estimated that the study area population will increase to approximately 4,865 (4,702 in Shelby) and the number of jobs will increase to approximately 3,054. Population, household and employment information for 2040 can be seen in **Table 1-3**.

Most population growth is anticipated to take place in the southern part of the Shelby city limits (see **Figure 1-7**), but some infill development and redevelopment within existing residential areas could be expected as well. Employment growth is expected to occur at the site of the proposed Multimodal Hub Center along US 2, on the west side of Interstate 15 and just south of the Interstate 15/Oilfield Avenue Interchange (see **Figure 1-7**). Most employment growth is related to the Multimodal Hub. The anticipated locations for population and employment growth were determined using information from the Toole County Housing Impact Study and from information obtained from local staff.

*Table 1-3 – Projected 2040 Study Area Population and Employment*

| Year | Population | Households* | Employment |
|---|---|---|---|
| 2010 | 3539 | 1566 | 2185 |
| 2040 | 4592 | 2032 | 2948 |
| *Assume household size = 2.26 (2010 ACS 5-year estimate) | | | |

*Figure 1-7 – 2010 Growth Areas*



# CHAPTER 2: EXISTING TRANSPORTATION NETWORK CONDITIONS

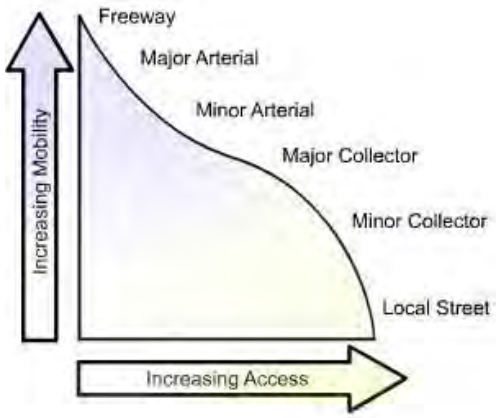
The existing transportation network conditions for vehicular, pedestrian, bicycle and rail modes were analyzed to identify any existing deficiencies in the study area.

## ROADWAY FUNCTIONAL CLASSIFICATION

A roadway's functional classification defines the roadway's role in the overall roadway network system. Arterial roadways are intended to emphasize mobility and local roadways are intended to emphasize property access. Collector roadways are intended to provide a balance of mobility and property access.

The existing roadway functional classification in the study area can be seen in **Figure 2-3**.

*Figure 2-1 – Mobility and Access Characteristics by Roadway Functional Classification*




## ROADWAY SURFACE CONDITION

Existing roadway surfaces were inspected visually during a field review to identify locations with poor pavement conditions. Pavement was considered to be in poor condition if significant cracking, rutting, potholes or aggregate loss was observed. Poor pavement conditions make roadways more susceptible to major failure and can also make driving or biking along these roadways more difficult. The existing pavement conditions can be seen in **Figure 2-4**.

## TRUCK ROUTE

Eastbound/westbound trucks on US 2 through Shelby are directed to bypass Main Street via Front Street and Montana Avenue. Trucks originating from or destined for Oilfield Avenue/I-15 Business Loop are directed to bypass Main Street and the Coyote Pass viaduct via Front Street and Dawson Drive. The truck routes through Shelby can be seen in **Figure 2-5**.

While through truck traffic is directed to bypass Main Street, many trucks and other large vehicles use Main Street anyway. Based on traffic counts performed in September 2013, approximately 650 trucks per day travel through downtown on Main Street (see **Figure 2-8**).

*Figure 2-2 – Truck Prohibition Sign on Viaduct*

### Oversized Truck Route

Very large trucks that are over 24 feet wide, 18 feet tall or 140 long are unable to travel on Interstate 15 since such large trucks cannot travel through interchanges. These very large trucks are uncommon in Shelby, however at least one or two per year can be expected. Therefore, for oversized trucks, Toole County has proposed an alternate truck route between Shelby and the Canadian border that does not use Interstate 15. The proposed oversized truck route can be seen in **Figure 2-6**.

*Figure 2-3 – Existing Shelby Functional Classification Network*

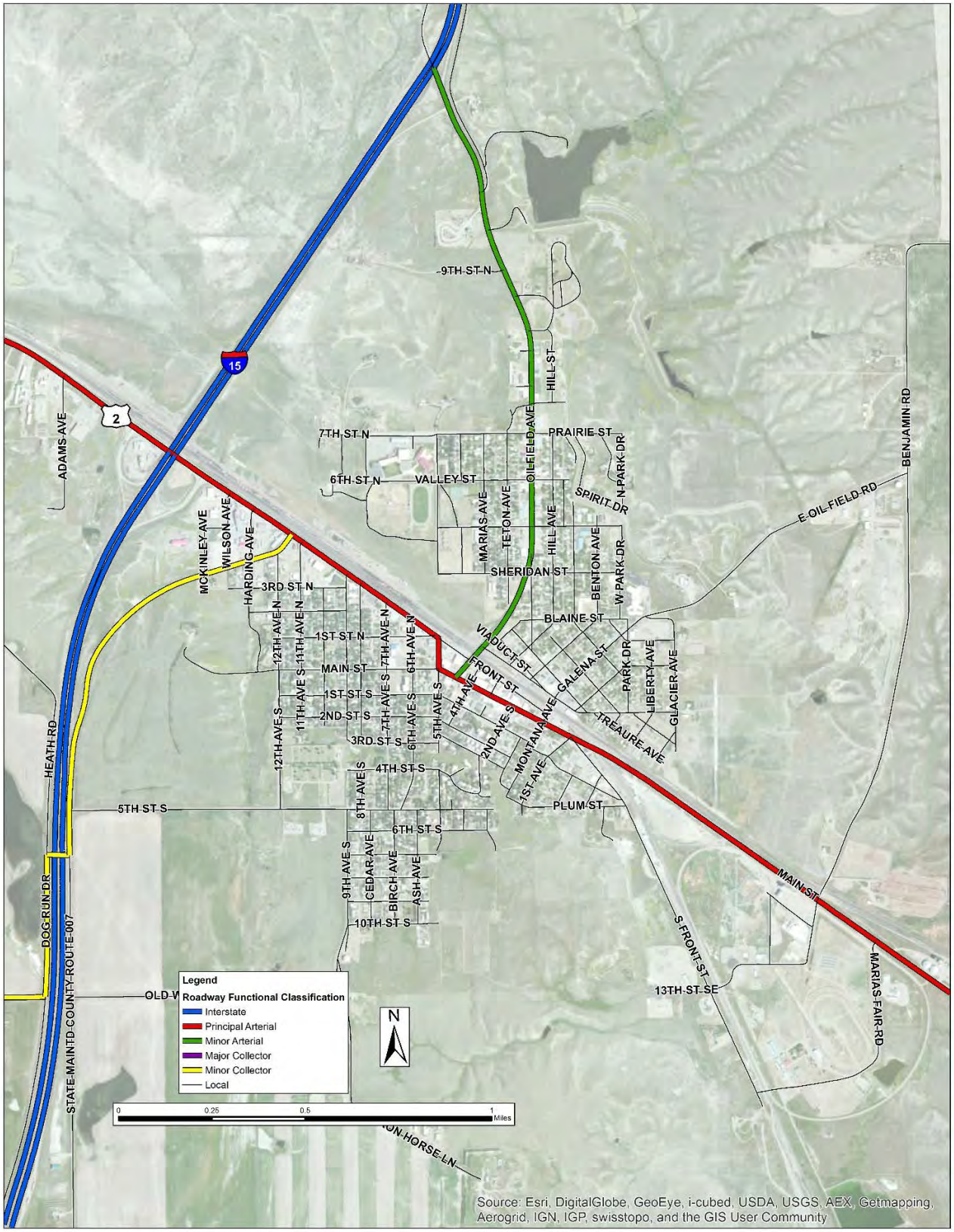


*Figure 2-4 – Existing Pavement Conditions*

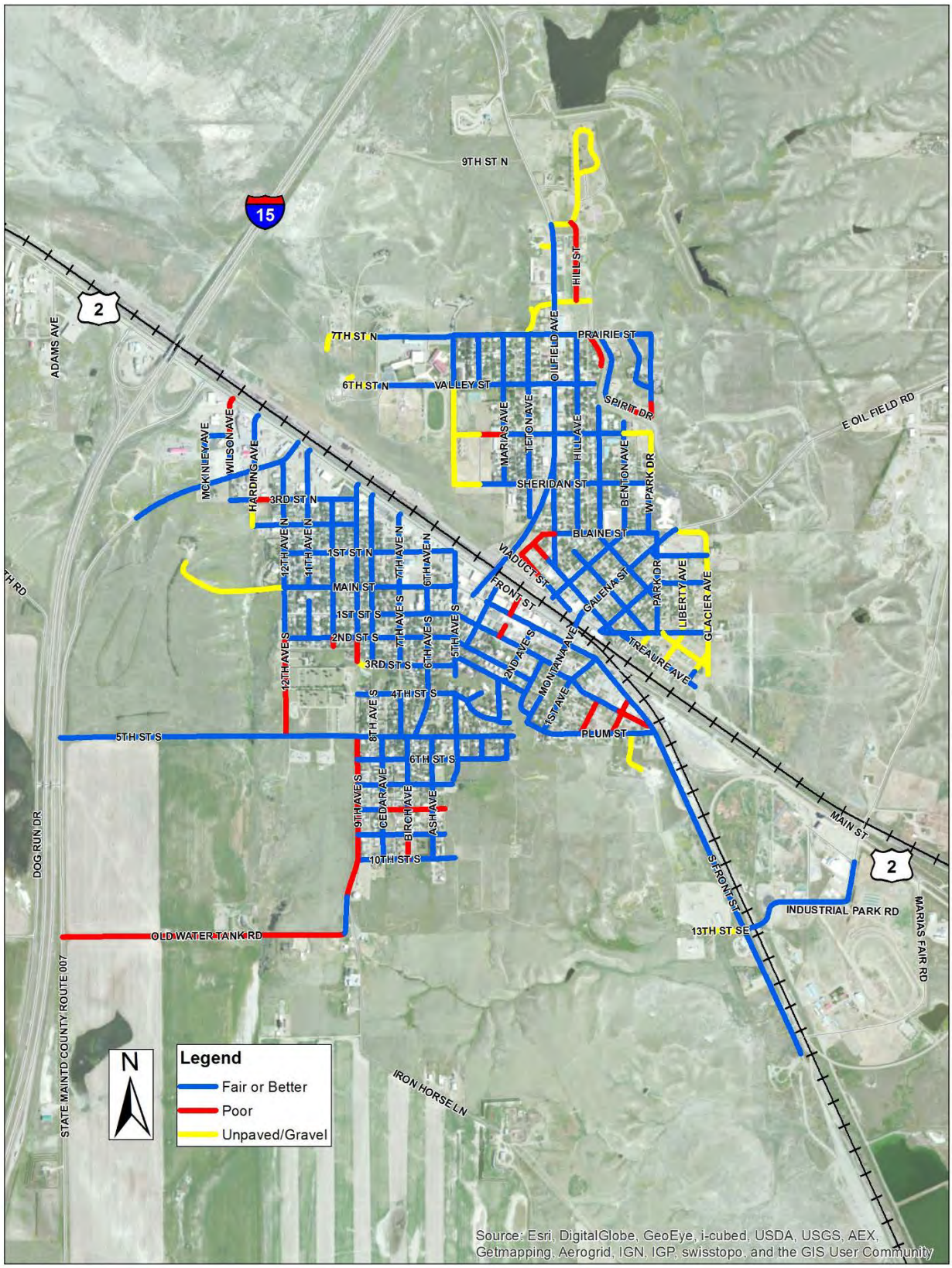
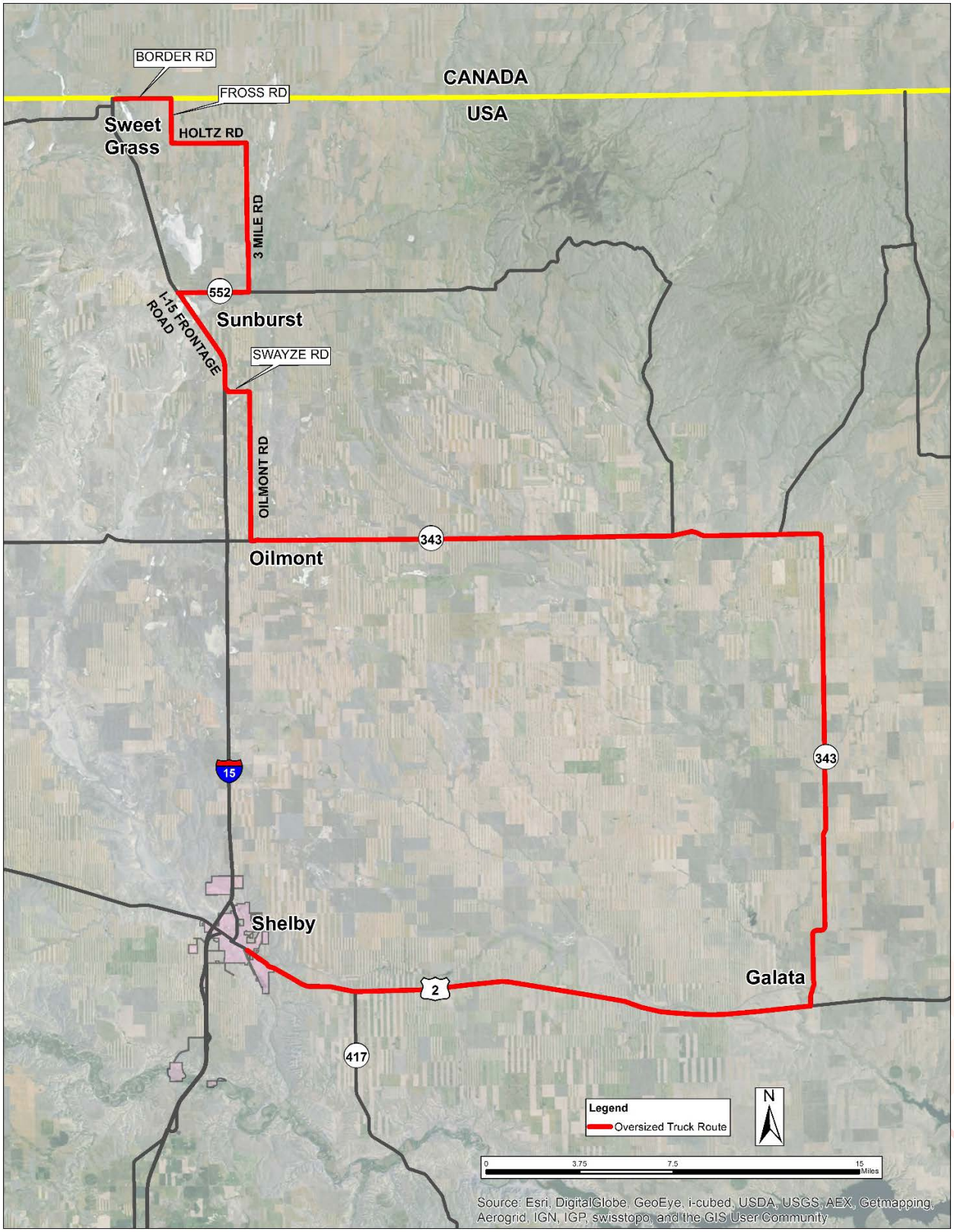


*Figure 2-5 – Shelby Truck Routes*

*Figure 2-6 – Proposed Oversized Truck Route*



## ROADWAY GEOMETRY ISSUES

Roadway geometric issues can increase crash potential and can also affect traffic flow. Locations with roadway geometry issues were identified through a field review and discussions with local staff. The primary roadway geometry concerns are at:

- Interstate 15 and US 2 Interchange
- Main Street and Front Street Intersections with Montana Avenue
- Oilfield Avenue "Y" Intersection

### Interstate 15 and US 2 Interchange

There are concerns regarding the loop ramp geometry and the impact the geometry has on large truck movements. Vehicle swept path analysis was performed on these loop ramps using a typical semi-truck as the design vehicle, and it appears that trucks are capable of negotiating this geometry without issue. The combination of vertical and horizontal curvature on these loop ramps can impact truck speeds, however the relatively low volumes on Interstate 15 result in low truck merging speeds being acceptable. The presence of the railroad just north of the interchange could make major interchange geometry revisions infeasible.

*Figure 2-7 – Identified Roadway Geometry Issues*


### Main Street and Front Street Intersections with Montana Avenue

The intersections of Main Street and Front Street with Montana Avenue are in close proximity and are near an at-grade railroad crossing. The complicated geometry in this area result in many conflict points that could potentially result in crashes.

### Oilfield Avenue "Y" Intersection

The "Y" intersection of Oilfield Avenue, Sheridan Avenue and Coyote Pass is currently a six-legged intersection, which presents more conflict points than a standard four-legged intersection. The increased number of conflict points over a standard intersection results in increased crash potential.

## TRAFFIC SPEEDS

Traffic speeds in Shelby, especially on Main Street have been identified as a concern. Speed data was collected at six locations in Shelby and can be seen in Table 2-1. 85th percentile speeds, or the speed at which 85% of drivers are driving below, is the standard method for determining speeding issues. Traffic speeds on Front Street, Oilfield Avenue and Coyote Pass (viaduct) are above the posted speed limit.

*Table 2-1 – Vehicle Speeds at Study Intersections (All Vehicles)*

| Location | Posted Speed Limit | 85th Percentile Speed |
|---|---|---|
| US 2 - East of 7th Avenue North | 40 | 35.7 |
| Main Street - West of Viaduct | 25 | 22.5 |
| Main Street - West of Montana Avenue | 25 | 24.8 |
| Front Street - West of 3rd Avenue North | 25 | 29.9 |
| Oilfield Avenue (West Leg/Viaduct) - South of Sheridan Street | 25 | 29.9 |
| Oilfield Avenue (East Leg) - South of Sheridan Street | 25 | 28.9 |

Further traffic studies could be completed to determine if traffic calming measures to reduce vehicle speeds on these roadways is appropriate. Posted speed limits alone have been proven to not affect driver speeds without appropriate roadway design. Some examples of traffic calming measures include curb extensions/neckdowns and roundabouts.

Truck speeds through Shelby have also been identified as a concern. The 85th percentile truck speeds and the percentage of trucks traveling above the speed limit at each of the six locations where speed data collected can be seen in Table 2-2.

*Table 2-2 – Truck Speeds at Study Intersections*

| Location | Posted Speed Limit | Truck Count | Trucks Above Speed Limit | 85th Percentile Truck Speed |
|---|---|---|---|---|
| US 2 - East of 7th Avenue North | 40 | 825 | 2% | 35 |
| Main Street - West of Viaduct | 25 | 595 | 2% | 21 |
| Main Street - West of Montana Avenue | 25 | 705 | 7% | 25 |
| Front Street - West of 3rd Avenue North | 25 | 890 | 38% | 30 |
| Oilfield Avenue (West Leg/Viaduct) - South of Sheridan Street | 25 | 435 | 34% | 29 |
| Oilfield Avenue (East Leg) - South of Sheridan Street | 25 | 240 | 30% | 30 |

*It should be noted that the term "truck" also includes pickups towing large trails such as RVs and horse trailers.*

## TRAFFIC VOLUMES

Recent (2010-2012) average daily traffic volumes (ADT) can be seen in Figure 2-9. ADT information was obtained from the Montana Department of Transportation (MDT), and some ADT information was collected as part of this study.

## ROADWAY LEVEL OF SERVICE

Level of Service (LOS) is a measure which is used to describe the operational performance of transportation infrastructure. For vehicular travel, roadway level of service can be analyzed for roadway segments and for intersections. Levels of service are determined based on methodologies presented in the Highway Capacity Manual.

Level of service letter grades range from LOS "A" (best) to LOS "F" (worst), with LOS "A" representing free flow operations and LOS "F" indicating breakdown of traffic flow or conditions where volumes exceed roadway capacity. This study considers LOS "D" or worse operationally deficient, in accordance with MDT design standards. Graphic depictions of LOS "A" through LOS "F" can be seen in Figure 2-8.

*Figure 2-8 – Level of Service Examples*

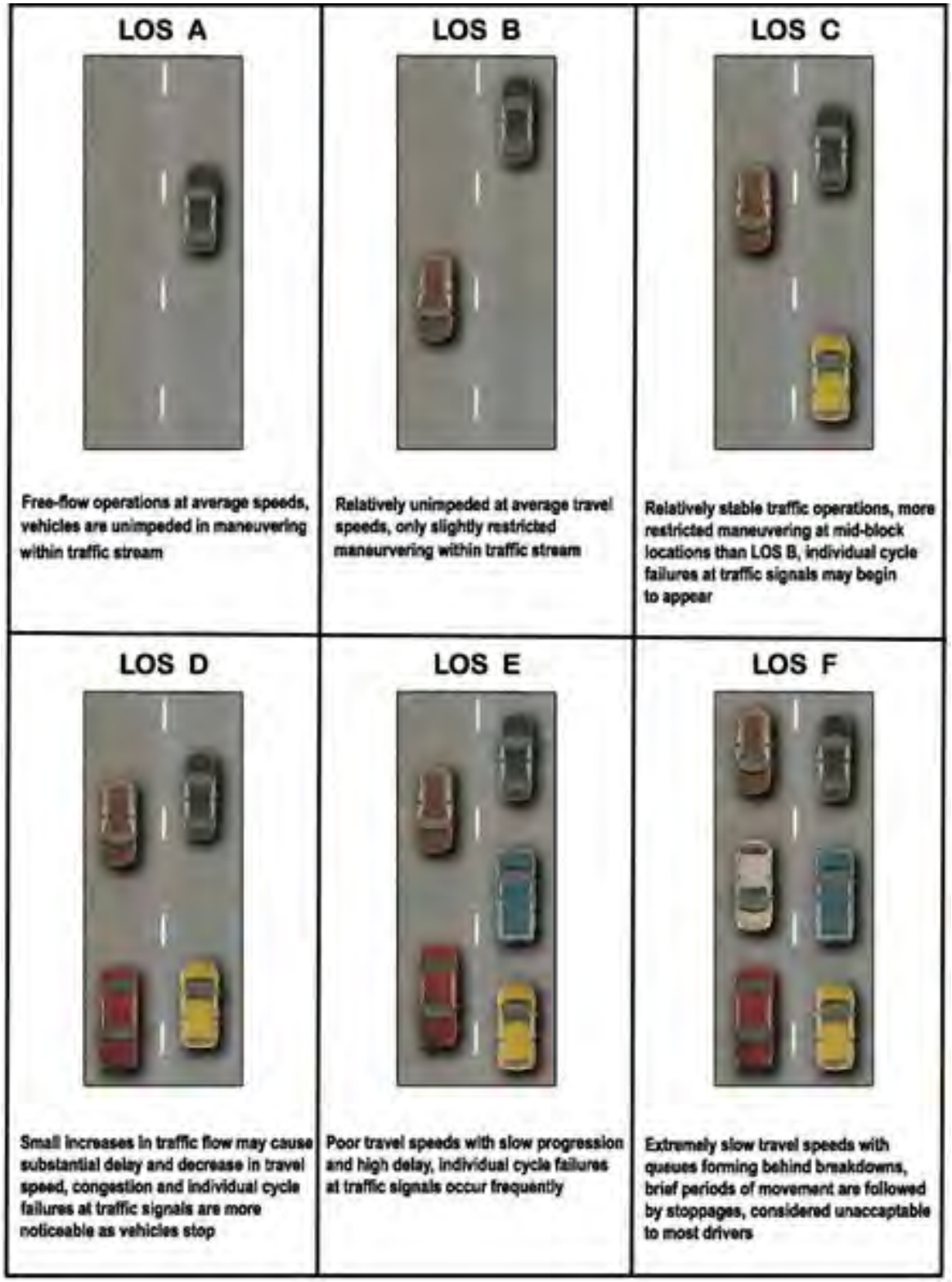


*Figure 2-9 – Recent Average Daily Traffic Volumes (2010-2013)*

## Corridor Level of Service

Corridor level of service refers to the quality of traffic operations along a series of roadway segments. Factors that affect corridor level of service are the presence of traffic control along the corridor, travel speeds, the number of through travel lanes, and the presence of turn lanes, among other factors.

The highest ADT in Shelby is on US 2 between I-15 and 5th Avenue South, which experiences approximately 5,400 vehicles per day. Generalized corridor level of service volume thresholds indicate that 6,500-8,000 ADT would be required to reach LOS "D", indicating that all roadways in the study area currently have sufficient number of through lanes. Corridor level of service volume thresholds can be seen in Table 2-3.

*Table 2-3 – Corridor LOS Volume Thresholds (Daily Volumes)*

| # of Lanes | LOS C | LOS D | LOS E |
|---|---|---|---|
| 2 | 6500-8000 | 10,000-13,000 | 12,000-15,000 |
| 4 | 20,000-29,000 | 27,000-37,000 | 32,000-42,000 |

Note: Thresholds shown as a range due to variability in posted speed limits, and presence of traffic control, turn lanes and other factors

## Intersection Level of Service

Intersection level of service refers to the quality of traffic operations at an intersection, and is assigned based on the delay experienced by drivers. Intersection level of service is typically evaluated for the overall intersection and for each intersection approach. Level of service thresholds at intersections can be seen in Table 2-4.

Intersection level of service was evaluated during PM peak hour traffic conditions at four intersections. These intersections are key intersections in Shelby and were identified as hotspots through discussions with local staff. The studied intersections are:

- Main Street and Montana Ave
- Front Street and Montana Avenue
- Main Street and Coyote Pass (Viaduct)
- Main Street and 5th Avenue North

Each of the intersections currently operate at LOS "B" or better, with no approaches operating worse than LOS "C", indicating acceptable traffic operations. Information regarding intersection levels of service at the studied intersections can be seen in Table 2-5.

*Table 2-4 – Intersection LOS Delay*

| Control Delay (sec/veh) | | Volume < Capacity | Volume > Capacity |
|---|---|---|---|
| Unsignalized | Signalized | | |
| ≤ 10 | ≤ 10 | A | F |
| > 10-15 | > 10-20 | B | F |
| > 15-25 | > 20-35 | C | F |
| > 25-35 | > 35-55 | D | F |
| > 35-50 | > 55-80 | E | F |
| > 50 | > 80 | F | F |

*Table 2-5 – PM Peak Hour Intersection LOS in Shelby*

| Intersection | Intersection Control | Intersection LOS | Approach LOS | | | |
|---|---|---|---|---|---|---|
| | | | EB | WB | NB | SB |
| Main Street and Montana Avenue | TWSC | A | A | A | B | B |
| Front Street and Montana Avenue | TWSC | A | B | B | A | A |
| Main Street and Oilfield Avenue | TWSC | A | A | A | - | C |
| Main Street and 5th Avenue North | AWSC | B | A | B | A | B |

TWSC = Two-ways top control

AWSC = All-waystop control

## ROADWAY SAFETY ANALYSIS

Roadway safety is a key component of any well-functioning transportation system. Recent crash data (1/1/2010 to 12/31/2012) was obtained from MDT to determine if there are any locations in the study area that exhibit crash patterns which indicate potential safety issues.

According to the MDT crash data, 113 crashes were reported in the study area during the analysis period. Of the reported crashes, 89 occurred within Shelby city limits. A breakdown of crashes by relation to Shelby city limits and by crash severity can be seen in Table 2-6.

*Table 2-6 – Crash-Data Summary*

| Location | Total Crashes | PDO Crashes* | Non-Incapacitating Injury Crashes | Incapacitating Injury Crashes** | Fatal Crashes |
|---|---|---|---|---|---|
| Shelby City Limits | 89 | 73 | 13 | 3 | 0 |
| Outside Shelby | 24 | 14 | 10 | 0 | 0 |
| **Study Area** | **113** | **87** | **23** | **3** | **0** |

*PDO = Property damage only

**Incapacitating injury = Any injury, other than a fatal injury, which prevents the injured person from walking, driving or normally continuing the activities the person was capable of performing before the injury occurred.

Approximately 23% of all crashes in the study area resulted in injuries, which is nearly equal to the Montana state average of 24% (from MDT). No fatal crashes were reported in the study area.

### Winter-Related Crashes

Crashes were broken down by month and season (see **Figure 2-10** and **Figure 2-11**) to see if crash frequency increases during times associated with snow and ice. The month with the highest number of reported crashes is November and the season with the highest number of reported crashes is fall (September through November). More crashes were reported during the winter months than during the spring and summer months, indicating that difficult driving conditions due to snow and ice could be resulting in more crashes during these times of the year.

*Figure 2-10 – Crashes by Month*

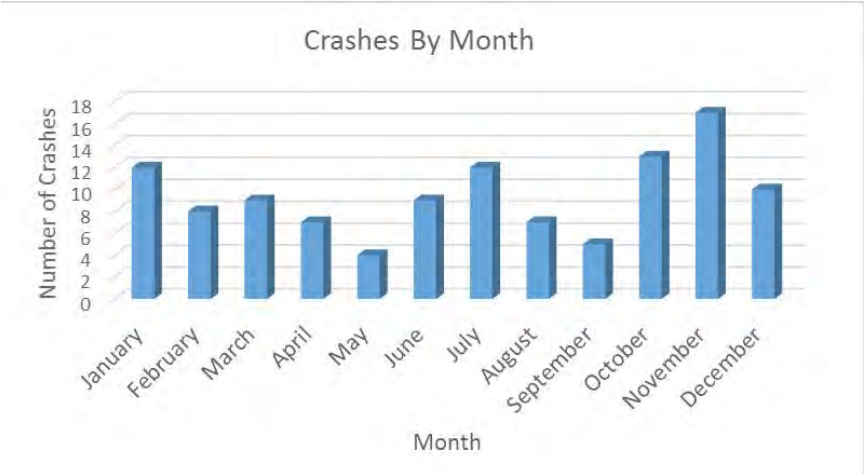
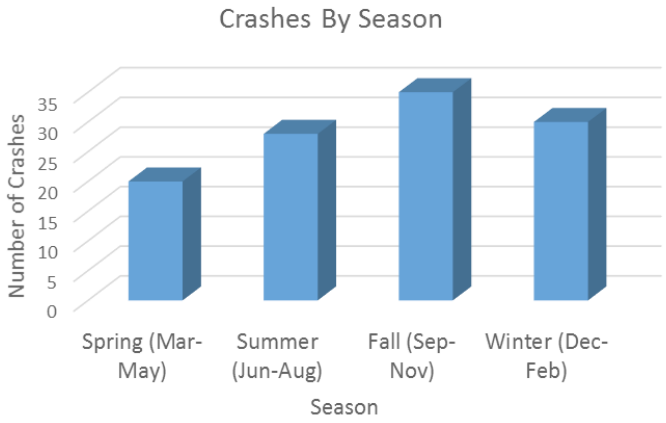



*Figure 2-11 – Crashes by Season*




## Intersection Crashes and Roadway Segment Crashes

Crashes at or related to intersections were analyzed separately from crashes occurring on roadway segments between intersections. Crash data is typically analyzed in this manner since intersection crashes and segment crashes have different causes and characteristics. A breakdown of crashes by relation to intersections can be seen in the Table 2-7.

*Table 2-7 – Intersection Crash Summary*

| Location | Intersection Crashes* | Intersection Injury Crashes** | Segment Crashes | Segment Injury Crashes | Total Crashes | Total Injury Crashes |
|---|---|---|---|---|---|---|
| Shelby City Limits | 41 | 11 | 49 | 5 | 90 | 16 |
| Outside Shelby | 0 | 0 | 23 | 10 | 23 | 10 |
| **Study Area** | **41** | **11** | **72** | **15** | **113** | **26** |

*Includes crashes at driveways

**All types of injury crashes

Intersection crashes make up 36% of total crashes in the study area. Across Montana, 34% of crashes occur at intersections (MDT). Of all injury crashes, 42% occurred at intersections. Nationwide, 51% of all injury crashes occur at intersections (NHTSA).

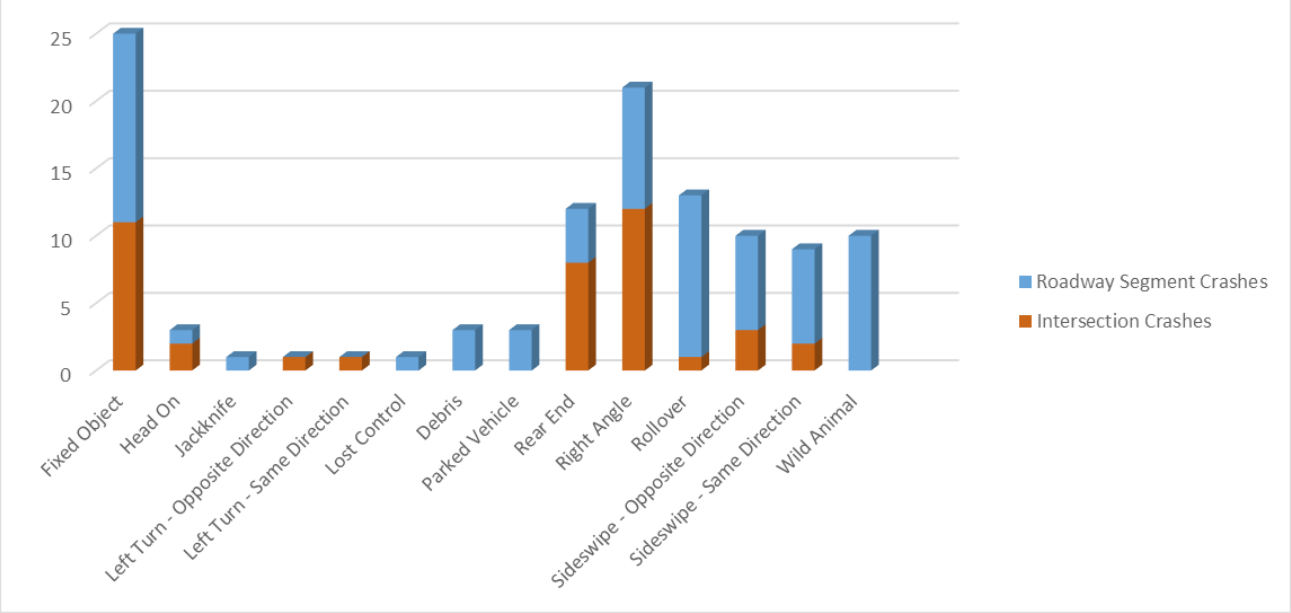
Crashes reported throughout the study period in Shelby can be seen in Figure 2-12.

*Figure 2-12 – Study Area Crashes (2010-2012)*

## Crashes by Manner of Collision

Crash data was broken down by manner of collision to determine if any crash types are disproportionately represented. Figure 2-13 shows the number of crashes by each collision type for both intersection crashes and roadway segment crashes.

*Figure 2-13 – Crashes by Manner of Collision*




The most prevalent crash types in the study area are fixed object crashes and right angle crashes. Fixed object crashes make up 22% of all crashes, which is above the Montana state average of 13%. Right angle crashes make up 19% of all crashes, which is slightly below the national average of 23%.

The number of fixed object crashes could potentially be reduced by ensuring that roadside object placement adheres to AASHTO clear zone guidelines. Right angle collisions at intersections could be reduced by ensuring that sight lines between vehicles are clear of obstructions by following sight distance guidelines from the AASHTO Policy on Geometric Design of Highways and Streets (Green Book).

## Intersection Crashes

Only two intersections in the study area experienced more than one crash over the three year analysis period. These intersections are:

- Cedar Avenue and 6th Street South
  - 2 right angle crashes – 1 property damage only (PDO) crash, 1 non-incapacitating injury crash
  - 1 fixed object crash – PDO crash
- Birch Avenue and 9th Street South
  - One sideswipe – non-incapacitating injury crash
  - One fixed object – PDO crash

### Roadway Segment Crashes

Roadway segment crashes were separated into two classifications, interstate crashes and non-interstate crashes.

#### Interstate Roadway Segment Crashes

15 roadway segment crashes were reported on Interstate 15 during the analysis period. This equates to 0.49 crashes per million vehicle miles traveled (MVMT), which is well below the Montana state average, which varied between 1.90 and 2.26 crashes per MVMT between 2000 and 2009 (from Montana Traffic Safety Problem Identification, FFY2011).

#### Non-Interstate Roadway Segment Crashes

### Roadway Safety Analysis Summary

Based on crash data analysis, no safety deficiencies were identified at any location in the study area. Crash patterns should however continue to be monitored to determine if any safety issues arise in the future.

## BICYCLE AND PEDESTRIAN FACILITIES

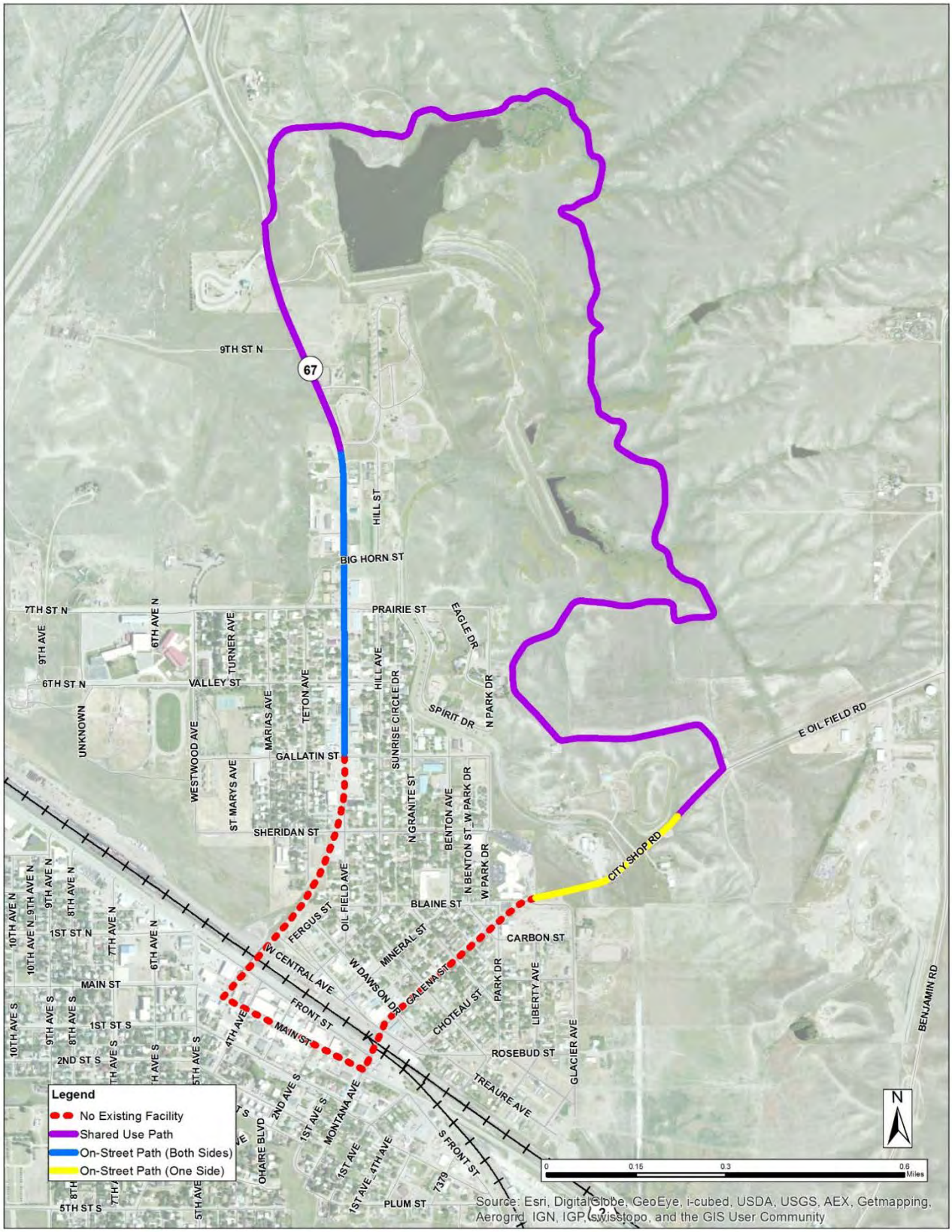
Well-planned and maintained bicycle and pedestrian facilities can improve the quality of life by providing transportation options and recreational opportunities for residents. Increased walking and bicycling has health and environmental benefits and also has the potential to reduce roadway congestion. Communities where pedestrian and bicycle activity is common are generally viewed as safe and inviting places that people would like to live. Communities that have emphasized bicycle and pedestrian system improvements have experienced economic growth, especially when commercial areas are well served by pedestrian and bicycle facilities.

Enhancing travelers' ability to walk or bike involves not only providing the infrastructure but also linking urban design, streetscapes and land use to encourage walking and biking. The 5 E's model should also be used when promoting increased bicycle and pedestrian activity. The 5 E's model includes Engineering, Education, Encouragement, Enforcement and Evaluation. This study primarily focuses on the Engineering aspect.

### Existing Bicycle Facilities

Dedicated bicycle facilities are located on the Roadrunner Recreational Trail, which can be seen in **Figure 2-16**. The Roadrunner trail has a combination of bicycle lanes and shared use paths. There are currently some gaps in the designated Roadrunner trail, primarily on Main Street, Galena Street and on the viaduct, which can be seen in **Figure 2-14**.

*Figure 2-14 – Roadrunner Recreational Trail Route*



## Existing Bicycle Facilities

Sidewalks are located on one or both sides of the street in many areas of Shelby. However, there are gaps in sidewalk continuity at several locations. A sidewalk inventory indicated that sidewalks are present one or both sides of the roadway along approximately 59% of roadways in Shelby and there are no sidewalks along approximately 41% of roadways (see **Table 2-8**). A map showing existing sidewalks in Shelby can be seen in **Figure 2-18**. Sidewalk gaps can present challenges to pedestrians, especially those with disabilities. Sidewalk discontinuity can also present safety issues since pedestrians may have to walk in the street where there are no sidewalks.

Wide sidewalks are present downtown along Main Street, which is desirable since wide sidewalks create an inviting walking environment in the area of Shelby which experiences the most pedestrian traffic.

Crosswalks are located at various pedestrian crossings throughout Shelby, primarily in the downtown area and near schools. Crosswalks can improve crossing conditions by notifying both pedestrians and drivers of pedestrian crossing locations; however careful consideration must be given to the selection of locations where new crosswalks are installed. Poorly located crosswalks can actually reduce pedestrian safety by giving pedestrians a false sense of security when crossing a roadway.

Table 2-8 – Sidewalk Presence Along Roadways in Shelby

| Sidewalk Presence | Approximate Percentage of Roadway Network |
|---|---|
| Both Sides of Roadway | 21% |
| One Side of Roadway | 38% |
| None | 41% |

### Sidewalk Design Standards

The Shelby City Code stipulates that newly constructed sidewalks shall be a minimum of 8 feet wide in commercial districts and 5 feet wide in all other districts. It is also stipulated that sidewalks shall be installed within 180 days of the substantial completion of any new dwelling unit.

### ADA Considerations

All pedestrian facilities should conform to ADA accessibility standards, however it is not uncommon for deficiencies to exist in most communities.

ADA deficiencies must be corrected as part of any improvement which alters the public right-of-way within the construction limits. Pavement resurfacing projects constitute as an alteration, therefore ADA improvements must be made during such projects to provide ADA compliant curb ramps since they are within the construction limits. ADA improvements on sidewalks are not triggered by resurfacing projects, however sidewalk reconstruction would trigger the requirement to ensure all sidewalks within the project limits are ADA compliant. Basic roadway maintenance such as patching and re-striping does not trigger the requirement to make ADA improvements.

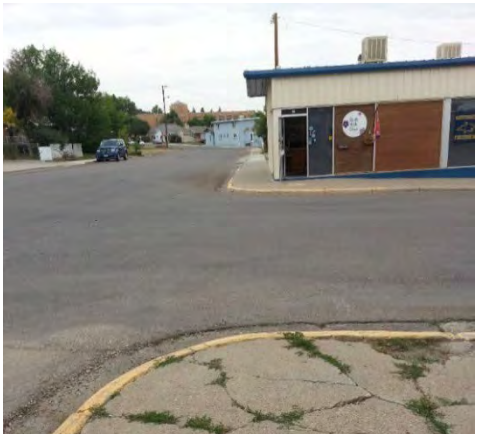
### Sidewalk Widths

Sidewalks in Shelby generally meet ADA width requirements (4 feet minimum, 5 feet preferred), however there are some locations with existing widths that do not meet these standards.

A critical location where sidewalk width standards are not met is the viaduct (see **Figure 2-15**), however adequate sidewalk widths cannot be provided unless the viaduct is replaced. This is a critical pedestrian facility deficiency since the viaduct is one of two locations where vehicles and pedestrians can cross the railroad tracks. During a field review, multiple instances of pedestrians and bicyclists conflicting on the narrow sidewalks were observed, which resulted in one user being forced off the sidewalk into the street. It would currently be impossible for two wheelchair or scooter users to pass each other.

*Figure 2-15 – Narrow Sidewalks on Viaduct*

*Figure 2-16 – Missing Curb Ramps*



### Curb Ramps

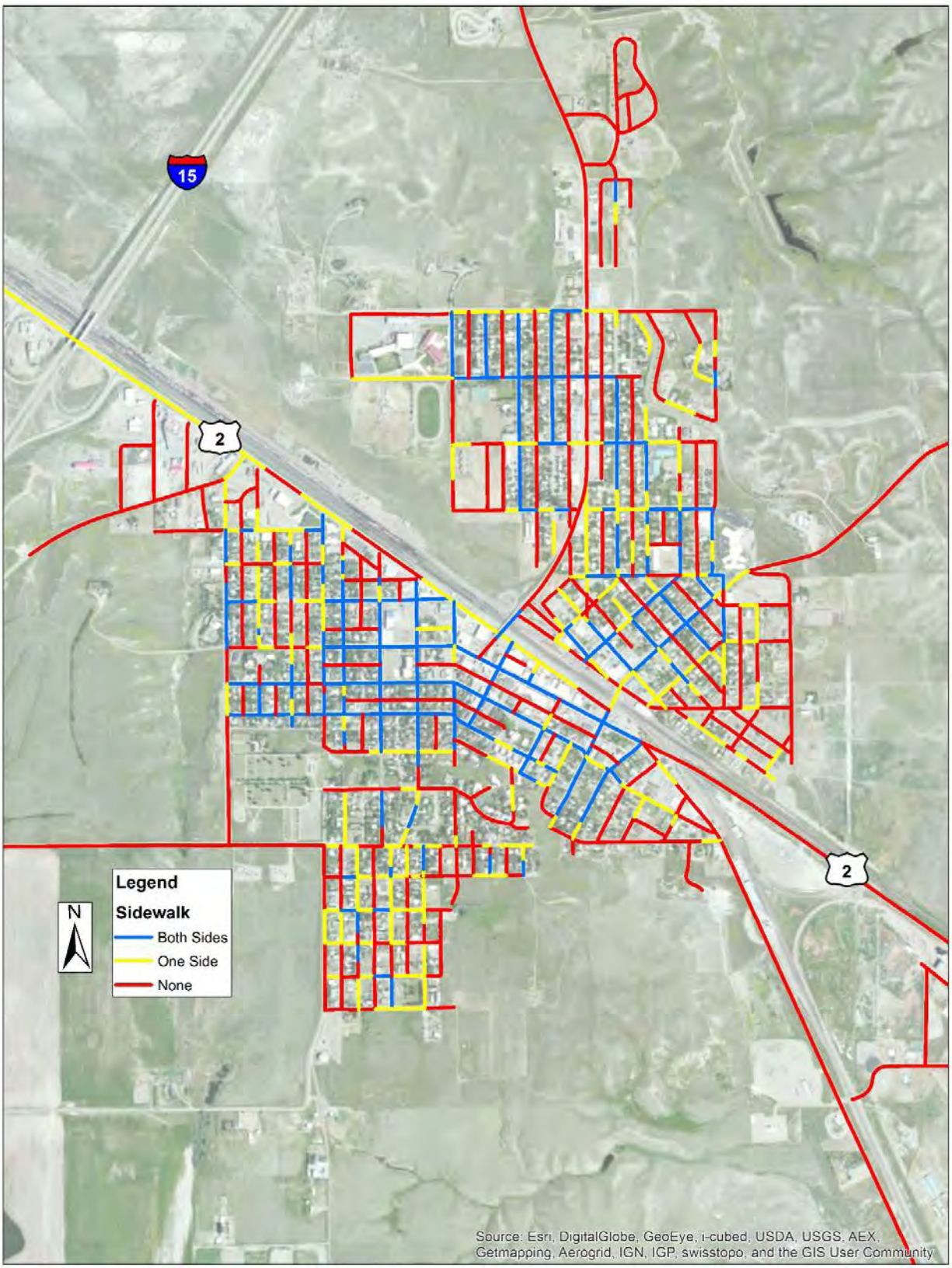
Curb ramps are provided for many pedestrian crossings in Shelby, however there are several locations where curb ramps are not present (see **Figure 2-16**). The absence of curb ramps can make such crossings difficult or impossible for wheelchair or scooter users to traverse and can also present difficulties to vision impaired pedestrians.

### Deteriorated Sidewalks

Some sections of deteriorated sidewalks (see **Figure 2-17**) were also identified throughout the city. Deteriorated sidewalks can be difficult for wheelchair users and vision impaired pedestrians to traverse.

*Figure 2-17 – Deteriorated Sidewalk*

*Figure 2-18 – Sidewalk Presence Along Roadways in Shelby*



## RAIL

The railroad has always been an important part of life in Shelby. Both passenger and freight trains travel through and make stops in Shelby on a daily basis. According to Federal Rail Administration (FRA) data, approximately 40 trains travel through Shelby every day.

Ensuring that the railroad and other travel modes can operate in harmony is important for the economic vitality and quality of life in Shelby.

The existing railroad facilities in Shelby can be seen in **Figure 2-20**.

*Figure 2-19 – Railroad Tracks Near Downtown Shelby*

### Passenger Rail

An Amtrak passenger rail station is located near downtown Shelby. Shelby is served by Amtrak's Empire Builder Line which runs from Seattle to Chicago. In 2012, the Shelby station had 15,501 combined passengers getting on and off of trains, which was the second highest total in the state of Montana.

### Freight Rail

BNSF's Hi Line and Great Falls Subdivisions intersect in Shelby. The BNSF Intermodal Facility is located southeast of the Interstate 15/US 2 interchange and currently processes approximately 1,000 revenue lifts per year. The Shelby Industrial Park in the southeast part of Shelby is served by a railroad loop that connects to the Great Falls subdivision tracks.

#### Proposed Port of Northern Montana Multimodal Hub Center

The state of Montana has been awarded a $10 million grant for the development of the Port of Northern Montana Multimodal Hub Center. The Multimodal Hub Center will be an inland port that would replace the existing BNSF Intermodal Facility. The proposed Multimodal Hub Center is located just southeast of Shelby City Limits and would be capable of effectively shipping and receiving containerized international cargo from intermodal unit trains.

The proposed Multimodal Hub Center would alleviate limitations faced by the existing Intermodal Facility. The current facility is not large enough to efficiently accommodate large modern unit trains. Trains must be moved and split into multiple sections to load and unload. Inefficiencies in loading and unloading cargo at the existing facility causes delays to freight trains which can result economic impacts. Passenger trains experience delays when the intermodal facility is required to have trains on the mainline while loading and unloading, with average delays of 20 minutes during such events. Delays are also experienced by automobiles, bicyclists and pedestrians when at-grade crossings are blocked by trains that have to be split up to be accommodated at the existing facility.

*Figure 2-20 – Existing Railroad Facilities*

## At Grade Railroad Crossings

There are six at-grade railroad crossings in the study area. The existing warning devices at each at-grade crossing can be seen in Table 2-9.

*Table 2-9 – Existing Grade Crossing Warning Devices*

| Crossing Roadway | Warning Devices |
|---|---|
| Main Street | Flashing Lights |
| Montana Avenue | Gates and Flashing Lights |
| Industrial Park Road (South End) | Crossbuck Only |
| Industrial Park Road (North End) | None |
| Marias Fair Road | Crossbuck Only |
| Benjamin Road | Gates and Flashing Lights |

A review of guidelines in the FHWA Railroad-Highway Grade Crossing Handbook indicates that the existing warning devices at each crossing are sufficient. Additional measures would however need to be taken if the implementation of a railroad quiet zone is desired. Trains would not be permitted to sound their horns while passing through Shelby if a quiet zone was implemented. Shelby does not currently have a railroad quiet zone.

*Figure 2-21 – Examples of Grade Crossing Warning Devices*


Crossbuck

Flashing Lights

Flashing Lights and Gates

The at-grade crossing on Montana Avenue north of Front Street has been identified as an issue by local staff. Multiple instances of trains being stopped at the crossing were observed, with some blockages lasting up to 20 minutes. Vehicle queues were observed to spill back across Front Street when the gates were down, which impacts traffic flow, especially for trucks. Improved freight train loading and unloading efficiency associated with the completion of the proposed Multimodal Hub Center should reduce the number of events where trains block the crossing for extended periods of time.

## PROJECTED 2040 TRAFFIC VOLUMES

Projected 2040 traffic volumes in Shelby were obtained using MDT's Shelby travel demand model. A travel demand model is a computerized traffic model which is used to predict future traffic volumes based on an assumed future transportation network and the locations of projected population and employment growth.

Three different 2040 roadway network scenarios were used in the travel demand model. These scenarios are:

- Base scenario
  - 2040 traffic volumes with the existing transportation network
- Alternative 1
  - 2040 traffic volumes with the recommended transportation network improvements:
    - Extend 12th Avenue South to Old Water Tank Road/13th Street South
    - Extend Old Water Tank Road/13th Street South to SE Front Street
- Alternative 2
  - 2040 traffic volumes with the recommended transportation network improvements:
    - Extend 12th Avenue South to Old Water Tank Road/13th Street South
    - Extend Old Water Tank Road/13th Street South to SE Front Street
    - Construct interchange at Interstate 15 and Old Water Tank Road/13th Street South

*Figure 3-1 – Travel Demand Model Alternatives Scenarios*


Estimated average daily traffic volumes under each of the three travel demand model scenarios can be seen in **Figure 3-2**, **Figure 3-3** and **Figure 3-4**. Improved roadway connectivity in south Shelby that is represented in Alternatives 1 and 2 is expected to result in less traffic growth on US 2/Main Street by providing additional route options from the south parts of Shelby.

*Figure 3-2 – 2040 Traffic Volumes – Existing Transportation Network*

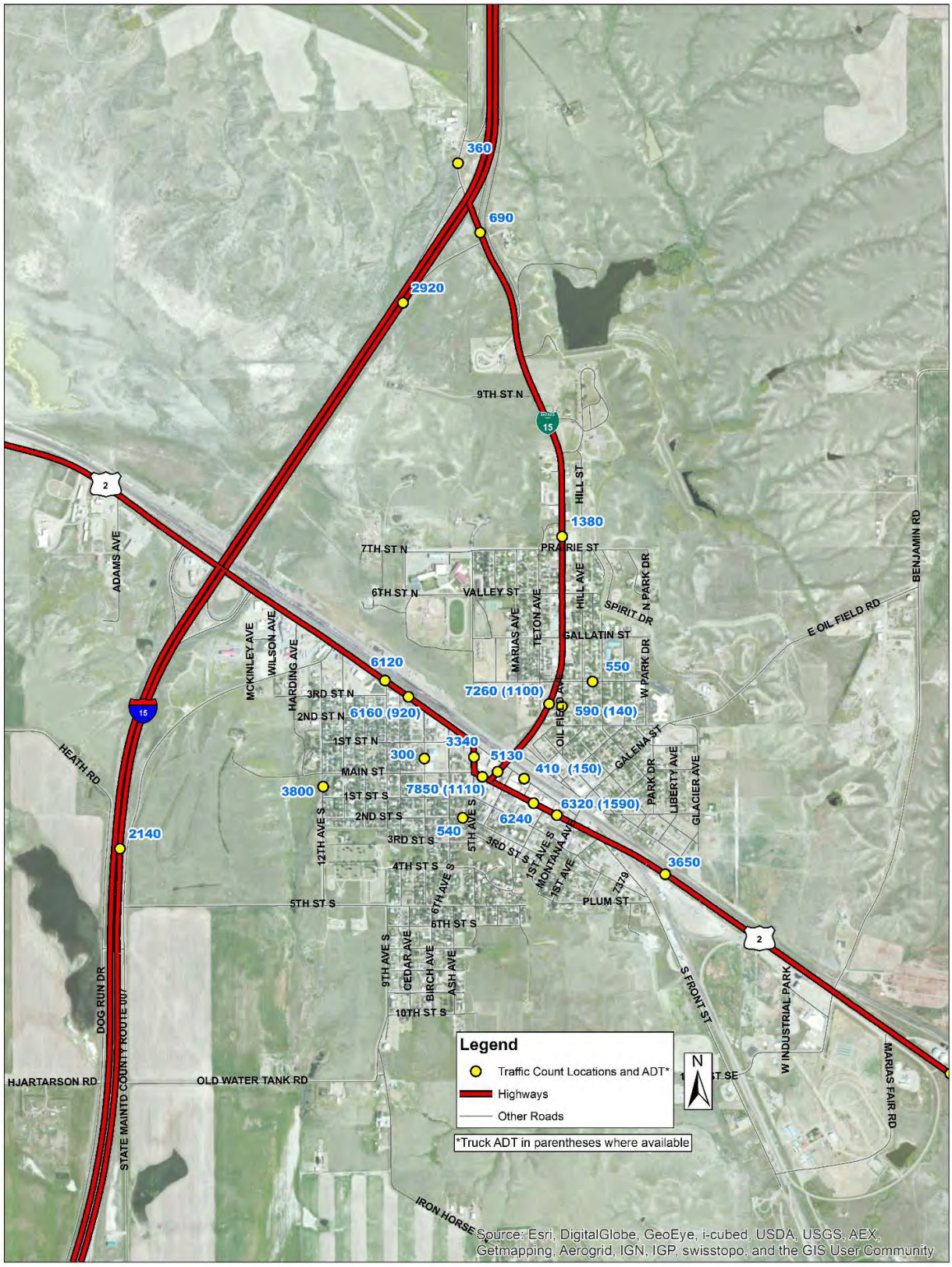


*Figure 3-3 – 2040 Traffic Volumes – Future Transportation Network Alternative 1*

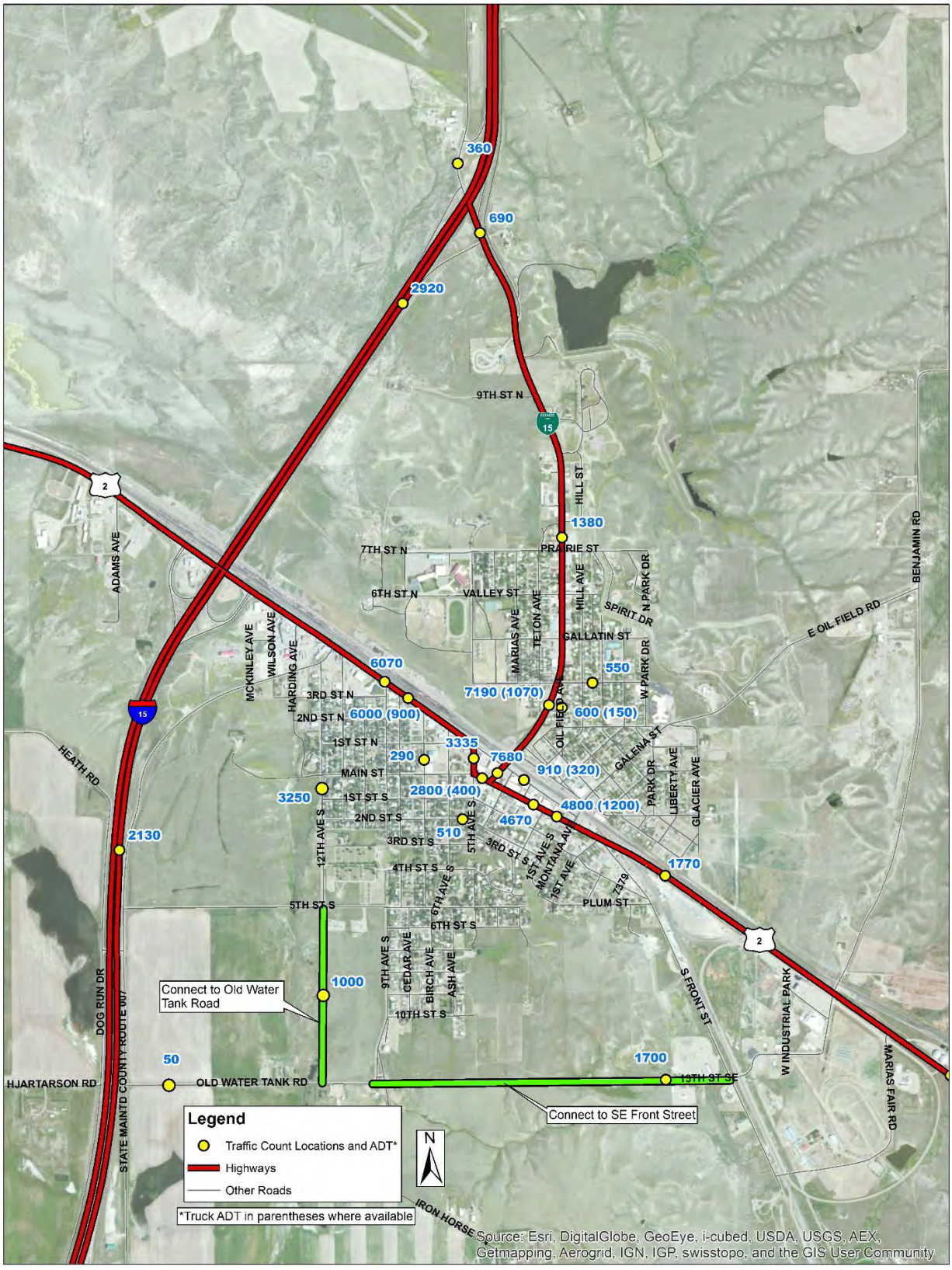
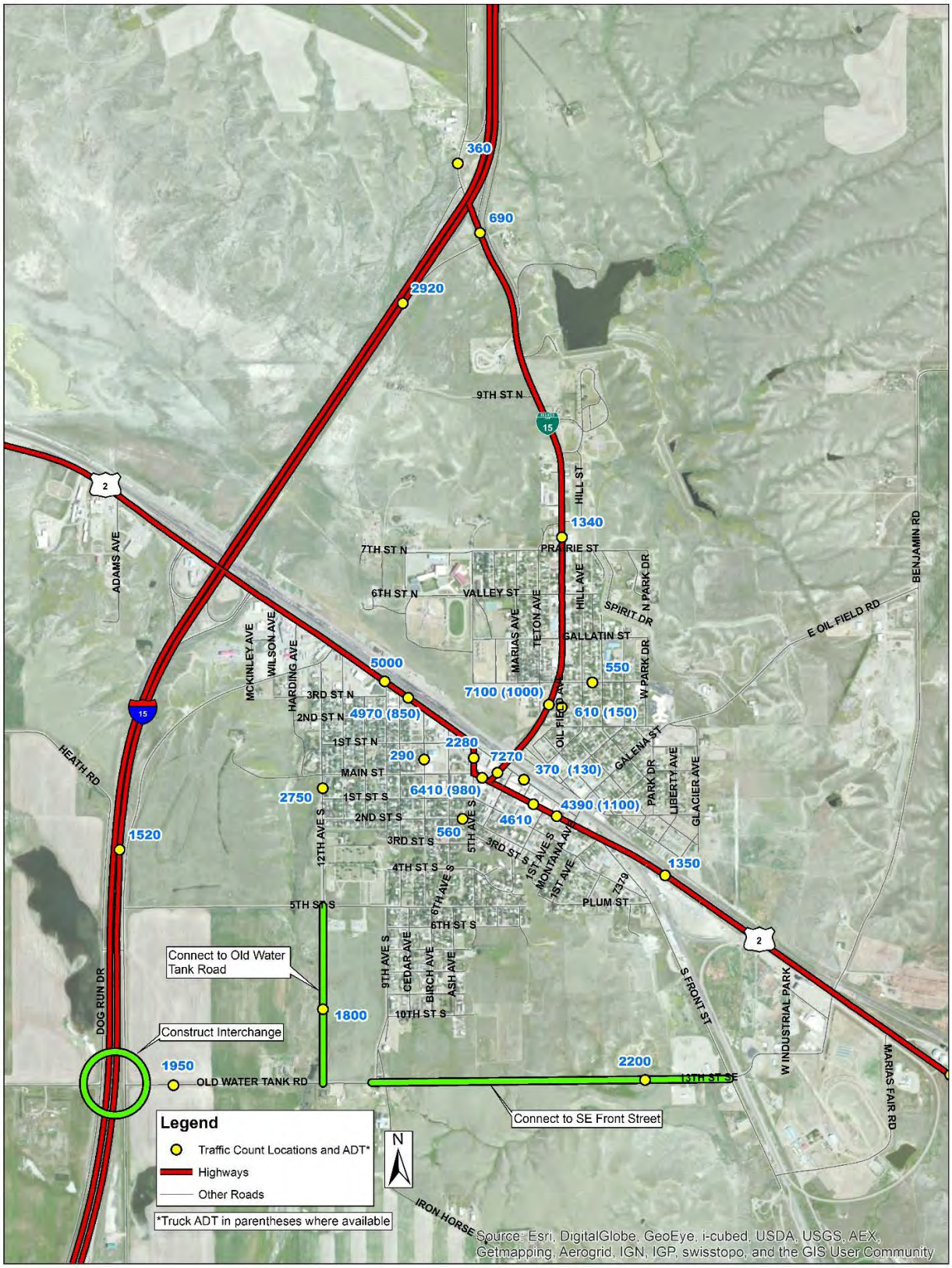


*Figure 3-4 – 2040 Traffic Volumes – Future Transportation Network Alternative 2*



The extension of 12th Avenue South to Old Water Tank Road/13th Street South through the future residential areas of south Shelby is expected to remove approximately 1500 vehicles per day from Main Street in downtown Shelby by 2040. The inclusion of an interchange at Interstate 15 and Old Water Tank Road/13th Street South is expected to remove approximately 1000 vehicles per day from US 2 west of 5th Avenue South. While US 2 and Main Street are not expected to have deficient operations by 2040 even if no additional route options are provided (additional discussion below), the redistribution of traffic from US 2/Main Street should offer operational improvements, particularly near the Town Pump and Pizza Hut.

## 2040 ROADWAY CAPACITY ANALYSIS

### Corridor Level of Service

No roadway in Shelby is expected to carry more than 8,000 vehicles per day, therefore major roadway expansion (i.e. expanding from 2 lanes to 4 lanes) is not required at any location since all corridors are expected to operate at LOS "C" or better. If major roadways become more congested as Shelby grows, intersection improvements such as traffic control modifications or the addition of turn lanes at critical intersections should result in acceptable corridor levels of service through 2040.

### Intersection Level of Service

Intersection levels of service at major intersections in Shelby were evaluated under each of the three 2040 travel demand model scenarios. Results from these analyses can be seen in **Table 3-1**. Results in **Table 3-1** are for 2040 traffic volumes with the existing intersection configurations.

*Table 3-1 – 2040 Intersection Level of Service (No Intersection Improvements)*

| Intersection | No Improvements | | | | | |
|---|---|---|---|---|---|---|
| | Intersection Control | Intersection LOS | Approach LOS | | | |
| | | | EB | WB | NB | SB |
| Main Street and Montana Avenue | TWSC | A | A | A | C | C |
| Front Street and Montana Avenue | TWSC | A | B | B | A | A |
| Main Street and Coyote Pass (Viaduct) | TWSC | E | A | A | - | F |
| Main Street and 5th Avenue North | AWSC | C | B | C | B | B |

TWSC = Two-way stop control
AWSC = All-way stop control

The only intersection with expected deficiencies by 2040 without intersection improvements is Main Street and Oilfield Avenue.

# CHAPTER 4: POLICY RECOMMENDATIONS

## PROPOSED FUNCTIONAL CLASSIFICATION NETWORK

As Shelby grows, there will be a need for additional collector roadways to maintain desirable mobility throughout the area. This is particularly true in south Shelby where most of the residential growth is expected, and where there is also opportunities for improved network connectivity. The proposed roadway functional classification network can be seen in **Figure 4-1**.

## ROTATING SIDEWALK CONSTRUCTION/REHABILITATION FUNDS

Many areas of Shelby currently do not have sidewalks on both sides of the street. To improve overall pedestrian connectivity, mobility and accessibility, it is recommended that Shelby develops a rotating sidewalk construction and rehabilitation fund.

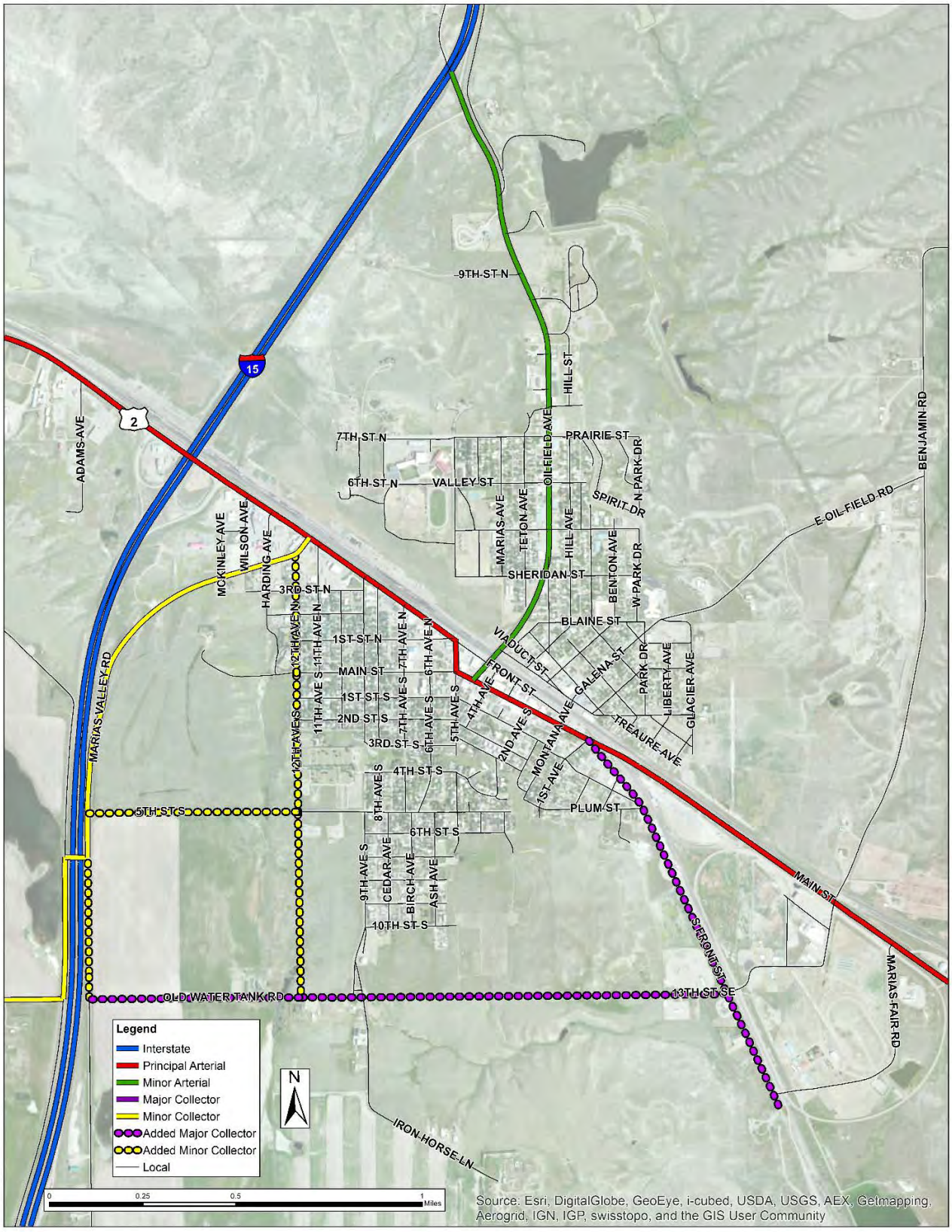
This rotating fund would be used to construct sidewalks alongside the paved roadways in Shelby. The fund could also be used for sidewalk repair or for ADA improvements. Sidewalk construction or rehabilitation would be assessed to the abutting property owners. The percentage of the overall cost assessment does not need to be 100 percent, but rather could be any range of values depending upon the City's available budget. Regardless of the proposed assessment percentage, the City would need to "seed" the fund to initiate the first round of sidewalk construction. The length of sidewalk constructed each year could also vary depending upon the available funds. If the fund is not 100 percent assessed, public-private partnerships could be promoted by allowing sidewalk improvement areas to be prioritized if abutting property owners are willing to go above the required assessment requirements (only valid if assessment is below 100 percent).

## TRANSIT

For Shelby, a formal transit service is simply not feasible because of the low number of potential riders, the distance to regional destinations, and the lack of a population center large enough to support the demand necessary. Therefore, for this community it is not recommended to explore a transit option.

Toole County Transit currently provides service from Shelby to Sweet Grass and the Northern Transit Interlocal bus service offers regional transit connections to Conrad and Great Falls.

*Figure 4-1 – Recommended Future Functional Classification Network*



## TRAFFIC IMPACT ANALYSIS

Additional traffic from new developments along major corridors can trigger operational and safety deficiencies on these corridors. One way to mitigate transportation issues resulting from new development is to require developers to have a traffic impact study completed for developments that are expected to generate traffic volumes above a certain threshold. Traffic impact studies are performed to determine any transportation infrastructure improvements that are required to accommodate additional traffic from a new development.

Traffic impact studies should evaluate existing transportation network conditions and the conditions expected after completion of the new development to understand what types of deficiencies are expected to be triggered by traffic related to new developments. The results from traffic impact studies can be used to determine cost-sharing for infrastructure improvements between the jurisdiction responsible for the roadway and the developer.

### Recommended Traffic Thresholds for Initiating Traffic Impact Analysis

It is recommended a traffic impact study is completed for any development that is expected to generate 500 or more trips per day or 100 or more peak hour trips. A trip is defined as a single or one-directional travel movement with either the origin or the destination of the trip inside the study site.

### Recommended Study Horizon

The recommended study horizon for traffic impact analysis is contingent on the amount of traffic the development is expected to generate. Table 4-1 shows the recommended study horizon for different trip generation thresholds.

*Table 4-1 – Recommended Study Horizon by Expected Trip Generation*

| Estimated Peak Hour Site Traffic | Recommended Study Horizon(s) |
|---|---|
| Less Than 500 Trips/Hour | Anticipated opening year, assuming full build-out and occupancy |
| 500-1000 Trips/Hour | Anticipated opening year, assuming full build-out and occupancy |
| | 5 years after opening date |
| More Than 1000 Trips/Hour | Anticipated opening year, assuming full build-out and occupancy |
| | 5 years after opening date |
| | Adopted transportation plan horizon year, if the development is significantly larger than that included in the adopted plan or travel forecasts for the area |

### Recommended Study Area for Traffic Impact Studies

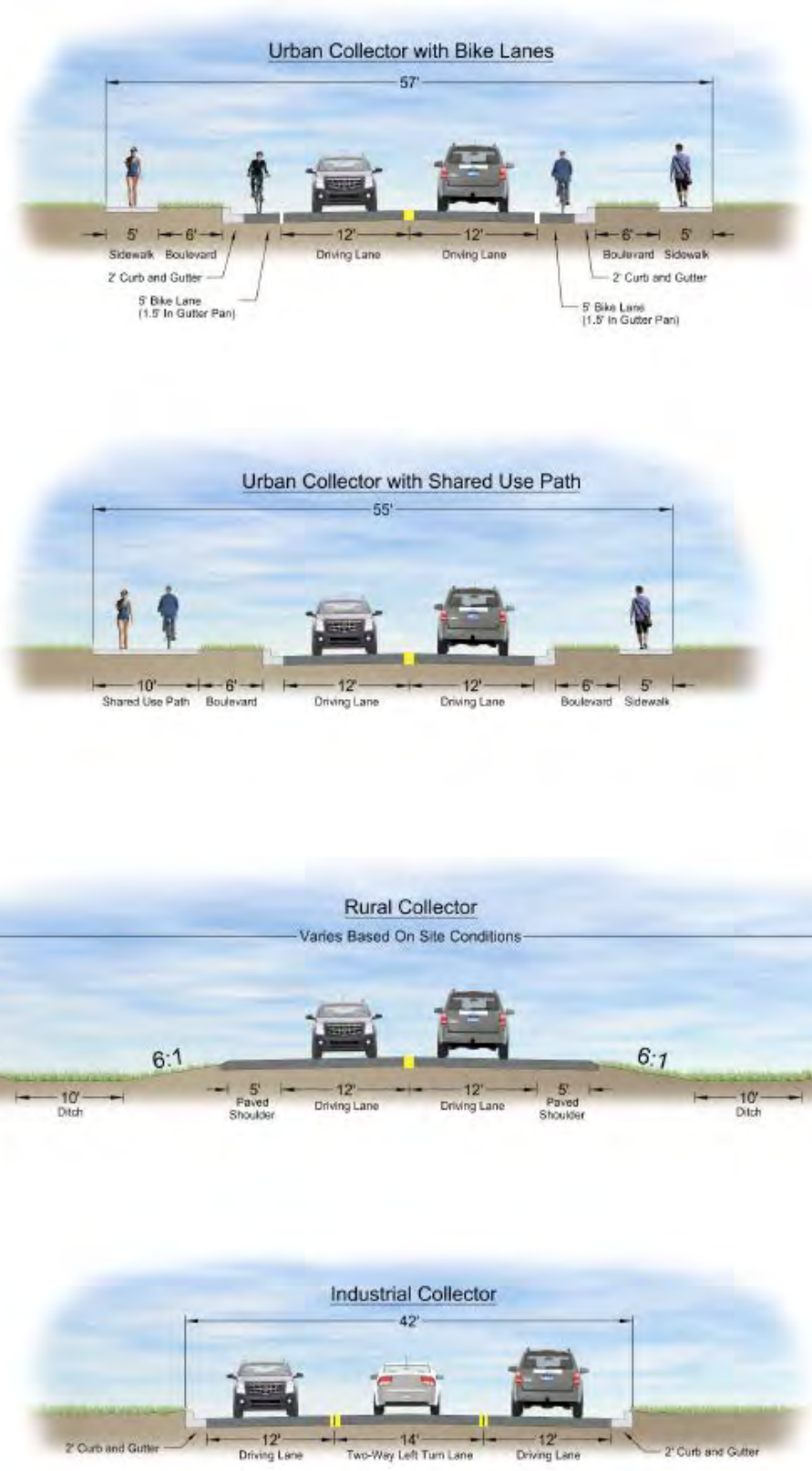
All development access drives, adjacent roadways and adjacent major intersections should be analyzed in the traffic impact study. Additional areas may be added based on development size and specific site or local issues.

## TYPICAL ROADWAY SECTIONS

Typical roadway sections were developed for various types of collector roadways in Shelby. New or reconstructed collector roadways should be built to match the proposed typical sections when feasible. The proposed sections are based on the types traffic that each type of roadway is expected to carry. For example, emphasis was placed on providing pedestrian and bicycle facilities on collector roadways in residential areas, where such facilities are not as critical on rural and industrial roadways.

Proposed typical sections were not developed for minor arterials or principal arterials since no additional arterial roadways are planned through 2040. Proposed typical roadway sections for collector roads can be seen in Figure 4-2.

*Figure 4-2 – Recommended Typical Sections for Collector Roadways*



## ACCESS MANAGEMENT STANDARDS

Access management is the systematic control of the location, spacing, design and operation of driveways, median openings, interchanges and street connections to a roadway.

### Access Spacing

Research has proven that keeping the number of access points per mile along a roadway to a reasonable minimum offers both operational and safety benefits. A city access spacing policy can help limit the number of access points on future roadways, and can also be used to modify access configurations during land redevelopment or roadway reconstruction.

The number of accesses allowed on a roadway should be determined by a roadway's functional classification. Roadways intended for mobility, like arterials, should have fewer access points than roadways intended for land access such as local roadways.

Table 4-2 shows recommended access spacing criteria by functional classification, which are based on MDT guidelines:

*Table 4-2 – Recommended Access Spacing Criteria by Functional Classification*

| Functional Classification | Access Spacing (feet) |
|---|---|
| Principal Arterial - Non CBD | 660 |
| Principal Arterial - CBD | 250-300 |
| Minor Arterial | 250-300 |
| Collector | 150 |

Two corridors in Shelby could particularly benefit from access spacing improvements:

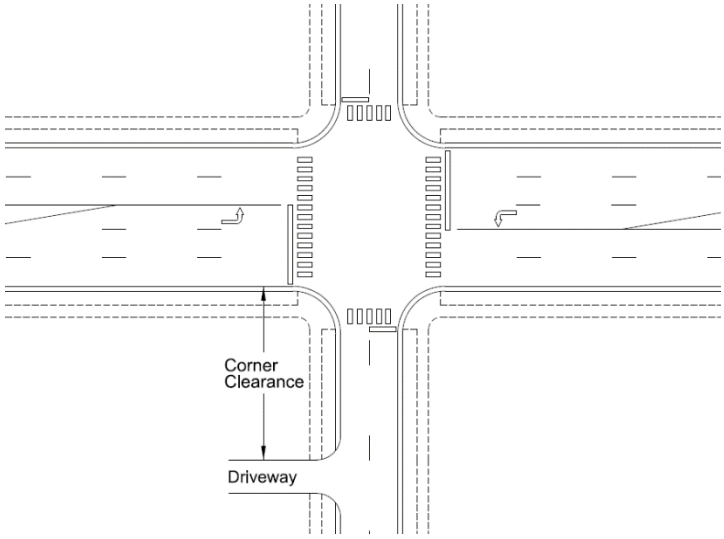
The US 2 corridor west of 5th Avenue North currently has approximately 25 accesses per mile, which is over 3 times what would be recommended under the proposed access management policy. Some options for reducing the number of accesses along this corridor include removing redundant accesses, consolidating accesses for adjacent properties into a single access, or relocating accesses to side streets.

The Oilfield Avenue commercial corridor north of the viaduct currently has no curb and gutter or ditches, therefore access to many properties is not confined to a single location. The installation of curb and gutter along the developed segments of the corridor and the removal, relocation or consolidation of access points could standardize operations along the corridor.

### Corner Clearance

Corner clearance is the minimum distance between an intersection and the closest access point (see Figure 4-3). A minimum of 120 feet of corner clearance is recommended between the roadway edge of a major roadway and the edge of the nearest driveway on the minor street. If curb radii are in excess of 50 feet, a minimum of 200 feet of corner clearance is recommended.

*Figure 4-3 – Illustration of Corner Clearance*



## Driveway Design

Standardizing driveways along a corridor offers the benefit of simplifying entering and exiting movements. Excessively wide driveway widths may result in vehicles lining up side-by-side, and driveways that are too narrow may not allow vehicles to enter and exit simultaneously. Excessively large curb radii can result in undesirably high vehicle speeds, where curb radii that are too small can result in vehicles driving over curbs, eventually leading to curb damage.

The following Montana Department of Transportation driveway design guidelines are recommended:

*Table 4-3 – Recommended Driveway Design Standards*

| Characteristics | | Intersecting Angle (Degrees) | Driveway Width (Feet) | Entry Curb Radius (Feet) | Exit Curb Radius (Feet) |
|---|---|---|---|---|---|
| | | Recommended (Range) | | | |
| Curbed | Two-Way | 90 (75-105) | 24 (24-40) | 20 (5-50) | 40 (20-50) |
| | One-Way In | | 16 (16-30) | 20 (5-50) | |
| | One-Way Out | | 16 (16-30) | 10 (5-15) | |
| Uncurbed | Two-Way | | 24 (24-40) | 25 (5-50) | N/A |
| | One-Way In | | 16 (16-30) | 20 (15-50) | |
| | One-Way Out | | 16 (16-30) | 10 (5-15) | |

# CHAPTER 5: PROPOSED IMPROVEMENT PLAN

Recommendations for transportation improvements in Shelby were based on the results of analyses discussed in preceding sections of this report. Specifically, traffic flow, safety and existing infrastructure condition were considered when recommending future improvements.

Cost estimates presented in this chapter are in 2014 dollars. Where applicable, contingencies were included to account for costs associated with preliminary engineering, utility impacts and right-of-way acquisition.

## RECOMMENDED ROADWAY IMPROVEMENTS

### Recommended Intersection Improvements

#### Main Street and SE Front Street

It is recommended that access revisions are considered near the intersection of Main Street and Front Street. The removal of the 1st Avenue South access to Main Street and the removal of the closest alley access to SE Front Street would reduce the number of conflicts near the intersection, therefore reducing crash potential. Estimated Access Revision Cost: $10,000

*Figure 5-1 – Potential Access Revisions at Main Street and SE Front Street*

## Recommended Corridor Improvements

A summary of all recommended corridor improvements can be seen in **Figure 5-3**.

### US 2

It is recommended that roadway lighting is installed on US 2 between the viaduct and Interstate 15. Data in the Highway Safety Manual states that the installation of roadway lighting has been found to reduce the total number of nighttime crashes by 20% and the number of nighttime injury crashes by 29% MDT has approved the installation of lighting on this segment of US 2 in conjunction with a storm drainage project that is scheduled for 2015. **Estimated Roadway Lighting Cost: $250,000**

### Oilfield Avenue/Coyote Pass

#### Reconstruct Viaduct

It is recommended that the Coyote Pass viaduct is reconstructed. The viaduct was constructed in 1938 and has a bridge sufficiency rating of 50.3 (as of 2012). Bridges with sufficiency ratings of 50 or less are eligible for federal replacement funding.

The construction of a new viaduct would enable the construction of ADA compliant pedestrian facilities, which is important since the viaduct is the only grade separated railroad crossing in Shelby. A new viaduct would also enable the construction of southbound turn lanes on Oilfield Avenue at Main Street, which would improve the 2040 intersection level of service from LOS "E" to LOS "B". **Estimated Viaduct Cost: $8,500,000**

#### Construct Curb and Gutter

The construction of curb and gutter along the developed segments of Oilfield Avenue is recommended. The absence of curb and gutter or ditches along the corridor limits the ability to standardize accesses. Access to many properties is currently not confined to a single location since driveways are flush with the roadway. This can lead to unexpected conflicts between vehicles, and also conflicts between vehicles and bicyclists on the corridor. Access spacing improvements could also be considered as part of curb and gutter construction. **Estimated Curb and Gutter Cost: $275,000** (This cost does not include storm sewer installation).

#### Construct Roundabout at Sheridan Avenue

The construction of a roundabout at the intersection of Oilfield Avenue, Sheridan Avenue and Coyote Pass would simplify operations at the six-legged intersection, therefore is recommended. Data from the Highway Safety Manual indicates that the construction of a roundabout could reduce the total number of crashes by 44% and the number of injury crashes by 82%.

It is important that a roundabout at this location is traversable by trucks. Trucks can be accommodated by either the provision of an adequately sized truck apron on the raised central island or by a central island that is completely traversable by trucks. **Estimated Roundabout Cost: $500,000**

*Figure 5-2 – Conceptual Roundabout Design at Oilfield Avenue and Sheridan Avenue*


## SE Front Street

Reconstruct as Industrial Collector

An estimated 600 trucks per day will be accessing the Multimodal Hub. As a result, additional truck traffic is expected on SE Front Street after completion of the planned Multimodal Hub. It is recommended that this corridor is reconstructed as a 3-lane industrial collector between Plum Street and the Multimodal Hub. The provision of a two-way left turn lane would reduce conflicts between through-moving and left turning vehicles.

The pavement section on SE Front Street between US Highway 2 and the Multimodal Hub should be designed to carry expected truck traffic throughout its design life.

Improvements on Front Street were recommended as part of the construction of the Multimodal Hub. **Estimated Reconstruction Cost: $3,460,000**

## Old Water Tank Road/13th Street South

Extend to SE Front Street and Reconstruct as Rural Collector

Extending Old Water Tank Road/13th Street South to SE Front Street was recommended as part of the construction of the Multimodal Hub and is also recommended as part of this transportation plan. This will provide another east/west connection in Shelby, consequently alleviating some congestion on Main Street. Additionally, reconstruction of the existing segment of Water Tank Road is recommended since the pavement is currently in poor condition.

It is also recommended that a shared use path is constructed along Old Water Tank Road/13th Street South between the I-15 frontage road and 9th Avenue South.

Estimated Cost:
New Segment - $2,200,000
Reconstructed Segment - $1,290,000
Shared Use Path - $340,000
Total - $3,830,000

### Construct Interchange at Interstate 15

Old Water Tank Road/13th Street South is planned to connect to SE Front Street as part of construction of the Multimodal Hub, therefore it is recommended that an interchange is constructed at Interstate 15 and Old Water Tank Road/13th Street South. This would allow trucks to access Old Water Tank Road/13th Street South directly from Interstate 15 to travel to the Multimodal Hub instead of requiring truck traffic to use Main Street/Front Street through downtown Shelby.

Construction of a new interchange on an interstate highway is contingent on the results of an eight point interstate access assessment, per FHWA policy. It should also be noted that a proposed interstate interchange must be sponsored by a local government agency, per Montana Transportation Commission policy. **Estimated Interchange Cost: $20,000,000** (actual cost may vary based on site conditions and design considerations)

### 12th Avenue South

Extend to Old Water Tank Road/13th Street South and Reconstruct as a Urban Collector

12th Avenue South will provide access to much of the future residential areas in Shelby and is expected to carry 2000 to 3000 ADT by 2040. Therefore, it is recommended that 12th Avenue South is extended to Old Water Tank Road/13th Street South as an urban collector and is reconstructed as an urban collector between Main Street and Old Water Tank Road/13th Street South. Reconstruction of the existing section of 12th Avenue South is desirable since the pavement is currently in poor condition.

If Old Water Tank Road/13th Street South is extended to SE Front Street, extending 12th Avenue South to Old Water Tank Road/13th Street South can alleviate congestion on Main Street by providing an alternative route between south Shelby and the Multimodal Hub.

In addition to being able to better handle vehicular traffic, constructing 12th Avenue South as an urban collector will enable the provision of bicycle and pedestrian facilities.

Estimated Cost:
New Segment: $1,290,000
Reconstructed Segment: $1,060,000
Total: $2,350,000

### 5th Street South

Reconstruct as Urban Collector

5th Street South provides access between the Interstate 15 frontage road and existing residential areas of Shelby and will also provide access to future residential areas. Therefore, it is recommended that 5th Street South is reconstructed as an urban collector to better handle vehicular traffic and also to provide bicycle and pedestrian facilities. **Estimated Reconstruction Cost: $1,970,000**

### 9th Avenue South

Pavement Rehabilitation/Reconstruction

It is recommended that 9th Avenue South is rehabilitated or reconstructed between 5th Street South and Old Water Tank Road/13th Street South since most of the pavement on this segment is in poor condition. It is also recommended that a shared use path is constructed as part of roadway reconstruction to provide more multi-modal transportation routes in the south part of Shelby.
**Estimated Reconstruction and Shared Use Path Cost: $1,500,000**

## Recommended Railroad Improvements

### Montana Avenue and BNSF Hi-Line Subdivision At-Grade Crossing

It is recommended that a wayside horn is installed at this at-grade crossing.

The installation of a wayside horn would make the crossing quiet zone compliant. A wayside horn sounds similar to the train horns, however the noise impact area from a wayside horn is far smaller than that of a train horn, without any compromise to crossing safety. Estimated Cost: $150,000

### Old Water Tank Road/13th Street and BNSF Great Falls Subdivision

Motorists can get stuck inside the rail loop on the east side of Shelby when trains are present on both the BNSF Great Falls Subdivision tracks and the BNSF Hi-Line Subdivision tracks. Such events are expected to increase in frequency through 2040. It is recommended that a grade separation is provided on 13th Street at the Great Falls Subdivision to enable motorists to exit the rail loop when trains are present on both tracks. Estimated Grade Separation Cost: $10,000,000

### US 2 and BNSF Great Falls Subdivision At-Grade Crossing

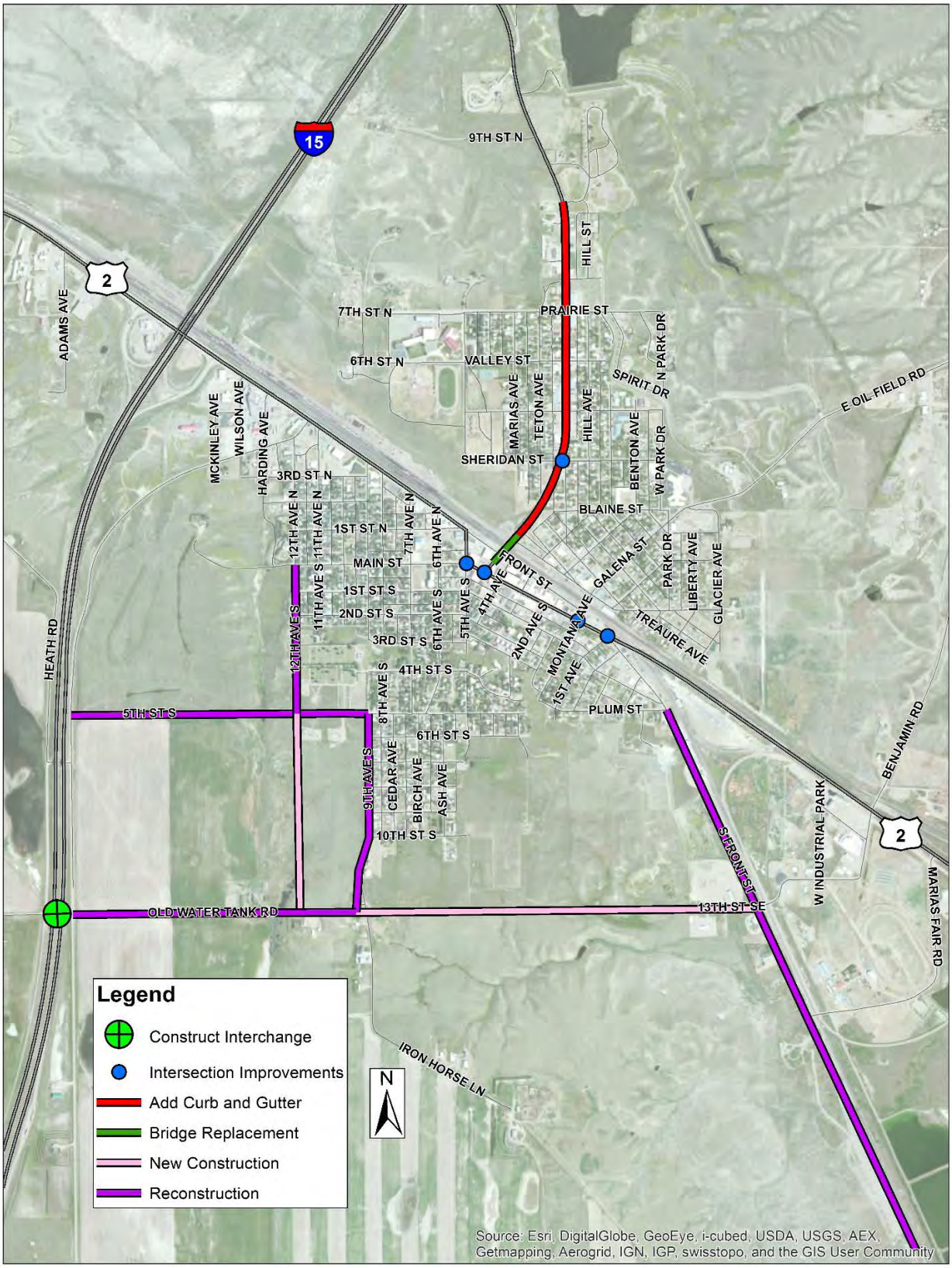
A grade separation on US 2 on the east side of Shelby would reduce delays on US 2 during train events, which will become more frequent in the future. It is expected that at least 50 trains per day will use this track by 2040. Estimated Grade Separation Cost: $10,000,000

In the interim, it is recommended that medians and 2-quadrant automatic gates are installed at this at-grade crossing. These improvements would make the crossing quiet zone compliant. Guidance in the Railroad-Highway Grade Crossing Handbook states that automatic gates should be considered at any grade crossing on a route on the National Highway System. Estimated Cost for Median and Automatic Gates: $250,000.

## Future Storm Water Improvement Project

A citywide storm water drainage improvement project is currently underway in Shelby. Improvements are expected to be completed in 2015. As a result, it may be feasible to complete some roadway improvement projects in conjunction with storm water drainage improvements.

*Figure 5-3 – Recommended Roadway Improvements*



## RECOMMENDED BICYCLE AND PEDESTRIAN IMPROVEMENTS

When determining recommended bicycle and pedestrian improvements, emphasis was placed on completing the Roadrunner Trail and providing bicycle and pedestrian access to major non-motorized trip generators such as commercial areas and Shelby High School. Recommended bicycle and pedestrian improvements can be seen in **Figure 5-7**.

### Shared Use Paths

Shared use paths are recommended in the south part of Shelby near proposed residential areas, near Shelby High School and along US Highway 2, west of 12th Avenue North.

Shared use paths should be at least 10 feet wide and should be separated from the adjacent roadway by at least a 6 foot buffer area when feasible.

### On-Street Bicycle Facilities

On street bicycle facilities such as bike lanes and shared lanes are recommended on Main Street downtown and on roadways where they could tie into existing on-street facilities.

*Figure 5-4 – Bike Lanes Adjacent to Parking Lanes (Top) and Adjacent to Curb and Gutter (Bottom)*

*Figure 5-5 – Wide Parking Lanes on Main Street*

#### Bike Lanes

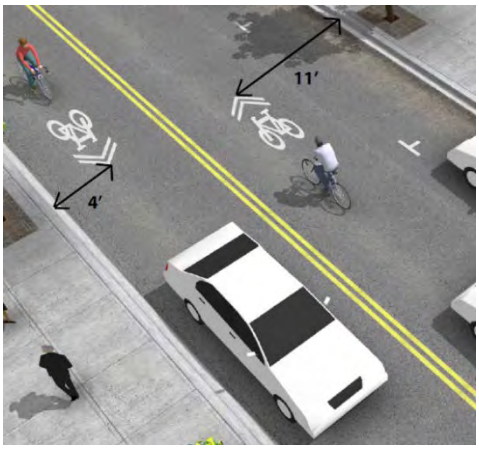
Bike lanes should be at least 5 feet wide. When bike lanes are adjacent to parking lanes, additional bike lane width (maximum of 7 feet) should be considered and the bike lane should be located to the left of the parking lane. When bike lanes are located adjacent to curb and gutter, 1.5 feet of the bike lane width may be located in the gutter pan.

A review of lane widths on Main Street indicates that sufficient roadway width is available to reduce parking lane widths in order to provide bicycle lanes in each direction (see **Figure 5-5**).

#### Shared Lanes

Shared lanes which have automobile and bike traffic use the same lane can be considered on low volume, low speed roadways (speed limit below 35 mph) where sufficient roadway width is not available for the provision of dedicated bike lanes. It is recommended that shared lanes are 14-15 feet wide, if feasible, to allow a vehicle to pass a bicyclist without encroaching on the opposing through lane.

*Figure 5-6 – Recommended Bicycle/ Pedestrian Improvements*




Shared lane markings (see **Figure 5-6**) can be placed on the roadway to better indicate that the lane is to be shared by automobiles and bicyclists. When located adjacent to parking lanes, shared lane markings should be located 11 feet from the back of the curb. When located adjacent to curb and gutter, shared lane markings should be located 4 feet from the back of the curb.

*Figure 5-7 – Recommended Bicycle/Pedestrian Improvements*

## Estimated Bicycle/Pedestrian Project Costs

Estimated project costs (in 2014 dollars) for all recommended bicycle/pedestrian improvements can be seen in Table 5-1.

*Table 5-1 – Estimated Bicycle/Pedestrian Project Costs*

| Roadway | Improvement | Estimated Cost (2014 Dollars) |
|---|---|---|
| Galena Street | On-Street Bike Facility | $6,000 |
| Oilfield Avenue | On-Street Bike Facility | $6,500 |
| 12th Avenue South | On-Street Bike Facility | $7,500 |
| Main Street | On-Street Bike Facility | $15,000 |
| City Shop Road | On-Street Bike Facility and Sidewalk | $60,000 |
| 7th Street North | Shared Use Path | $120,000 |
| Montana Avenue | Railroad Crossing Improvements | $200,000 |
| Westood Avenue-6th Avenue North | Shared Use Path | $360,000 |
| 9th Avenue South | Shared Use Path | $240,000 |
| I-15 Frontage Road | Shared Use Path | $250,000 |
| Old Water Tank Road | Shared Use Path | $340,000 |
| US Highway 2 | Shared Use Path | $620,000 |
| 12th Avenue South | Shared Use Path | *** |
| 5th Street South | Shared Use Path | *** |
| Oilfield Avenue Viaduct | Shared Use Path | *** |

*** - Cost Included In Cost Estimates for Other Corridor Improvements

MDT administers a number of programs that are funded from State and Federal sources. Each year, in accordance with 60-2-127, Montana Code Annotated (MCA), the Montana Transportation Commission allocates a portion of available Federal-aid highway funds for construction purposes and for projects located on the various systems in the state as described throughout this document.

## FEDERAL FUNDING SOURCES

The following summary of major Federal transportation funding categories received by the State through Titles 23-49 U.S.C., including state developed implementation/sub-programs that may be potential sources for projects. In order to receive project funding under these programs, projects must be included in the State Transportation Improvement Program (STIP) and the MPO TIP, where relevant.

### National Highway Performance Program (NHPP)

The National Highway Performance Program (NHPP) provides funding for the National Highway System, including the Interstate System and National Highways system roads and bridges. The purpose of the National Highway System (NHS) is to provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, intermodal transportation facilities and other major travel destinations; meet national defense requirement; and serve interstate and interregional travel. The National Highway System includes all Interstate routes, a large percentage of urban and rural principal arterials, the defense strategic highway network, and strategic highway connectors.

#### Allocations and Matching Requirements

NHPP funds are Federally-apportioned to Montana and allocated to Districts by the Montana Transportation Commission. Based on system performance, the funds are allocated to three programs; Interstate Maintenance, National Highway, and NHPP Bridge (see 2.1.1 – 2.1.3).

#### Eligibility and Planning Considerations

Activities eligible for the National Highway System funding include construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the NHS roadway; construction, replacement, rehabilitation, preservation and protection of bridges on the National Highway System; and projects or part of a program supporting national goals for improving infrastructure condition, safety, mobility, or freight movements on the National Highway System. Operational improvements as well as highway safety improvements are also eligible. Other miscellaneous activities that may qualify for NHS funding include bikeways and pedestrian walkways, environmental mitigation, restoration and pollution control, infrastructure based intelligent transportation systems, traffic and traveler monitoring and control, and construction of intra or inter-city bus terminals serving the National Highway System. The Transportation Commission establishes priorities for the use of National Highway Performance Program funds and projects are let through a competitive bidding process.

The Great Falls District, is anticipated to receive an average of about $36.5 million annually of NHPP funds during the next five years. Current Great Falls District priorities already under development total an estimated construction cost of $56.91 million. Given the estimated range of planning level costs, NHPP funding for improvements is highly unlikely over the short term, but may be available toward the end of the planning horizon depending on the other NHS needs within the Great Falls District.

### Interstate Maintenance

Interstate Maintenance (IM) funds are Federally-apportioned to Montana and allocated based on system performance by the Montana Transportation Commission. The Commission approves and awards projects for improvements on the Interstate Highway System which are let through a competitive bidding process. The Federal share for IM projects is 91.24% and the State is responsible for 8.76%.

### National Highway

The Federal share for non-Interstate NHS projects is 86.58% and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account.

### NHPP Bridge (NHPB)

Federal and state funds under this program are used to finance bridge inspection, improvement, and replacement projects on Interstate and non-Interstate National Highway System routes. NHPB program funding is established at the discretion of the state. However, Title 23 U.S.C. establishes minimum standards for NHS bridge conditions. If more than 10% of the total deck area of NHS bridges in a state is on structurally deficient bridges for three consecutive years, the state must direct NHPB funds equal to 50% of the state's FY 2009 Highway Bridge Program to improve bridges each year until the state's NHS bridge condition meets the minimum standard.

## Surface Transportation Program (STP)

Surface Transportation Program (STP) funds are Federally-apportioned to Montana and allocated by the Montana Transportation Commission to various programs including the Surface Transportation Program Primary Highways (STPP)*, Surface Transportation Program Secondary Highways (STPS)* and the Surface Transportation Program Urban Highways (STPU).* The Federal share for these projects is 86.58% with the non-Federal share typically funded through Highway State Special Revenue (HSSR).

### Primary Highway System (STPP)[1]

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Primary Highway System. The Primary Highway System includes highways that have been functionally classified by MDT as either principal or minor arterials and that have been selected by the Montana Transportation Commission to be placed on the primary highway system [MCA 60-2-125(3)].

### Allocations and Matching Requirements

Primary funds are distributed statewide (MCA 60-3-205) to each of five financial districts. The Commission distributes STPP funding based on system performance. Of the total received, 86.58% is Federal and 13.42% is State funds from the Highway State Special Revenue Account.

### Eligibility and Planning Considerations

STP Primary funds are eligible for a wide range of transportation improvement projects and activities, ranging from roadway reconstruction and rehabilitation, to bridge construction and inspection, to highway and transit safety infrastructure, environmental mitigation, carpooling, and bicycle and pedestrian transportation facilities.

### Bridge Program (STP)

The Federal and state funds available under this program are used to finance bridge projects for on-system and off-system routes in Montana. Title 23 U.S.C. requires that a minimum amount (equal to 15 percent of Montana's 2009 Federal Bridge Program apportionment) be set aside for off-system bridge projects. The remainder of the Bridge Program funding is established at the discretion of the state. Bridge Program funds are primarily used for bridge rehabilitation or reconstruction activities on Primary, Secondary, Urban or off-system routes. Projects are identified based on bridge condition and performance metrics.

[1] State Funding program developed to distribute funding within Montana.

## Highway Safety Improvement Program (HSIP)

HSIP funds are apportioned to Montana for allocation to safety improvement projects approved by the Commission and are consistent with the strategic highway safety improvement plan. Projects described in the State strategic highway safety plan must correct or improve a hazardous road location or feature, or address a highway safety problem. The Commission approves and awards the projects which are let through a competitive bidding process. Generally, the Federal share for the HSIP projects is 90% with the non-Federal share typically funded through the HSSR account.

## Transportation Alternatives Program

The Transportation Alternatives Program (TA) requires MDT to obligate 50% of the funds within the state based on population, using a competitive process, while the other 50% may be obligated in any area of the state. The Federal share for these projects is 86.58, with the non-Federal share funded by the project sponsor through the HSSR.

Funds may be obligated for projects submitted by:

- Local governments
- Transit agencies
- Natural resource or public land agencies
- School district, schools, or local education authority
- Tribal governments
- Other local government entities with responsibility for recreational trails for eligible use of these funds.

### Eligibility and Planning Considerations

Eligible categories include:

- On-road and off-road trail facilities for pedestrians and bicyclists, including ADA improvements;
- Historic Preservation and rehabilitation of transportation facilities;
- Archeological activities relating to impacts for a transportation project;
- Any environmental mitigation activity, including prevention and abatement to address highway related stormwater runoff and to reduce vehicle/animal collisions including habitat connectivity;
- Turnouts, overlooks, and viewing areas;
- Conversion/use of abandoned railroad corridors for trails for non-motorized users;
- Inventory, control, and removal of outdoor advertising;
- Vegetation management in transportation right of way for safety, erosion control, and controlling invasive species;
- Construction, maintenance, and restoration of trails and development and rehabilitation of trailside and trailhead facilities;
- Development and dissemination of publications and operation of trail safety and trail environmental protection programs;
- Educations funds for publications, monitoring, and patrol programs and for trail-related training;
- Planning, design, and construction of projects that will substantially improve the ability of students to walk and bicycle to school; and
- Non-infrastructure-related activities to encourage walking and bicycling to school, including public awareness campaigns, outreach to press and community leaders, traffic education and enforcement school vicinities, student sessions on bicycle and pedestrian safety, health, and environment, and funding for training.

### Competitive Process

The State and any Metropolitan Planning Organizations required to obligate Transportation Alternative funds must develop a competitive process to allow eligible applicants an opportunity to submit projects for funding. MDT's process emphasizes safety, ADA, relationships to State and community planning efforts, existing community facilities, and project readiness.

## Congressionally Directed or Discretionary Funds

Congressionally Directed funds may be received through either highway program authorization or annual appropriations processes. These funds are generally described as "demonstration" or "earmark" funds. Discretionary funds are typically awarded through a Federal application process or Congressional direction. If a local sponsored project receives these types of funds, MDT will administer the funds in accordance with the Montana Transportation Commission Policy #5 – "Policy resolution regarding Congressionally directed funding: including Demonstration Projects, High Priority Projects, and Project Earmarks."

# STATE FUNDED SOURCES

## State Special Revenue/State Funded Construction

### Allocations and Matching Requirements

The State Funded Construction Program, which is funded entirely with state funds from the Highway State Special Revenue Account, provides funding for projects that are not eligible for Federal funds. This program is totally State funded, requiring no match.

### Eligibility and Planning Considerations

This program funds projects to preserve the condition and extend the service life of highways. Eligibility requirements are that the highways be maintained by the State. MDT staff nominates the projects based on pavement preservation needs. The District's establish priorities and the Transportation Commission approves the program.

## Rail/Loan Funds

### Administration and Matching Requirements

The Montana Rail Freight Loan Program (MRFL) is a revolving loan fund administered by the Montana Department of Transportation to encourage projects for construction, reconstruction, or rehabilitation of railroads and related facilities in the State and implements MCA 60-11-113 to MCA 60-11-115. Loans are targeted to rehabilitation and improvement of railroads and their attendant facilities, including sidings, yards, buildings, and intermodal facilities. Rehabilitation and improvement assistance projects require a 30 percent loan-to value match. Facility construction assistance projects require a 50 percent match.

### Eligibility and Planning Consideration

Eligible applicants for loans under the program include railroads, cities, counties, companies, and regional rail authorities. Port authorities may also qualify, provided they have been included in the state transportation planning process. Projects must be integrally related to the railroad transportation system in the State and demonstrate that they will preserve and enhance cost-effective rail service to Montana communities and businesses.

## State Fuel Tax

The State of Montana assesses a tax of $0.27 per gallon on gasoline and $0.2775 per gallon on clear diesel fuel used for transportation purposes. According to State law, each incorporated city and town within the State receives an allocation of the total tax funds based upon:

1. The ratio of the population within each city and town to the total population in all cities and towns in the State, and
2. The ratio of the street mileage within each city and town to the total street mileage in all incorporated cities and towns in the State. (The street mileage is exclusive of the Federal-Aid Interstate and Primary Systems.)

State law also establishes that each county be allocated a percentage of the total tax funds based upon:

3. The ratio of the rural population of each county to the total rural population in the state, excluding the population of all incorporated cities or towns within the county and State;
4. The ratio of the rural road mileage in each county to the total rural road mileage in the State, less the certified mileage of all cities or towns within the county and State; and
5. The ratio of the land area in each county to the total land area of the State.

For State Fiscal Year SFY14, the City of Shelby will receive $92,165, and Toole County will receive $70,532 in State fuel tax funds. The amount varies annually.

All fuel tax funds allocated to the city and county governments must be used for the construction, reconstruction, maintenance, and repair of rural roads or city streets and alleys. The funds may also be used for the share that the city or county might otherwise expend for proportionate matching of Federal funds allocated for the construction of roads or streets that are part of the primary, secondary or urban system.

Priorities for the use of these funds are established by each recipient jurisdiction.

# CHAPTER 7: IMPROVEMENT PRIORITIZATION PLAN

A master transportation plan has a typical planning horizon of 20 to 30 years. It plans for basic transportation improvements to support land use development, both currently and as growth is anticipated to develop over the course of the planning horizon. The Shelby transportation improvements are not only focused on building capacity to address future traffic, but also about setting priorities for improving roadways to allow safe connections and improved mobility throughout the community. Project types include turn lane improvements, bike/ped upgrades, road reconstruction, widening pavement and shoulders, and other spot improvements. A total of 26 projects have been identified in Shelby.

Recommended transportation improvements were split into three project programming time frames:

- Short-term improvements – Implement improvement in 1 to 5 years
- Mid-term improvements – Implement improvement in 5 to 10 years
- Long-term improvements – Implement improvement in 10+ years

Time frames for recommended improvements were based on:

- Funding requirements
- Time frame when transportation deficiencies are expected to be triggered
- The anticipated time frame for future residential, commercial or industrial development
- The ability to implement recommended transportation improvements in conjunction with previously programmed infrastructure improvement projects

Programming time frames presented in this section are tentative. All improvements are dependent on the identification of funding. Once funding sources have been identified, the project complexity will ultimately drive the time frame for project completion.

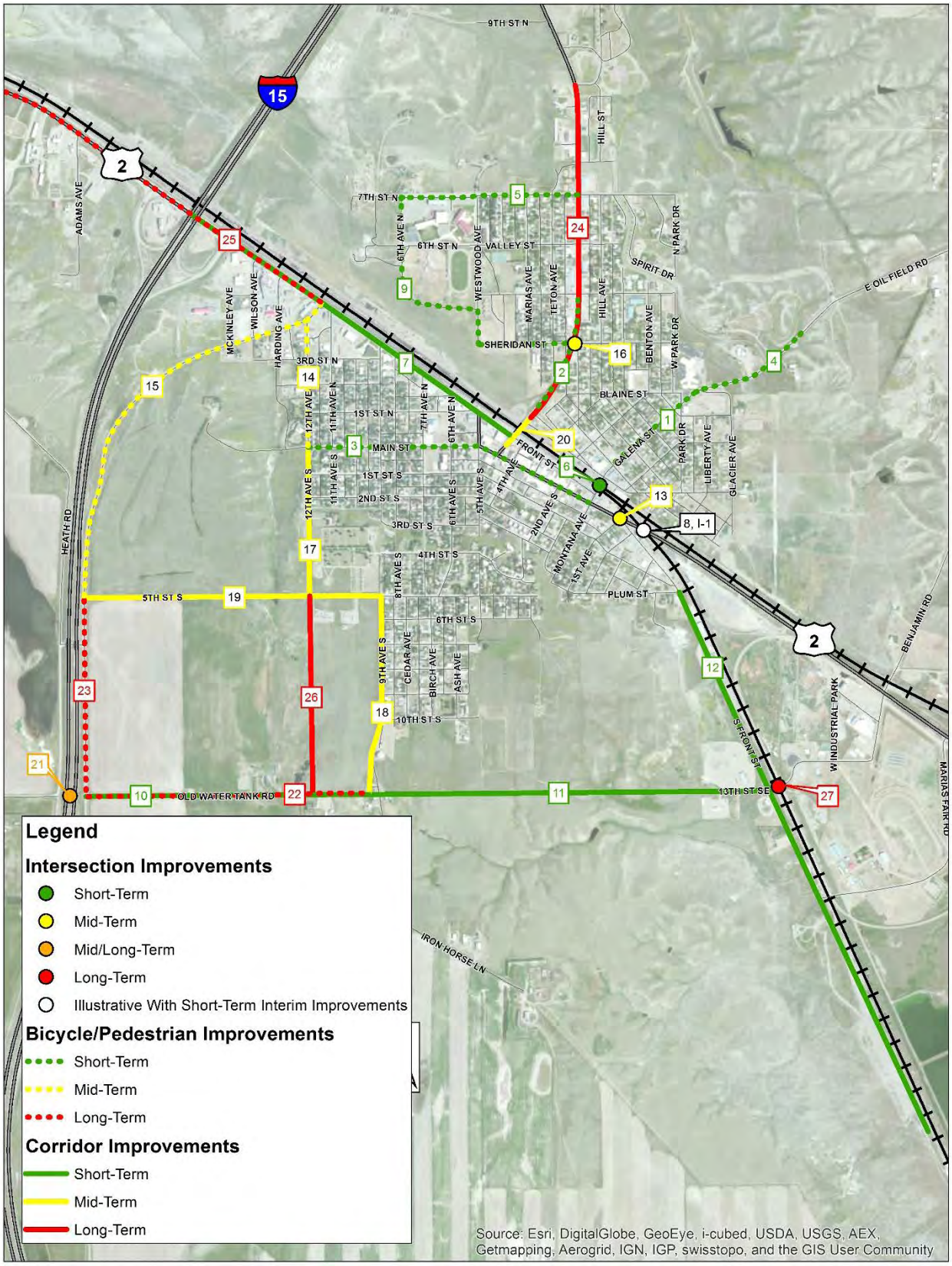
Details regarding all recommendations including estimated project costs (in 2014 dollars) can be seen in **Table 7-1**. A map showing all recommended improvements and programming time frames can be seen in **Figure 7-1**.

*Table 7-1 – Recommended Transportation Improvements and Estimated Project Costs*

| Timeframe | Project ID | Roadway/Intersection | Between | Improvement Type | Improvement | Estimated Cost (2014 Dollars) | Potential Federal Funding Sources |
|---|---|---|---|---|---|---|---|
| Short (0-5 Years) | 1 | Galena Street | Dawson Drive and Glacier Avenue | Bicycle/Pedestrian | On-Street Bike Facility | $6,000 | TAP |
| | 2 | Oilfield Avenue | Viaduct Street and Gallatin Street | Bicycle/Pedestrian | On-Street Bike Facility | $6,500 | STP, TAP |
| | 3 | Main Street | Montana Avenue and 12th Avenue South | Bicycle/Pedestrian | On-Street Bike Facility | $15,000 | NHPP, STP, TAP |
| | 4 | City Shop Road | Glacier Avenue and Existing Shared Use Path | Bicycle/Pedestrian | On-Street Bike Facility and Sidewalk | $60,000 | TAP |
| | 5 | 7th Street North | Oilfield Avenue and 8th Avenue North | Bicycle/Pedestrian | Shared Use Path | $120,000 | TAP |
| | 6 | Montana Avenue and BNSF Hi-Line Subdivision At-Grade Crossing | - | Railroad Crossing | Quiet Zone Implementation | $150,000 | - |
| | 7 | US Highway 2 | Viaduct and Interstate 15 | Roadway - Corridor | Install Roadway Lighting | $250,000 | NHPP, STP, TAP, HSIP |
| | 8 | US 2 and BNSF Great Falls Subdivision At-Grade Crossing | - | Railroad Crossing | Quiet Zone Implementation | $290,000 | STP, HSIP |
| | 9 | Sheridan Avenue, Westwood Avenue, 6th Avenue North | Oilfield Avenue and 7th Street North | Bicycle/Pedestrian | Shared Use Path | $360,000 | TAP |
| | 10 | Old Water Tank Road/13th Street South | I-15 Frontage Road and 9th Avenue South | Roadway - Corridor | Reconstruct as Rural Collector + Shared Use Path | $1,630,000 | STP |
| | 11 | Old Water Tank Road/13th Street South | 9th Avenue South and SE Front Street | Roadway - Corridor | Construct as Rural Collector | $2,200,000 | STP |
| | 12 | SE Front Street | Plum Street and Intermodal Hub Site | Roadway - Corridor | Reconstruct as Industrial Collector | $3,480,000 | STP |
| | | | | | **Subtotal For Short-Term Projects** | **$8,507,500** | |
| Mid (5-10 Years) | 13 | Main Street and Front Street | - | Roadway - Intersection | Access Removal or Relocation Near Intersection | $10,000 | NHPP, STP |
| | 14 | 12th Avenue South | Main Street and US 2 | Bicycle/Pedestrian | On-Street Bike Facility and Sidewalks | $135,000 | STP, TAP |
| | 15 | I-15 Frontage Road | 5th Street South and 12th Avenue South | Bicycle/Pedestrian | Construct Shared Use Path | $480,000 | STP, TAP |
| | 16 | Oilfield Avenue and Sheridan Avenue | - | Roadway - Intersection | Construct Roundabout | $300,000 | STP |
| | 17 | 12th Avenue South | Main Street and 5th Street South | Roadway - Corridor | Reconstruct as Urban Collector With Shared Use Path | $1,060,000 | STP |
| | 18 | 9th Avenue South | 5th Street South and Old Water Tank Road | Roadway - Corridor | Pavement Rehabilitation or Reconstruction + Shared Use Path | $1,500,000 | - |
| | 19 | 5th Street South | I-15 Frontage Road and 9th Avenue South | Roadway - Corridor | Reconstruct as Urban Collector With Use Path | $1,970,000 | - |
| | 20 | Coyote Pass | - | Roadway - Corridor | Construct New Viaduct | $8,500,000 | STP |
| | | | | | **Subtotal For Mid-Term Projects*** | **$24,155,000** | |
| Mid/Long | 21 | Interstate 15 and Old Water Tank Road | - | Roadway - Intersection | Construct Interchange | $10,000,000 | NHPP, STP |
| Long (10+ Years) | 22 | Old Water Tank Road/13th Street South | I-15 Frontage Road and 9th Avenue South | Bicycle/Pedestrian | Shared Use Path | $340,000 | STP, TAP |
| | 23 | I-15 Frontage Road | Old Water Tank Road and 5th Street South | Bicycle/Pedestrian | Shared Use Path | $240,000 | STP, TAP |
| | 24 | Oilfield Avenue | Viaduct and Lake Shelooke Loop | Roadway - Corridor | Construct Curb and Gutter | $275,000 | STP |
| | 25 | US Highway 2 | 12th Avenue North and Approximately 1 Mile West of I-15 | Bicycle/Pedestrian | Shared Use Path | $620,000 | NHPP, STP, TAP |
| | 26 | 12th Avenue South | 5th Street South and Old Water Tank Road | Roadway - Corridor | Construct as Urban Collector | $1,290,000 | STP |
| | 27 | 13th Street and BNSF Great Falls Subdivision At-Grade Crossing | - | Roadway - Intersection | Grade Separation | $10,000,000 | STP, HSIP |
| | | | | | **Subtotal For Long-Term Improvements*** | **$22,765,000** | |
| Illustrative** | I-1 | US 2 and BNSF Great Falls Subdivision At-Grade Crossing | - | Railroad Crossing | Grade Separation | $10,000,000 | NHPP, STP, HSIP |
| | | | | | **Total For All Projects**** | **$55,427,500** | |

*Project cost for I-15/Old Water Tank Road interchange was split evenly across mid-term subtotal and long-term subtotal
**Illustrative projects are NOT included in total cost for all projects
NHPP = National Highway Performance Program
STP = Surface Transportation Program
TAP = Transportation Alternatives Program
HSIP = Highway Safety Improvement Program

*Figure 7-1 – Recommended Transportation Improvements Programming Time Frames*



## National perspective.

KLJ has the size and scope of engineering-based services you need, with the local expertise to drive your project forward to a successful result.

## Regional expertise.

KLJ is dedicated to improving the health, safety and welfare of our communities.

## Trusted Advisor.

KLJ delivers quality and accuracy you expect from a trusted advisor and dedicated partner.

KLJ

kljeng.com