

Culbertson Corridor Planning Study

IMPROVEMENT OPTIONS REPORT

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Prepared for:

Montana Department of Transportation



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Improvement Options

The town of Culbertson has experienced a considerable increase in truck traffic through town due to the increased growth of the oil and gas industry in and around the study area. The purpose of this Technical Memorandum is to look at improvement options that would address needs and objectives in the area.

The corridor needs and objectives developed for this study led to the development of a range of improvement options that address corridor issues and areas of concern. The information that follows provides descriptions, evaluations, and planning level cost estimates of recommended improvement options. Planning level costs are for construction costs only in 2012 dollars. The planning level costs do not include right-of-way acquisition, utility relocation, preliminary engineering, or construction engineering.

Improvement options were categorized into implementation timeframes. Short-term options could likely be implemented within 2 years. Mid-term options could likely be implemented between 2 and 5 years while long-term options would likely not be implemented for more than five years. Long-term options are addressed in the *Alternate Routes* report.

1.1 *Improvement Option Categories*

Improvement options on the existing network were considered and recommended to address the corridor needs, objectives, issues, and/or areas of concern. Recommended improvement options were grouped into the following five different categories:

- Non-Motorized Infrastructure
- Geometrics, Sight Distance, and Pavement Conditions
- Truck Traffic
- Access Points
- Community Area of Concern

The various improvement option types are discussed in the following sections. These improvement options are also shown in Appendix A. Figure 1 shows the approximate location of the potential improvement options.

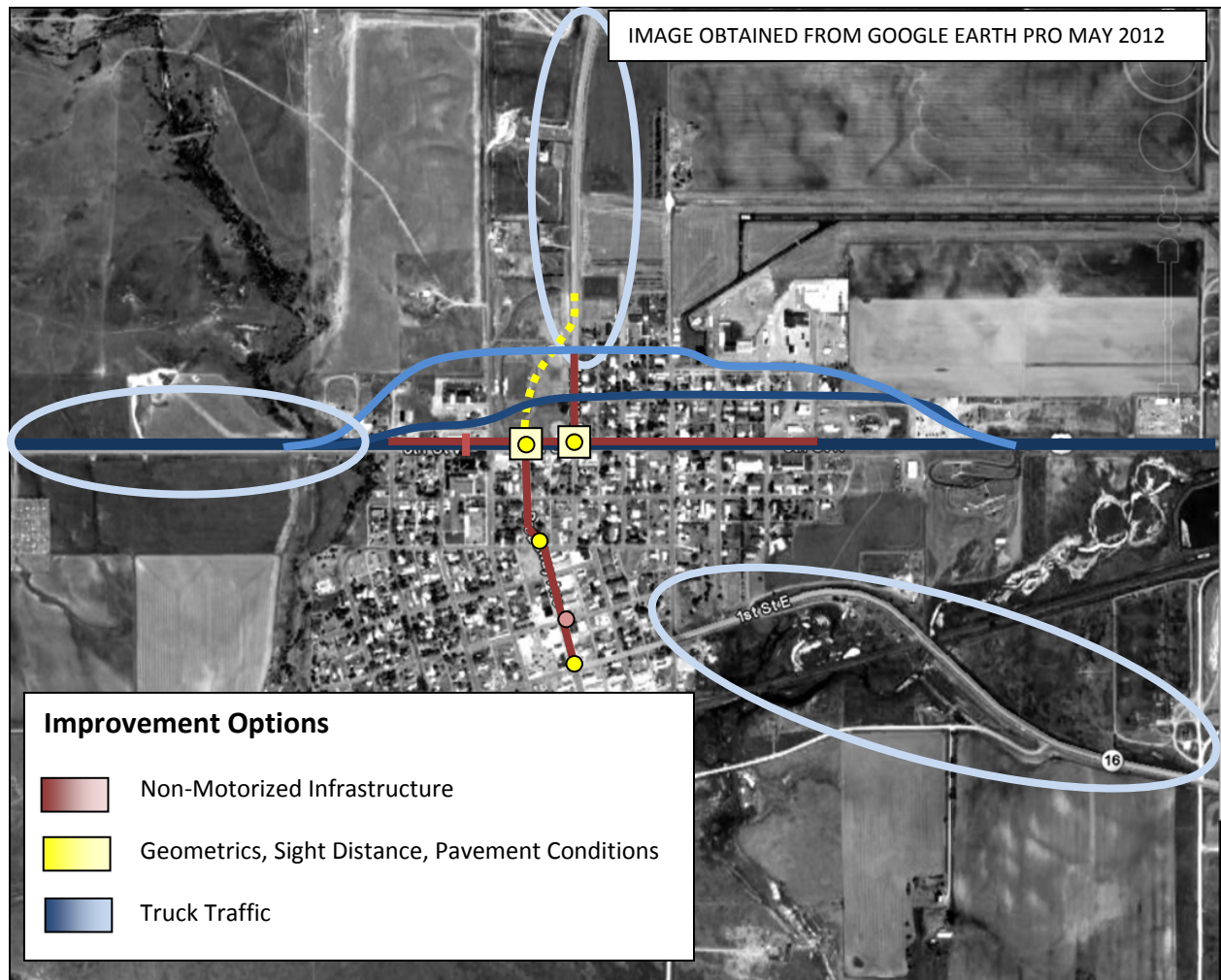


Figure 1. Improvement Options

1.1.1 Non-Motorized Infrastructure

Additional non-motorized studies and infrastructure are needed in the Study area because of the limited pedestrian travel interconnectivity throughout both the Town and surrounding areas. This limited interconnectivity either discourages pedestrian travel or requires pedestrians to use the roadway in several portions of the Study area. Non-motorized studies and infrastructure have the potential to enhance pedestrian movements along US 2 and MT 16, improve pedestrian crossing safety near the school, and minimize impacts associated with access points and roadside parking.

Improvement Option Number 1: Urban Amenities on MT 16 and US 2

This improvement option would update the typical section of US 2 and MT 16 to include urban amenities (curb and gutter and sidewalks). This would take place within the incorporated city limits (i.e., approximately MP 644.2 to 645.5 along US 2, MP 88.6 to 88.1 along MT 16 (north), and MP 0 to the Broadway Avenue/1st Street West intersection along MT 16 (south)). Sidewalks would be implemented

on both sides of US 2 where they do not currently exist to enhance pedestrian movements. Curb and gutter would be implemented along both sides of US 2 to address surface water flow, delineate current access points, and provide access control for future businesses that may develop within the incorporated city limits. This improvement as a whole is considered mid-term, but could be broken into smaller, short-term improvement options as funding becomes available.

Project Timeline: Mid-Term Implementation (2-5 years)

Estimated Cost: \$1,000,000 to \$1,200,000

Improvement Option Number 2: Rectangular Rapid Flashing Beacon (RRFB)

One crosswalk is located on US 2 between the Culbertson Public Schools and the adjacent convenience store to the north, currently called Val-Am Stop & Go. This crosswalk is located mid-block and is primarily used by school-aged children to access the convenience store and also to access the Culbertson Schools Recreation Complex. With the percentage of trucks traversing the corridor and the speed limit change so close to this crosswalk location, this has the potential to be a safety concern. One objective for this study is to improve pedestrian crossing safety near the school.

Because a signed and striped crosswalk currently exists along US 2 between 1st Avenue West and 2nd Avenue West, this improvement option calls for the enhancement of the crosswalk through the installation of a highly visible Rectangular Rapid Flashing Beacon (RRFB). Due to the low material cost of this improvement option, it has been classified as follows:

Project Timeline: Short-Term Implementation (0-2 years)

Estimated Cost: \$5,000 to \$10,000

Improvement Option Number 3: Non-Motorized Transportation Plan

It is recommended that the City or the County completes a non-motorized transportation plan in order to identify potential bicycle and pedestrian needs and potential mitigation measures to address these needs, not only for school-aged children, but for all pedestrians traversing the Study area. This plan would encompass the area within the incorporated city limits (i.e., approximately MP 644.2 to 645.5 along US 2, MP 88.6 to 88.1 along MT 16 (north), and MP 0 to 1.2 along MT 16 (south)).

Due to the lack of construction coupled with the low cost to complete this study, this option has been classified as follows:

Project Timeline: Short-Term Implementation (0-2 years)

Estimated Cost: \$50,000 to \$60,000

Improvement Option Number 4: Bulb-Out

During the first public informational meeting, local residents noted that the intersection of MT 16 (south) and 2nd Street is dangerous due to the sight distance related to the proximity of business parking to the intersection and the number of pedestrians that want to travel between businesses on both sides of MT 16 (south). Currently, no signed or striped crosswalk exists between downtown businesses located along both sides of MT 16 (south). With the percentage of trucks traversing the corridor, this has the potential to be a safety concern. One objective for this study is to enhance

pedestrian movements along US 2 and MT 16, to the extent practicable. Another objective is to improve intersection sight distance, to the extent practicable.

Design and implementation should be considered to heighten pedestrian visibility at this intersection. Curb bulb-outs or other infrastructure would increase awareness to pedestrians. The bulb-out improvement should be done with sensitivity to drainage considerations, snow plowing operations, and local truck and vehicle turning movements. Shifting street parking away from the intersection would also heighten pedestrian visibility and assist the sight distance issue. There are currently multiple businesses along Broadway Avenue/MT 16 and off this main thoroughfare that require trucks or other large vehicles to turn onto local roadways. For those businesses located along Broadway Avenue/MT 16, most use adjacent streets or alleyways to park and then walk the freight to the respective businesses. Because school bus parking and the Farm Equipment Sales Incorporated business are both located to the west of the intersection, more trucks and large vehicles are using 2nd Street west of Broadway Avenue. To avoid potential conflicts with trucks turning between Broadway Avenue and 2nd Street west of Broadway Avenue, a curb bulb-out is only recommended on the east side of Broadway Avenue parallel to 2nd Street. To improve sight distance on the west side of the intersection, parking restrictions could also be considered. Due to the low material cost of this improvement option it has been classified as follows:

Project Timeline: Short-Term Implementation (0-2 years)

Estimated Cost: \$10,000 to \$12,000

Non-Motorized Improvement Options Summary

All non-motorized infrastructure options presented in this section would be independent of each other. However, a non-motorized transportation plan may identify better improvement option(s) and/or specific locations to heighten awareness of pedestrians traversing US 2 and MT 16.

1.1.2 Geometrics, Sight Distance, and Pavement Conditions

Many intersections on US 2 and MT 16 in Culbertson are a concern is due to multiple factors including the limited sight distance, high number of left-turning trucks, and substandard geometrics. One objective for this study is to improve intersection sight distance along US 2 and MT 16. Another objective for the study is to improve geometric elements to provide for semi-trucks and recreational vehicles.

Improvement Option Number 5: Geometric Upgrade of MT 16 (north) / US 2 Intersection

This improvement option requires the intersection of MT 16 (north) / US 2 to be upgraded to meet current MDT design standards to accommodate the WB-67 design vehicle. By bringing the intersection up to current MDT design standards, the objective to improve geometric elements to provide for semi-trucks would be met. Due to the need for design in upgrading an intersection along with the need to purchase right-of-way, and the overall cost of construction, this option has been classified as follows:

Project Timeline: Mid-Term Implementation (2-5 years)

Estimated Cost: \$300,000 to \$400,000

Improvement Option Number 6: Upgrade MT 16 (south) / US 2 Intersection

The geometric layout of the intersection of MT 16 (south) and US 2 is not sufficient for proper turning movements of large trucks going through the intersection as trucks occupy two lanes in order to make the turn. With increased amounts of traffic, especially large trucks, deterioration of the existing roadway pavement is a concern. Large trucks with dual axel configurations pose the biggest threat to the pavement. Also, particular attention should be given to the roadway shoulders. As trucks have to pull over to the side of the road, or as rear wheels “track” onto the shoulder going through a right turn, the existing pavement can be damaged considerably. Broken up pavement, substantial cracks, and potholes reduce the service life of the roadway and pose a safety risk to the traveling public.

Upgrade the intersection to meet current MDT design standards to accommodate the WB-67 design vehicle. This upgrade would include improvements to the pavement section of the MT 16 (south) by adding a concrete element or other means. Improving the pavement section may be implemented with the existing Broadway Avenue rehabilitation project [NH 62-1(10)0 MT 16-Culbertson] that the MDT Glendive District is currently working on. In order to upgrade the intersection, additional right-of-way would be required on either side. The Oelkers Carter Service Center located in the southeast quadrant of the intersection is a potential 4(f) property which may require additional environmental consideration under this improvement option. Due to the need for design in upgrading an intersection along with the need to purchase right-of-way, and the overall cost of construction, this option has been classified as follows:

Project Timeline: Mid-Term Implementation (2-5 years)

Estimated Cost: \$200,000 to \$300,000

Improvement Option Number 7: MT 16 (North) Realignment

When considered together, the geometric layout of the intersections of MT 16 with US 2 is not sufficient for proper turning movements of large trucks. The two sequential 90-degree turns on the two lane facilities located within one block of each other has the potential to cause congestion and safety issues for not only heavy vehicles, but for other vehicles behind them. Although there are no current or projected capacity issues at either intersection of MT 16 with US 2, this option has the potential to address the need to improve operations of US 2 and MT 16.

This improvement option considers realigning the existing MT 16 (north) roadway to line up with MT 16 (south). In order to implement this option, right-of-way would need to be purchased along the new route’s entirety. Due to the impacts to the recreational fields, this entire facility would need to be relocated. If this improvement option was implemented, it would be designed to meet current MDT design standards to accommodate the WB-67 design vehicle. Although the intersection of MT 16 (north) and 8th Street would remain open for emergency services accessibility, the small portion of MT 16 (north) located north of 8th Street would be removed. Due to the need for design of the new roadway, the need to purchase right-of-way, and the overall cost of construction, this option has been classified as follows:

Project Timeline: Long-Term Implementation (5+ years)

Estimated Cost: \$500,000 to \$600,000

Improvement Option Number 8: Sight Distance Improvements at Project Intersections

In order to improve sight distance throughout the Study area, signs located in sight distance triangles at all quadrants of an intersection should be removed and/or relocated, to the extent practicable. This improvement includes the intersections of MT 16 (north) / US 2, MT 16 (south) / US 2, Broadway Avenue / 4th Street, and Broadway Avenue / 1st Street. On-street parking near these intersections should also be eliminated, to the extent practicable. However, MDT has very limited enforcement power over signs outside highway right-of-way and over parking restrictions. It would be more appropriate for Culbertson to pass an ordinance regarding sight distance and/or parking restrictions if the community considers this improvement option necessary. Because of the low cost and the increased involvement of the Town of Culbertson, this option has been classified as follows:

Project Timeline: Short-Term Implementation (0-2 years)

Estimated Cost: \$20,000 to \$25,000

Geometric Improvement Options Summary

Options to upgrade the intersections of MT 16 with US 2 should both be considered together. If the option to realign MT 16 (north) is considered, upgrades to the intersection of MT 16 (south) and US 2 should also be considered at that time; however, consideration of the option to realign MT 16 (north) would negate the need to improve the current intersection of MT 16 (north) and US 2. Sight distance improvements at the identified project intersections should be considered regardless of what other improvement options are implemented.

1.1.3 Truck Traffic

Culbertson has experienced greatly increased truck traffic through town because of the booming oil industry in and around the Study area. Improvement options in this section have the potential to address the study objective of minimizing the impacts of increased truck traffic through the Study area.

Improvement Option Number 9: Four Lane US 2

Since an EA was previously prepared for US 2 in the Culbertson area, it was necessary to evaluate the 4-lane facility in this improvement option process. The *Culbertson – East to North Dakota EA* investigated a four-lane facility on US 2 from the intersection of MT 16 (north) at approximate Reference Post (RP) 644.6 to the North Dakota state line, which is beyond the Study area boundary for this project. The Town of Culbertson noted their preferred typical section from the intersection of MT 16 (north) to the eastern incorporated city limits located at approximate RP 645.0 would be composed of two five-foot sidewalks, curb and gutter on both sides of the roadway, two five-foot shoulders, two 12-foot outside travel lanes, and two 11-foot inside travel lanes. There would be no on-street parking. As the roadway leaves Culbertson, the curb and gutter and sidewalks would be terminated but the roadway would remain in a four-lane undivided configuration with eight-foot shoulders and four 12-foot traveling lanes. This configuration would extend to a point west of the Clover Creek bridge where it would transition to a divided four-lane section. The Culbertson EA noted that the four-lane facility would provide benefits

related to improved level of service, improved safety, support for anticipated economic growth, and updated roadway design.¹

In order to be consistent with the proposed action of the Culbertson EA, US 2 to the west of MT 16 (north) would continue the four lane configuration with sidewalks to the western edge of incorporated city limits at approximate RP 644.3. As US 2 reached the west end of Culbertson, the typical section would transition to an undivided four-lane with eight-foot shoulders until it reached the Study area boundary at approximate RP 642.8.

The four-lane typical section for US 2 through the Study area would be a long-term solution that is consistent with the local planning efforts including the Culbertson EA and the Town of Culbertson's 2011 Growth Policy. New bridges and/or large culverts would be necessary to cross Diamond Creek, Clover Creek, and blue line intermittent streams. Adjacent floodplains would be impacted. This route has the potential to encroach on the Eastern Red Bat, Great Blue Heron, Western Hog-nosed Snake, and habitat for the Whooping Crane. Due to the proximity of a number of hazardous material sites and 4(f) and 6(f) sites, the route's ability to impact or avoid these sites would be determined during final design if this route were carried forward from this Study. To be consistent with local planning efforts including the Culbertson EA and the Town of Culbertson's 2011 Growth Policy, and due to the cost of implementation, this improvement option has been classified as follows:

Project Timeline: Long-Term Implementation (5+ years)

Estimated Cost: \$16,500,000 to \$20,000,000*

**It should be noted that this cost was based on the overall cost given in the 2008 EA, which is in 2008 dollars and includes construction costs and preliminary right-of-way costs.*

Improvement Option Number 10: 7th Street Couplet

Although there are no current or projected capacity issues along US 2, the increase in traffic volumes associated with the recent boom in the oil and gas industry may result in functional issues in the future. The Culbertson-East to North Dakota EA identified a proposed action to incorporate a four-lane facility along US 2. The Culbertson EA noted that the four-lane facility would provide benefits related to improved level of service, improved safety, support for anticipated economic growth, and updated roadway design. Although a couplet was not addressed in the Culbertson EA, it could be a design option that would allow for consistency and continuity of a four-lane facility.

As a re-evaluation of the US 2 four-lane facility included in the Culbertson EA, a couplet along 7th Street was explored. This option consists of a couplet utilizing the existing US 2 for the eastbound direction and 7th Street and portions of developed land for the westbound direction. The west end of 7th Street would bisect a residential area and tie into US 2 near Diamond Creek. The east end of 7th Street would bisect a residential/industrial area and tie into US 2 near the weigh scale. The recreational fields would be impacted and would need to be relocated. The cost estimate takes into account urban amenity

¹ Montana Department of Transportation, Culbertson – East to North Dakota Environmental Assessment, 2008.

improvements along US 2 and urban rehabilitation and new urban roadway along 7th Street. Due to the cost of implementation, this improvement option has been classified as follows:

Project Timeline: Long-Term Implementation (5+ years)

Estimated Cost: \$3,200,000 to \$3,800,000

Improvement Option Number 11: 8th Street Couplet

Although there are no current or projected capacity issues along US 2, the increase in traffic volumes associated with the recent boom in the oil and gas industry may result in functional issues in the future. The Culbertson-East to North Dakota EA identified a proposed action to incorporate a four-lane facility along US 2. The Culbertson EA noted that the four-lane facility would provide benefits related to improved level of service, improved safety, support for anticipated economic growth, and updated roadway design. Although a couplet was not addressed in the Culbertson EA, it would be a design option that would allow for consistency and continuity of a four-lane facility.

As a re-evaluation of the four-lane facility along US 2 included in the Culbertson EA, a couplet along 8th Street was explored to minimize impacts to the recreational fields. This option consists of a couplet utilizing the existing US 2 for the eastbound direction and 8th Street and portions of developed land for the westbound direction. The west end of 8th Street would minimize impacts to the recreational fields and residential area to the extent practicable before intersecting US 2 near Diamond Creek. The east end of 8th Street would bisect a residential/industrial area and tie into US 2 near the weigh scale. This option would minimize impacts to the recreational fields and the airport to the extent practicable; however, more curves in the alignment would be required. The cost estimate takes into account urban amenity improvements along US 2 and urban rehabilitation and new urban roadway along 8th Street. Due to the cost of implementation, this improvement option has been classified as follows:

Project Timeline: Long-Term Implementation (5+ years)

Estimated Cost: \$3,200,000 to \$3,800,000

Improvement Option Number 12: Weigh-in-Motion Systems

All trucks entering the Study area from the east, west, and south and some trucks entering from the north must first proceed to the weigh scale, which means some trucks make two passes through Culbertson before they can proceed to their destination.

This improvement option includes the installation of three WIM systems: one on US 2 west of Culbertson, one on MT 16 (south), and relocating the current WIM system on MT 16 (north). The precise location and equipment used at each WIM site would be determined based on general requirements of the WIM system. By installing new WIM systems on these two roadways entering Culbertson, not all truck traffic would need to proceed to the weigh scale before proceeding onto their destinations. This would potentially diversify the paths of trucks. Even with the installation of WIM systems, the necessity of other spot improvements would not likely change because truck traffic has no other means of diversion away from downtown. This improvement as a whole is considered mid-term, but could be broken into individual installations as funding becomes available.

Project Timeline: Mid-Term Implementation (2-5 years)

Estimated Cost: \$300,000 to \$400,000

Truck Traffic Improvement Options Summary

Because the Four Lane US 2, the 7th Street Couplet, and the 8th Street Couplet are all options which include four lanes on US 2, only one of these three options would need to be considered in the future. For this reason, the Weigh-in-Motion Systems improvement option should be considered no matter which selection is made regarding four lanes on US 2.

1.1.4 Access Points

The number and location of access points is an area of concern. In particular, the proximity of an access point to an intersection is an issue. Too many access points along the highway and access points that are located too close to an intersection create potentially unsafe conflict points. One of the objectives of the Study is to minimize impacts associated with access points and roadside parking, to the extent practicable.

Improvement Option Number 13: Access Management Plan

A comprehensive Access Management Plan should be completed along US 2 from approximately MP 644.2 to 645.5, along MT 16 (north) from MP 88.6 to 88.1), and along MT 16 (south) from MP 0 to 1.2. These sections of highway are categorized by multiple approaches, by continuous asphalt parking lots, and by numerous driveway turning movements. The combination of these three categories result is conflicting operations. A formal Access Management Plan would allow for one-on-one dialogue with each property owner to devise a strategy to combine drive accesses, restrict problematic accesses, and/or to totally remove unneeded accesses. Implementing access control would require action by the Transportation Commission. Here, the potential also exists to install curb and gutter to restrict future access points along these roadways. The success of a formal Access Management Plan depends on aggressive outreach to all affected parties, plus a basic strategy on why access control will benefit both the adjacent land uses as well as the traveling public. Not only because of the high level of outreach but also because of the cost associated with completing an Access Management Plan, this improvement option has been classified as follows:

Project Timeline: Mid-Term Implementation (2-5 years)

Estimated Cost: \$130,000 to \$160,000

1.1.5 Community Area of Concern

During the first public information meeting, locals noted that besides the areas of concern noted above and in the Existing and Projected Conditions report, there is one other issue that they would like to see resolved.

Improvement Option Number 14: US 2 Speed Study

During the first public informational meeting, community members pointed out that the crosswalk located along US 2, adjacent to the Culbertson Public Schools, is dangerous because of the combination of four things: the proximity of the 25 mph sign, the difficulty finding the speed limit sign, the

percentage of trucks using US 2, and the hill west of the 25 mph sign. With a combination of these factors, community members observed that many vehicles, especially large trucks, are going faster than the posted 25 mph speed limit and possibly too fast for the crosswalk. One objective for this study is to improve pedestrian crossing safety near the school.

For these reasons, the Town of Culbertson should request a speed study. This speed study would evaluate and determine proper speed limits within the community and would potentially address the Study objective to improve pedestrian crossing safety near the school. It is also recommended that enforcement be increased near speed zone changes. Due to the low cost, this option is considered as follows:

Project Timeline: Short-Term Implementation (0-2 years)

Estimated Cost: \$40,000 to \$50,000

1.2 ***Improvement Options Considered But Not Advanced***

The following improvement options were developed and investigated and were ultimately not advanced into recommended improvement options.

1.2.1 **Traffic Signal or Roundabout at MT 16(north) / US 2 Intersection**

Recommendation of any type of traffic control must first undergo a study and documentation verifying a need before it can be proposed. Once traffic control is defined as a need, it must undergo signal warrant analysis. Any time a new signal is considered, state law requires the consideration of a roundabout.

At this time the four legs of the intersection at MT 16 (north) and US 2 operate at a level of service A or B and do not warrant traffic control. If a traffic control measure is warranted in the future, a signal warrant analysis and/or roundabout analysis would take place at that time.

1.2.2 **Install Left Turn Lane on MT 16(north)**

The option to install a left turn lane on MT 16 (north) in accordance with current MDT standards was considered. A dedicated left turn lane would allow trucks to turn left towards the weigh station and still allow vehicles to go straight or turn right at the intersection. At this time the four legs of the intersection at MT 16 (north) and US 2 operate at a level of service A or B. Analysis of projected traffic volumes determined that the four legs of this intersection would continue to operate at level of service A or B in the year 2032. Because there are no current or projected capacity issues at this intersection, this improvement is not advanced.

1.2.3 **Install Turn Lanes on US 2**

The option to install a left turn lane on the US 2 EB lane and a right turn lane to the US 2 WB lane was considered. Although the inclusion of WB right-turn lane would be ideal, adjacent buildings would hinder this addition. The intersection geometrics to incorporate these two turning lanes within the

constrained corridor would be complicated combined with the lack of current and future capacity issues led to the elimination of this improvement option from further consideration.

1.2.4 Convert Old Weigh Scale Area to Parking Lot

Although converting the old weigh scale area to a parking lot would decrease the need for on-street parking, it would result in more pedestrian crossing needed to access businesses to the east and south of this area. Even with parking moved off the street, there would still be potential for sight-distance issues with a new parking lot. This improvement option would not address any area of concern and is therefore not advanced.

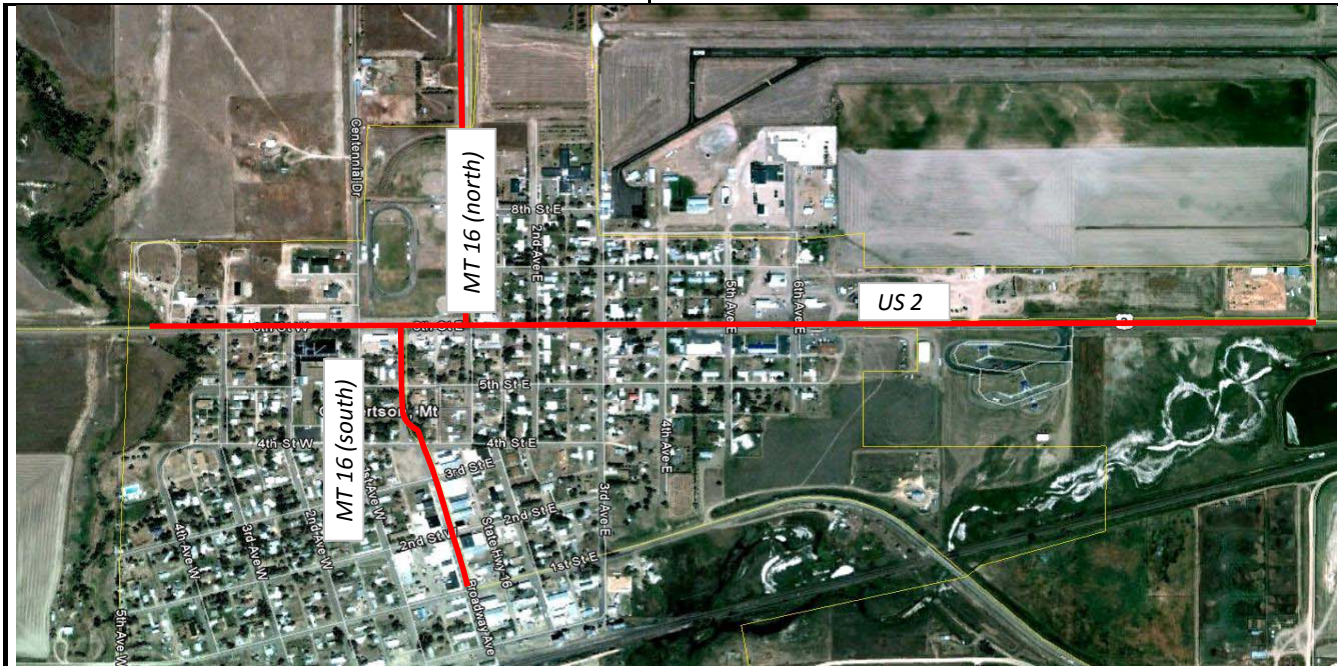
1.2.5 3rd Avenue East Truck Route Designation

In the past, 3rd Avenue East was designated as a "truck route" and the Town of Culbertson maintained the facility. This route provided a direct north-south connector for trucks to pass through Culbertson without requiring sharp turns and passing through the downtown area of Culbertson, which is the current situation along Broadway Avenue. Recently, signs were placed along 3rd Avenue East stating "No Trucks over 20,000 GVW" were allowed along this road segment. This action required all trucks to remain on Broadway Avenue/MT 16, creating a longer and more difficult route through the downtown area of Culbertson.

To address these issues with trucks on Broadway and associated geometric concerns, re-designation of 3rd Avenue East as the truck route was considered. If funding and maintenance responsibility were the barrier to this recommendation, the City of Culbertson could consider working with MDT, through their formal process, to try and designate 3rd Avenue East instead of Broadway as MT 16 through Culbertson if it is eligible. This improvement option was not considered due to the recent petition by Culbertson community members to eliminate the 3rd Avenue East truck route designation.

Appendix A
Improvement Option Forms

Improvement Number 1: Urban Amenities on MT 16 and US 2	
Road 1:	MT 16
Road 2:	US 2
County:	Roosevelt
Length (Miles):	2.2
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Mid-Term
Cost (construction only):	\$1,000,000 to \$1,200,000



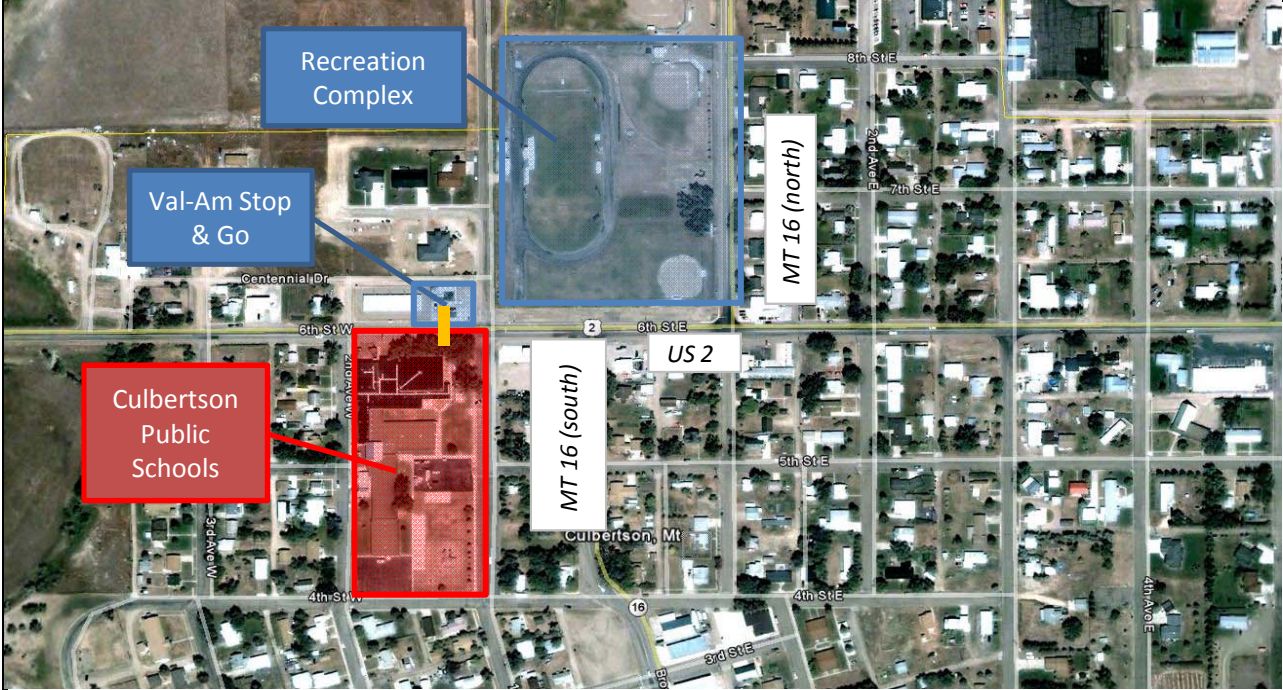
Problem Description

There is currently limited pedestrian travel interconnectivity throughout both the Town and surrounding areas. This limited interconnectivity discourages pedestrian travel or requires pedestrian use of the roadway in several portions of the Study area. One objective for this study is to enhance pedestrian movements along US 2 and MT 16, to the extent practicable. Another objective for this study is to minimize impacts associated with access points and roadside parking, to the extent practicable.

Proposed Improvement Solution

Update typical section to include urban amenities (curb and gutter and sidewalks). This would take place within the incorporated city limits (i.e., approximately MP 644.2 to 645.5 along US 2, MP 88.6 to 88.1 along MT 16 (north), and MP 0 to the Broadway Avenue/1st Street West intersection along MT 16 (south)). Sidewalks would be implemented on US 2 where they do not currently exist to enhance pedestrian movements. Depending on the right-of-way limits on each side of the current roadway, addition of sidewalks would have the potential to impact adjacent land owners. Curb and gutter would be implemented along both sides of US 2 to address surface water flow, delineate current access points, and provide access control for future businesses that may develop within the incorporated city limits. The addition of curb and gutter would have minimal impact on landowners if curb and gutter was implemented only where current accesses do not exist. This improvement as a whole is considered mid-term, but could be broken into smaller, short-term improvement options as funding becomes available. The cost of this improvement option includes curb and gutter and five-foot sidewalks along both sides of MT 16 (north) and along US 2. It was assumed that curb and gutter already exists along MT 16 (south). Five-foot sidewalks were also included as part of the cost estimate along both sides of MT 16 (south) from the intersection of MT 16 (south) and US 2 to 3rd Street.

Improvement Number 2: Rectangular Rapid Flashing Beacon (RRFB)	
Road 1:	MT 16
Road 2:	US 2
County:	Roosevelt
Length (Miles):	2.5
Route Description	
Lanes:	
	Road 1: 2
	Road 2: 2
Phase:	Short-term
Cost (construction only):	\$5,000 to \$10,000



Problem Description

One crosswalk is located on US 2 between the Culbertson Public Schools and the adjacent convenient store, currently called Val-Am Stop & Go. This crosswalk is located mid-block and is primarily used by school-aged children to access the convenient store and also to access the Culbertson Schools Recreation Complex. With the percentage of trucks traversing the corridor and the speed limit change so close to this crosswalk location, this has the potential to be a safety concern. One objective for this study is to improve pedestrian crossing safety near the school.

Proposed Improvement Solution

Because a signed and striped crosswalk currently exists along US 2 between 1st Avenue West and 2nd Avenue West, this improvement option calls for the enhancement of the crosswalk through the installation of a highly visible Rectangular Rapid Flashing Beacon (RRFB).

Improvement Number 3: Non-Motorized Transportation Plan	
Road 1:	MT 16
Road 2:	US 2
County:	Roosevelt
Length (Miles):	2.5
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Short-term
Cost (construction only):	\$50,000 to \$60,000



Problem Description

There is currently no signed or striped crosswalk to allow children or other pedestrians within the northeast quadrant of Culbertson, located north of US 2 and east of MT 16 north, to access the school. One crosswalk is located on US 2 between the Culbertson Public Schools and the adjacent convenient store to the north, currently called Val-Am Stop & Go. A second crosswalk is located on 5th Street and crosses Broadway Avenue. One objective for this study is to improve pedestrian crossing safety near the school. Another objective for this study is to enhance pedestrian movements along US 2 and MT 16, to the extent practicable.

Proposed Improvement Solution

It is recommended that the City or County completes a non-motorized transportation plan in order to identify potential bicycle and pedestrian needs and potential mitigation measures to address these needs, not only for school-aged children, but for all pedestrians traversing the Study area. This plan would encompass the area within the incorporated city limits (i.e., approximately MP 644.2 to 645.5 along US 2, MP 88.6 to 88.1 along MT 16 (north), and MP 0 to 1.2 along MT 16 (south)). Due to the lack of construction coupled with the low cost to complete this study, this option has been classified as short-term. The cost estimate developed for this improvement option is for the completion of a Non-Motorized Transportation Plan.

Improvement Option 4: Bulb-Out	
Road 1:	MT 16 (south)
Road 2:	2nd Street
County:	Roosevelt
Length (Miles):	Intersection
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Short-term
Cost (construction only):	\$10,000 to \$12,000



Problem Description

During the first public informational meeting, local residents noted that the intersection of MT 16 (south) and 2nd Street is dangerous due to the sight distance related to the proximity of business parking to the intersection and the number of pedestrians that want to travel between businesses on both sides of MT 16 (south). Currently, no signed or striped crosswalk exists between downtown businesses located along both sides of MT 16 (south). With the percentage of trucks traversing the corridor, this has the potential to be a safety concern. One objective for this study is to enhance pedestrian movements along US 2 and MT 16, to the extent practicable. Another objective is to improve intersection site distance, to the extent practicable.

Proposed Improvement Solution

Design and implementation should be considered to heighten pedestrian visibility at this intersection. Curb bulb-outs or other infrastructure would increase awareness to pedestrians. The bulb-out improvement should be done with sensitivity to drainage considerations, snow plowing operations, and local truck and vehicle turning movements. Shifting street parking away from the intersection would also heighten pedestrian visibility and assist the sight distance issue. There are currently multiple businesses along Broadway Avenue/MT 16 and off this main thoroughfare that require trucks or other large vehicles to turn onto local roadways. For those businesses located along Broadway Avenue/MT 16, most use adjacent streets or alleyways to park and then walk the freight to the respective businesses. Because school bus parking and the Farm Equipment Sales Incorporated business are both located to the west of the intersection, more trucks and large vehicles are using 2nd Street west of Broadway Avenue. To avoid potential conflicts with trucks turning between Broadway Avenue and 2nd Street west of Broadway Avenue, a curb bulb-out is only recommended on the east side of Broadway Avenue parallel to 2nd Street. To improve sight distance on the west side of the intersection, parking restrictions could also be considered.

Improvement Number 5: Geometric Upgrade of MT 16 (north) / US 2 Intersection	
Road 1:	MT 16 (north)
Road 2:	US 2
County:	Roosevelt
Length (Miles):	Intersection
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Improvement:	
Phase:	Mid-term
Cost (construction only):	\$300,000 to \$400,000



Problem Description
 The intersection of US 2 and MT 16 (north) in Culbertson is a concern due to substandard geometrics. One objective for this study is to improve geometric elements to provide for semi-trucks and recreational vehicles.

Proposed Improvement Solution
 Upgrade the intersection to meet current MDT design standards to accommodate the WB-67 design vehicle. By bringing the intersection up to current MDT design standards, the objective to improve geometric elements to provide for semi-trucks would be met. Due to the need for design in upgrading an intersection along with the need to purchase right-of-way, and the overall cost of construction, this option has been classified as mid-term. The cost of this improvement option includes curb and gutter, five-foot sidewalks, asphalt, subgrade, and excavation on all four legs of the intersection.

Improvement Number 6: Upgrade MT 16 (south) / US 2 Intersection	
Road 1:	MT 16 (south)
Road 2:	US 2
County:	Roosevelt
Length (Miles):	Intersection
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Mid-term
Cost (construction only):	\$200,000 to \$300,000



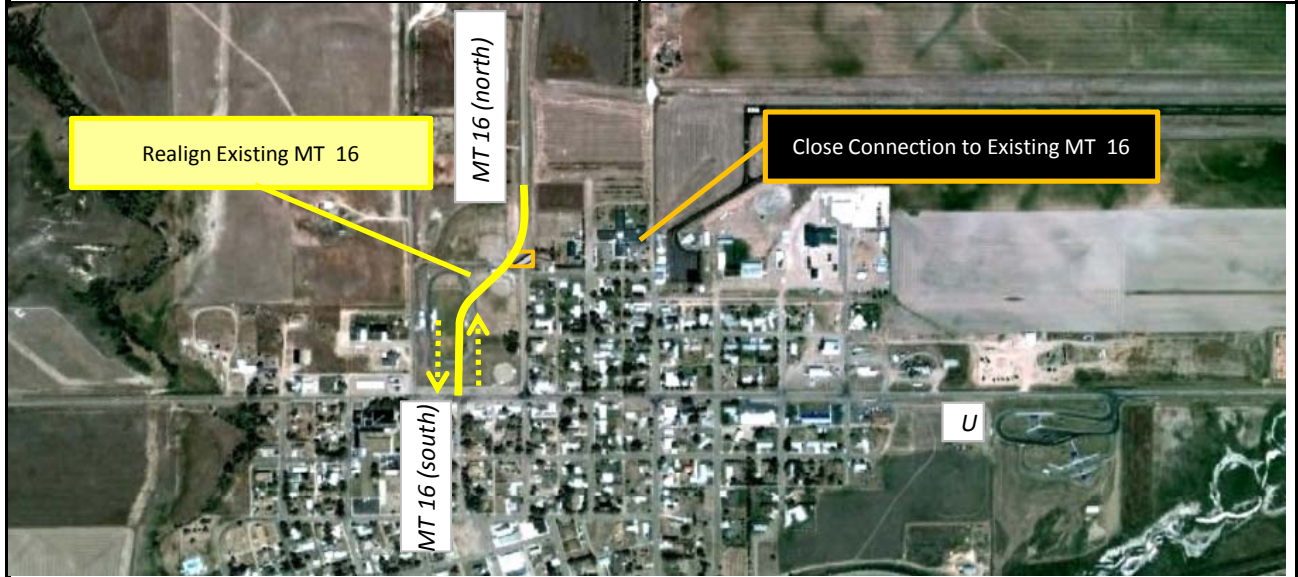
Problem Description

The geometric layout of the intersection is not sufficient for proper turning movements of large trucks going through the intersection as trucks occupy two lanes in order to make the turn. With increased amounts of traffic, especially large trucks, deterioration of the existing roadway pavement is a concern. Large trucks with dual axle configurations pose the biggest threat to the pavement. Also, particular attention should be given to the roadway shoulders. As trucks have to pull over to the side of the road, or as rear wheels “track” onto the shoulder going through a right turn, the existing pavement can be damaged considerably. Broken up pavement, substantial cracks, and potholes reduce the service life of the roadway and pose a safety risk to the traveling public.

Proposed Improvement Solution

Upgrade the intersection to meet current MDT design standards to accommodate the WB-67 design vehicle. This upgrade would include improvements to the pavement section of the MT 16 (south) by adding a concrete element or other means. Improving the pavement section may be implemented with the existing Broadway Avenue rehabilitation project [NH 62-1(10)0 MT 16-Culbertson] that the MDT Glendive District is currently working on. In order to upgrade the intersection, additional right-of-way would be required on either side. The Oelkers Carter Service Center located in the southeast quadrant of the intersection is a potential 4(f) property which may require additional environmental consideration under this improvement option. Due to the need for design in upgrading an intersection along with the need to purchase right-of-way, and the overall cost of construction, this option has been classified as mid-term. The cost of this improvement option includes curb and gutter, five-foot sidewalks, asphalt, subgrade, and excavation on all three legs of the intersection. A small amount of concrete was also included in the overall cost.

Improvement Number 7: MT 16 (North) Realignment	
Road 1:	MT 16 (North)
Road 2:	-
County:	Roosevelt
Length (Miles):	0.2
Route Description	
Lanes:	
Road 1:	2
Road 2:	-
Phase:	Long-term
Cost (construction only):	\$500,000 to \$600,000



Problem Description

When considered together, the geometric layout of the intersections of MT 16 with US 2 is not sufficient for proper turning movements of large trucks. The two sequential 90-degree turns on the two lane facilities located within one block of each other has the potential to cause congestion and safety issues for not only heavy vehicles, but for other vehicles behind them. Although there are no current or projected capacity issues at either intersection of MT 16 with US 2, this option has the potential to address the need to improve operations of US 2 and MT 16.

Proposed Improvement Solution

This improvement option considers realigning the existing MT 16 (north) roadway to line up with MT 16 (south). In order to implement this option, right-of-way would need to be purchased along the new route's entirety. Due to the impacts to the recreational fields, this entire facility would need to be relocated. If this improvement option was implemented, it would be designed to meet current MDT design standards to accommodate the WB-67 design vehicle. Although the intersection of MT 16 (north) and 8th Street would remain open for emergency services accessibility, the small portion of MT 16 (north) located north of 8th Street would be removed.

Improvement Number 8: Sight Distance Improvements at Project Intersections	
Road 1:	MT 16
Road 2:	US 2
County:	Roosevelt
Length (Miles):	Intersections
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Improvement:	
Phase:	Short-term
Cost (construction only):	\$20,000 to \$25000



Problem Description

The sight distance for vehicles trying to enter or exit the roadway at intersections along US 2 and MT 16 through Culbertson is a concern. Hindered sight triangles with the increased traffic on these roads pose a safety risk for the vehicles on the highway and those trying to enter/exit the highway. Several sight obstructions including buildings, signs, vegetation, and parked/turning vehicles exist within quadrants at various intersections in Culbertson. One objective for this study is to improve sight distance, to the extent practicable.

Proposed Improvement Solution

In order to improve sight distance throughout the Study area, signs located in sight distance triangles at all quadrants of an intersection should be removed and/or relocated, to the extent practicable. This includes the intersections of MT 16 (north) / US 2, MT 16 (south) / US 2, Broadway Avenue / 4th Street, and Broadway Avenue / 1st Street. On-street parking near these intersections should also be eliminated, to the extent practicable. MDT has very limited power of enforcement regarding signs outside highway right-of-way and parking restrictions. It would be more appropriate for Culbertson to pass an ordinance regarding sight distance and/or parking restrictions if the community considers this improvement option necessary. Due to the low cost and increased involvement required on the part of the Town of Culbertson, this option has been classified as short-term. The cost of this improvement option includes the cost of moving 18 signs and removing 3 large trees.

Improvement Number 9: Four-Lane US 2	
Road 1:	US 2
Road 2:	-
County:	Roosevelt
Length (Miles):	4.0
Route Description	
Lanes:	
Road 1:	4
Road 2:	-
Phase:	Long-term
Cost (prorated from EA):	\$16,500,000 to \$20,000,000



Problem Description

Although there are no current capacity issues along US 2, the increase in traffic volumes associated with the recent boom in the oil and gas industry may result in capacity issues in the future. The *Culbertson-East to North Dakota EA* identified a proposed action to incorporate a four-lane facility along US 2. The Culbertson EA noted that the four-lane facility would provide benefits related to improved level of service, improved safety, support for anticipated economic growth, and updated roadway design. The four-lane typical section for US 2 serves as a long-term solution that is consistent with local planning efforts including the Culbertson EA and Town of Culbertson's 2011 Growth Policy.

Proposed Improvement Solution

According to the Culbertson EA, the Town of Culbertson's preferred typical section from MT 16 (north) to the eastern incorporated city limits would be composed of two five-foot sidewalks, curb and gutter on both sides of the roadway, two five-foot shoulders, two 12-foot outside travel lanes, and two 11-foot inside travel lanes. There would be no on-street parking. As the roadway leaves Culbertson, the curb and gutter and sidewalks would be terminated but the roadway would remain a four-lane undivided section with eight-foot shoulders and four 12-foot travel lanes. This configuration would extend to a point west of the Clover Creek bridge where it would transition to a divided four-lane section. In order for consistency, it is recommended US 2 to the west of MT 16 (north) would continue the four-lane configuration with sidewalks to the western edge of incorporated city limits. As US 2 reached the west end of Culbertson, the typical section would transition to an undivided four-lane with eight-foot shoulders until it reached the study area boundary. The cost estimate was obtained from the Culbertson EA and Finding of No Significant Impact (2008 dollars) which takes preliminary right-of-way and construction costs into consideration.

Improvement Number 10: 7th Street Couplet	
Road 1:	US 2
Road 2:	7th Street
County:	Roosevelt
Length (Miles):	2.1
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Long-term
Cost (construction only):	\$3,200,000 to
	\$3,800,000



Problem Description

Although there are no current or projected capacity issues along US 2, the increase in traffic volumes associated with the recent boom in the oil and gas industry may result in functional issues in the future. The Culbertson-East to North Dakota EA identified a proposed action to incorporate a four-lane facility along US 2. The Culbertson EA noted that the four-lane facility would provide benefits related to improved level of service, improved safety, support for anticipated economic growth, and updated roadway design. Although a couplet was not addressed in the Culbertson EA, it could be a design option that would allow for consistency and continuity of a four-lane facility.

Proposed Improvement Solution

As a re-evaluation of the US 2 four-lane facility included in the Culbertson EA, a couplet along 7th Street was explored. This option consists of a couplet utilizing the existing US 2 for the eastbound direction and 7th Street and portions of developed land for the westbound direction. The west end of 7th Street would bisect a residential area and tie into US 2 near Diamond Creek. The east end of 7th Street would bisect a residential/industrial area and tie into US 2 near the weigh scale. The recreational fields would be impacted and would need to be relocated. The cost estimate takes into account urban amenity improvements along US 2 (1.0 miles) and new urban roadway/improvements to the existing 7th Street (1.1 miles).

Improvement Number 11: 8th Street Couplet	
Road 1:	US 2
Road 2:	8th Street
County:	Roosevelt
Length (Miles):	2.2
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Long-term
Cost (construction only):	\$3,200,000 to \$3,800,000




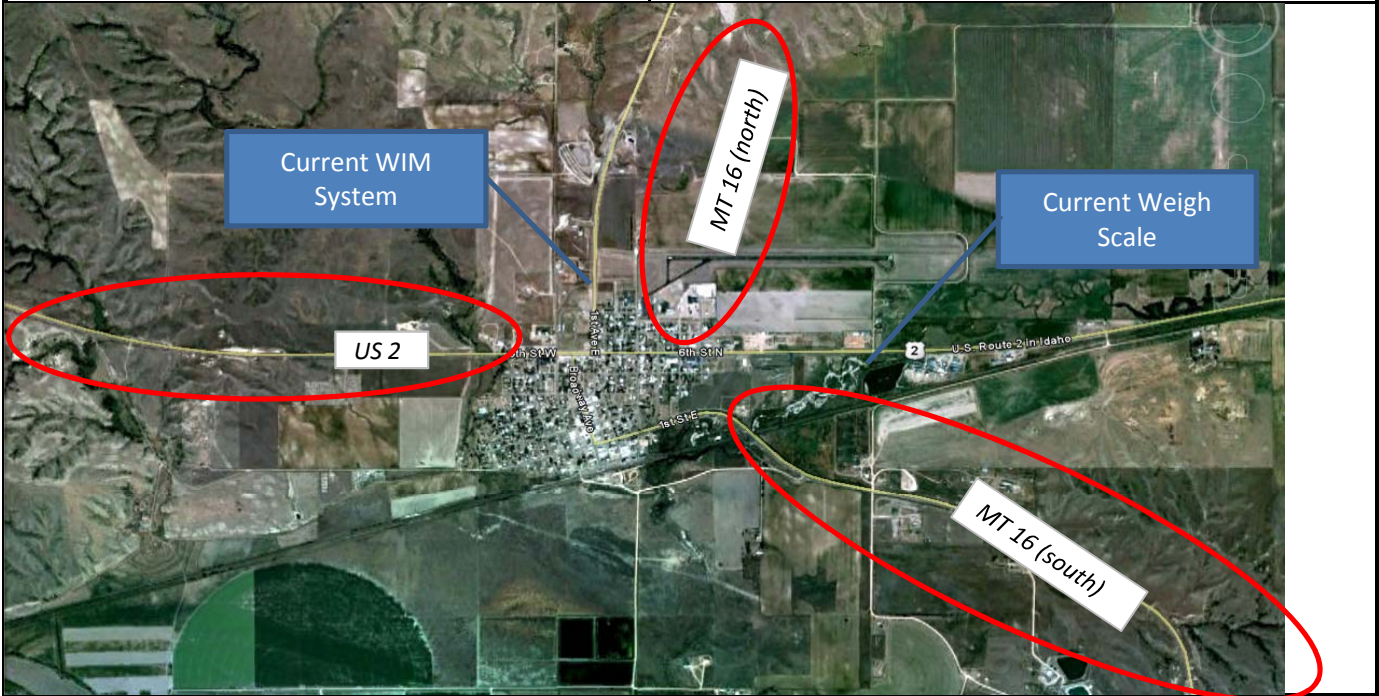
Problem Description

Although there are no current or projected capacity issues along US 2, the increase in traffic volumes associated with the recent boom in the oil and gas industry may result in functional issues in the future. The Culbertson-East to North Dakota EA identified a proposed action to incorporate a four-lane facility along US 2. The Culbertson EA noted that the four-lane facility would provide benefits related to improved level of service, improved safety, support for anticipated economic growth, and updated roadway design. Although a couplet was not addressed in the Culbertson EA, it would be a design option that would allow for consistency and continuity of a four-lane facility.

Proposed Improvement Solution

As a re-evaluation of the four-lane facility along US 2 included in the Culbertson EA, a couplet along 8th Street was explored to minimize impacts to the recreational fields. This option consists of a couplet utilizing the existing US 2 for the eastbound direction and 8th Street and portions of developed land for the westbound direction. The west end of 8th Street would minimize impacts to the recreational fields and residential area to the extent practicable before intersecting US 2 near Diamond Creek. The east end of 8th Street would bisect a residential/industrial area and tie into US 2 near the weigh scale. This option would minimize impacts to the recreational fields and the airport to the extent practicable; however, more curves in the alignment would be required. The cost estimate takes into account urban amenity improvements along US 2 (1.0 miles) and urban rehabilitation and new urban roadway along 8th Street (1.2 miles).

Improvement Number 12: Weigh-In-Motion Systems		
Road 1:	MT 16	
Road 2:	US 2	
County:	Roosevelt	
Length (Miles):	WIM Sites	
Route Description		
Lanes:		
	<i>Road 1:</i>	2
	<i>Road 2:</i>	2
Phase:	Mid-Term	
Cost (construction only):	\$300,000 to \$400,000	



Problem Description
The town of Culbertson has experienced a considerable increase in truck traffic through town due to the increased growth of the oil and gas industry in and around the study area. All trucks entering the Study area from the east, west, and south and some trucks entering from the north must first proceed to the weigh scale, which means some trucks make two passes through Culbertson before they can proceed to their destination.

Proposed Improvement Solution
Install WIM systems on US 2 west of Culbertson and MT 16 (south). The current WIM system on MT 16 (north) may need to be moved further north. The precise location and equipment used at each WIM site would be determined based on requirements of the WIM system. By installing new WIM systems on these two roadways entering Culbertson, not all truck traffic would need to proceed to the weigh scale before proceeding onto their destinations. This would potentially diversify the paths of trucks. Even with the installation of WIM systems, the necessity of other spot improvements would not likely change because truck traffic has no other means of diversion away from downtown. This improvement as a whole is considered mid-term, but could be broken into individual installations as funding becomes available.

Improvement Number 13: Access Management Plan

Road 1:	MT 16
Road 2:	US 2
County:	Roosevelt
Length (Miles):	2.5
Route Description	
Lanes:	
Road 1:	2
Road 2:	2
Phase:	Mid-Term
Cost (construction only):	\$130,000 to \$160,000



Problem Description

The number of access points and their location are a concern. In particular, the proximity of an access point to an intersection is an issue. Too many access points along the highway and access points that are located too close to an intersection create potentially unsafe conflict points. One of the objectives of the Study is to minimize impacts associated with access points and roadside parking, to the extent practicable.

Proposed Improvement Solution

A comprehensive Access Management Plan should be completed along US 2 from approximately MP 644.2 to 645.5, along MT 16 (north) from MP 88.6 to 88.1), and along MT 16 (south) from MP 0 to 1.2. These sections of highway are categorized by multiple approaches, by continuous asphalt parking lots, and by numerous driveway turning movements. The combination of these three categories result is conflicting operations. A formal Access Management Plan would allow for one-on-one dialogue with each property owner to devise a strategy to combine drive accesses, restrict problematic accesses, and/or to totally remove unneeded accesses. Implementing access control would require action by the Transportation Commission. Here, the potential also exists to install curb and gutter to restrict future access points along these roadways. The success of a formal Access Management Plan depends on aggressive outreach to all affected parties, plus a basic strategy on why access control will benefit both the adjacent land uses as well as the traveling public. Not only because of the high level of outreach but also because of the cost associated with completing an Access Management Plan, this improvement option has been classified as a mid-term project: . This cost estimate is for the completion of the Access Management Plan.

Improvement Option 14: US 2 Speed Study	
Road 1:	US 2
Road 2:	-
County:	Roosevelt
Length (Miles):	Sign Location
Route Description	
Lanes:	
	<i>Road 1:</i> 2
	<i>Road 2:</i> -
Phase:	Short-term
Cost (construction only):	\$40,000 to \$50,000



Problem Description
 During the first public informational meeting, locals noted that the proximity of the 25 mph sign to the US 2 crosswalk has the potential to be dangerous. With the percentage of trucks traversing the US 2 corridor coupled with the hill to the west of the speed limit change, locals observed that many vehicles, especially trucks, are not going 25mph at the posted speed limit and possibly not in time for the crosswalk either. One objective for this study is to improve pedestrian crossing safety near the school.

Proposed Improvement Solution
 It is recommended that the Town of Culbertson requests a speed study. The speed study would evaluate and determine proper speed limits within the community. It is also recommend to increase enforcement near speed zone changes. Due to the low cost of this improvement option, it is considered short-term. This cost estimate is for the completion of a Speed Study.