MONTANA 3 BILLINGS
CORRIDOR STUDY

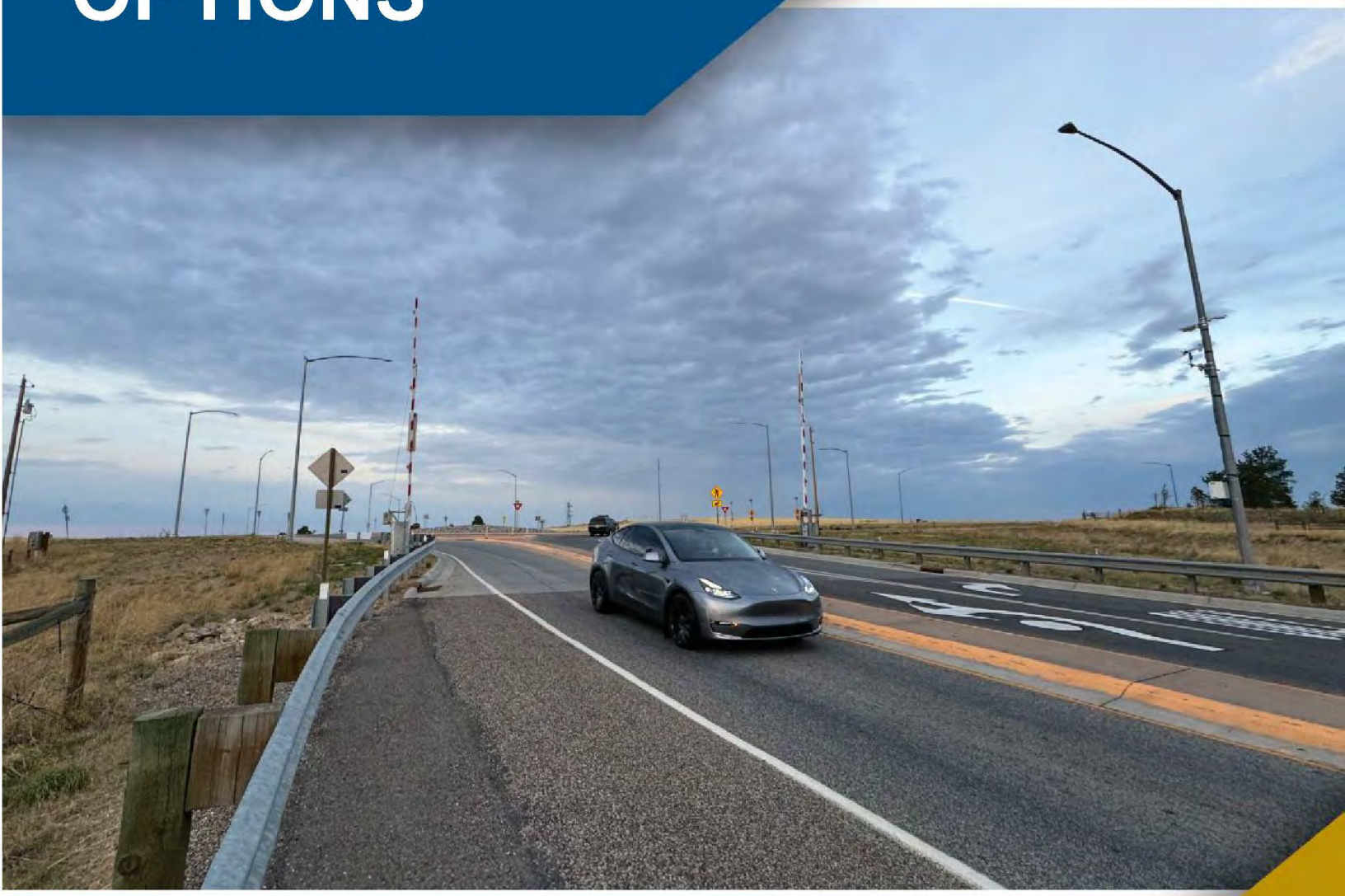
Appendix E

Improvement Options Report

MONTANA 3 BILLINGS
CORRIDOR STUDY

DECEMBER 2025

IMPROVEMENT OPTIONS



Prepared for:

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DOWL

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1.0 INTRODUCTION

The Montana Department of Transportation (MDT) initiated a corridor study of Montana Highway 3 (MT 3) in Billings, between the highway's intersection with Apache Trail and the East (E.) Airport Road/North (N.) 27th Street intersection. The study's purpose is to develop a comprehensive long-range plan for managing the corridor and determine what could be done to improve the corridor based on needs, public and agency input, and financial feasibility. This is a collaborative process with local jurisdictions, resource agencies, MDT, Federal Highway Administration (FHWA), and the public to identify transportation needs and potential solutions given environmental constraints, financial feasibility, constructability, and corridor context.

The intent of the *Improvement Options Report* is to identify and evaluate options for improving MT 3. Potential improvement options are intended to address issues or areas of concern defined in the *Existing and Projected Conditions Report* prepared for the study corridor. Recommended improvement options described in this report reflect input from stakeholders and the public as well as a thorough evaluation of the existing conditions within the MT 3 Billings study corridor.

1.1 Study Corridor Area

The MT 3 Billings study corridor area is in the northwest part of Billings, within Yellowstone County, Montana. The study corridor includes 5.1 miles of MT 3 between the intersection with Apache Trail (Reference Post [RP] 8.1) and the intersection with E. Airport Road and N. 27th Street (RP 3.0). The study corridor area includes a 0.25-mile buffer from the centerline of the roadway, except in portions south of the road where the Rimrocks mark the boundary. Figure 1 depicts the study corridor area and the system designation for roads in the area.

Highway system designation is established based on the functional classification of the route; the system designation is important as it affects methods and sources of funding for roadway improvements. MT 3 is designated as a national highway system (NHS) non-interstate route and connects Billings to Great Falls. Zimmerman Trail and E. Airport Road are designated as urban routes.

Roundabout at Intersection of MT 3 with E. Airport Road and N. 27th Street

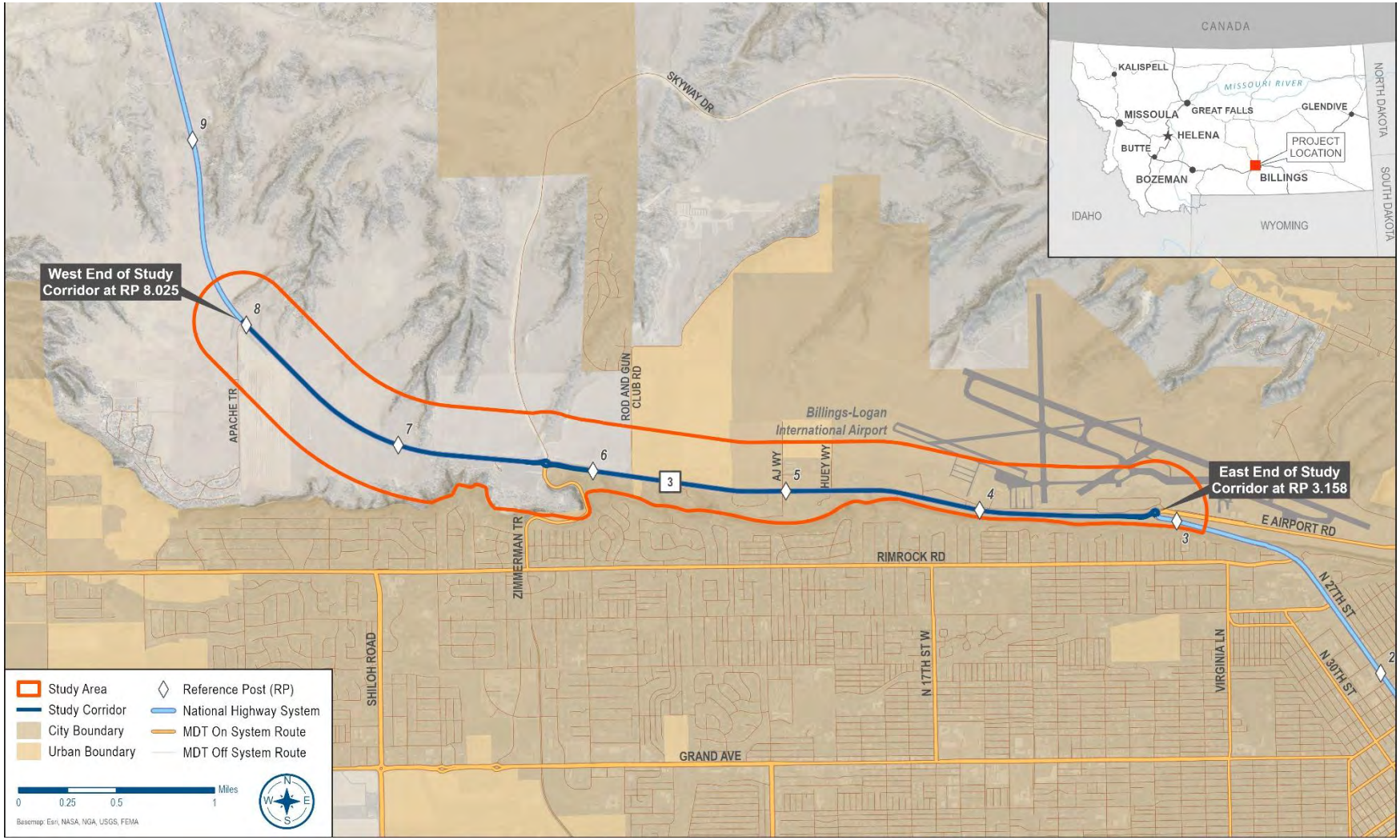

Figure 1: Study Corridor Area and System Designation

1.2 Needs and Objectives

Needs and objectives for the MT 3 corridor planning study were developed based on the social, environmental, and engineering conditions described in the *Existing and Projected Conditions Report*; input from the public, key stakeholders, and resource agencies; review of local plans; and coordination with the technical oversight committee. Improvement options identified in this report address the needs and objectives to the extent feasible within the other limiting considerations listed below. As projects are advanced from this study, needs and objectives may be incorporated in purpose and need statements for future National and Montana Environmental Policy Act (NEPA/MEPA) documentation. Needs, objectives, and considerations are not listed in order of priority.

Need 1: Improve the Safety of the Corridor

- Reduce fatalities and serious injuries in support of Vision Zero.
- Reduce vehicle conflicts.
- Improve safety at non-motorized crossings.

Need 2: Improve the Corridor Transportation Operations

- Accommodate existing and future travel demand.
- Improve intersection operations and level of service.
- Improve non-motorized mobility and accessibility.
- Maintain reasonable access to adjacent businesses and residences.

Other Considerations

- Impacts to environmental resources
- Drainage impacts and Storm Water Management Program requirements
- Constructability and related impacts
- Public and private utilities
- Funding availability
- Maintenance operations, responsibility, and cost
- Consistency with local plans and developments

1.3 Related Projects and Planned Developments

There is one committed and one proposed pedestrian/bicycle project in the study corridor area:

- The **Stagecoach Trail** project is active/committed and will provide an 8-foot-wide pedestrian and bicycle path on the east side of Zimmerman Trail, from Rimrock Road to MT 3. This project is currently in design and construction is planned for 2028. This connection is part of the Marathon Loop, a 26-mile multi-use paved path around Billings.
- The **Yellowjacket Trail** proposed project will provide a pedestrian and bicycle path along N. 27th Street, from the E. Airport Road roundabout to Rimrock Road. Billings TrailNet is conducting a high-level feasibility study to identify the recommended configuration for this non-motorized connection.[1]

The developments listed below are planned in the study corridor area on AJ Way and Huey Way. Intersection improvement options to accommodate development traffic are detailed in this report.

- The **Billings Readiness and Innovation Campus**[2] (BRIC) is a planned development located on the north side of MT 3 off AJ Way. The campus will consist of training and aviation support facilities for the Montana Army National Guard. The campus will be built-out in several phases, with opening year in 2026 and full build expected in 2050. The BRIC will accommodate drill weekend trainings, which will occur seven to 12 weekends per year. At full build in 2050, up to 880 personnel are anticipated at the BRIC during drill weekends. The traffic impact analysis for the BRIC recommends a roundabout at the MT 3 and AJ Way intersection to accommodate full build development traffic volumes.
- The **Yellowstone Landing Commercial Park**[3] (YLCP) development is planned on the north side of MT 3 with access provided via the AJ Way and Huey Way intersections. The development will consist of nine lots with commercial and light industrial land uses; full build-out is expected by 2029 (pending the timeframe for intersection improvements at AJ Way).
- The **Billings Logan International Airport Draft Master Plan**[4] shows that development is expected at the airport including terminal expansion, an additional runway and taxiway, a new parking garage and shuttle lot, and additional general aviation hangars. The airport also has plans to provide a frontage road connection north of MT 3 in the future, connecting Huey Way east to Southview Drive. Although still in the planning stage, airport developments are expected to impact traffic at the Southview Drive, Overlook Drive, and Huey Way intersections.

2.0 IMPROVEMENT OPTIONS

Improvement options were developed to address the needs and objectives identified for MT 3 within the study corridor area. These options are organized as intersection improvements, roadway widening improvements, multimodal improvements, travel demand management improvements, and access management improvements. Each improvement option can be implemented independent of other options or combined as a larger project. Grouping options into larger projects may result in cost savings and efficiencies.

Implementation Partners and Potential Funding Sources: Successful implementation of improvements may require cooperation and effort from multiple entities. The lead agencies responsible for each improvement option are identified; however, coordination with other entities may be necessary. The ability to advance recommendations from this study and develop projects on MT 3 depends on the availability of existing and future federal, state, local, and private funding sources. Recommendations identified in this study may be eligible for funding through a variety of programs and sources. Funding has not been identified to complete the recommended improvement options described in this report. However, the identified improvement options may qualify for funding through the programs listed below.

- National Highway Performance Program (NH, Non-Interstate)
- Highway Safety Improvement Program (HSIP)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Transportation Alternatives Program (TA)
- Private funding, grant funding, or other partnerships

Implementation Timeframe: An implementation timeline was identified in this report for each improvement option based on minimum level of service (LOS) thresholds, considering the time necessary for design, right-of-way (ROW) acquisition, and utility relocation. The implementation timeframes are as follows.

- Short-term: within 0 to 5 years (by 2030)
- Mid-term: within 5 to 10 years (by 2035)
- Long-term: within 10 to 20 years (by 2045)

Cost Estimates: Planning-level cost estimates were developed for each improvement option using average bid prices from MDT's AASHTOWare Project Estimation software. MDT Cost Estimation Procedures[5] were followed for estimating costs related to preliminary engineering, construction engineering, traffic control, mobilization, contingency/miscellaneous items, indirect costs, ROW, incidental construction/utility relocation, and inflation. The cost estimates are provided in **Attachment 1**. Each cost estimate represents cost during the construction year and represents that improvement option alone (i.e., cost estimate is independent of other improvement options). Present value (2025) cost is also included for planning and programming purposes.

Project Development Considerations: Improvement options forwarded from this study will be subject to MDT's standard project development process. This process typically includes project-specific design activities such as stakeholder coordination, environmental impact analysis and permitting, utility conflict mitigation, traffic and safety analysis, hydraulic and geotechnical investigations, and ROW acquisition based on project location and design features. For projects initiated outside of MDT that may substantially and permanently impact the transportation system, the MDT Systems Impact Action Process (SIAP) may apply. Notable project development considerations are listed for each option such as potential stakeholder interests, resources and site features, indirect effects, and other factors to be addressed during project development.

If improvement options are forwarded from this study, detailed analysis would be required during the project development process to quantify specific resource impacts, and identify associated permits, laws, and regulations that may apply. Information contained in this report may be used to support future project development and environmental documentation.

A list of regulatory and resource agencies that may be consulted during project development as well as associated permits, laws, regulations, and guidelines administered by those agencies are listed in Table 1. Information provided in this report may be forwarded into applicable documentation for the NEPA and/or MEPA process.

Table 1: Regulatory and Resource Agencies and Responsibilities

Regulatory Entity	Responsibilities/Authorizations	Resource Affected
Federal Highway Administration (FHWA)	• National Environmental Policy Act (NEPA) • Section 4(f) of Department of Transportation Act • Uniform Relocation Assistance Act	All Resources
United States Fish and Wildlife Service (USFWS)	• NEPA • Endangered Species Act • Bald and Golden Eagle Protection Act • Migratory Bird Treaty Act • Birds of Conservation Concern	Wildlife, Habitat, Protected Species
United States Army Corps of Engineers (USACE)	• NEPA • Clean Water Act (CWA) Section 404 Permit	Wetlands, Riverbed, Riverbank, Irrigation Canals/Ditches
US Environmental Protection Agency (EPA)	• NEPA • Resource Conservation and Recovery Act (RCRA) • Clean Air Act (CAA) • CWA	Surface Waters, Irrigation Features, Wetlands, Hazardous Materials
Montana Department of Environmental Quality (DEQ)	• Montana Environmental Policy Act (MEPA) • Montana Water Quality Act • 401 Water Quality Certification • Short-Term Water Quality Standard for Turbidity (318 Authorization) • Montana Pollutant Discharge Elimination System (MPDES) General Permit • CAA • RCRA	Wetlands, Riverbed, Riverbanks, Floodplains, Stormwater Discharges into Surface Waters
Montana Fish, Wildlife, & Parks (FWP)	• MEPA • Stream Protection Act (SPA) 124 Authorization • Land and Water Conservation Fund (LWCF) – Section 6(f)	Riverbed, Riverbanks, LWCF Properties
Montana Department of Natural Resources & Conservation (DNRC)	• MEPA • Montana Land Use License or Easement on Navigable Waters	State Lands, Groundwater, Surface Waters, Irrigation Features, Wetlands, Floodplains
State Historic Preservation Office (SHPO)	• MEPA • National Historic Preservation Act (NHPA) Section 106 Coordination/Consultation	Historic/Cultural Resources
Yellowstone County, City of Billings	• Local Planning Documents • Yellowstone County Floodplain Regulations	All Resources

2.1 Intersection Improvement Options

Improvement options in this section address operations, capacity, and safety concerns at intersections. AM and PM peak hour level of service (LOS) calculations were performed using SYNCHRO 12 traffic analysis software and the Highway Capacity Manual (HCM) 7th Edition methodology. Roundabouts were also analyzed in SIDRA version 9, as SYNCHRO is limited in its ability to model complex lane geometry at roundabouts. A saturation flow rate of 1,750 vehicles per hour per lane was used at all intersections (base saturation flow rate used for communities with a population under 250,000).[6]

LOS describes the quality of traffic operations and is a letter grade based on average control delay. LOS defines how well vehicle traffic flows along a street or road. LOS is graded from A to F, with LOS A representing free-flow conditions and LOS F representing severe congestion with stop-and-go flow conditions. Given the principal arterial classification and roadway context, the design year intersection LOS threshold is LOS D or better. Table 2 lists the delay threshold for roundabouts and two-way stop controlled (TWSC) intersections.

Table 2: LOS Criteria for Roundabouts and TWSC Intersections

LOS	Average Control Delay (Seconds / Vehicle)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Additional analysis was completed for roundabout lane configurations using the *National Cooperative Highway Research Program (NCHRP) Report 1043: Guide for Roundabouts.*[7] This report cites that one entry lane may be sufficient if the sum of the entry volume and conflicting circulating volume is between 901 and 1,300 vehicles per hour and a two-lane entry is likely sufficient if the sum of these two volumes is between 1,301 and 1,600 vehicles per hour.

S1. Zimmerman Trail Intersection

The MT 3 and Zimmerman Trail roundabout provides access to the Heights neighborhood via Skyway Drive and access to west Billings via Zimmerman Trail. Residential areas exist south of the roundabout. The Stagecoach Trail project will provide a shared use path along the east side of Zimmerman Trail. The intersection currently operates at LOS A in the AM and PM peak hours. The intersection is forecasted to operate at LOS F in 2045. The delay during the AM peak hour is highest on the eastbound approach, while the PM peak hour delay is highest on the westbound approach.

Figure 2 depicts the existing and forecasted 2045 turning movements in the AM and PM peak hours. The *Existing and Projected Conditions Report* documents the assumptions for projecting future 2045 traffic volumes at study intersections.

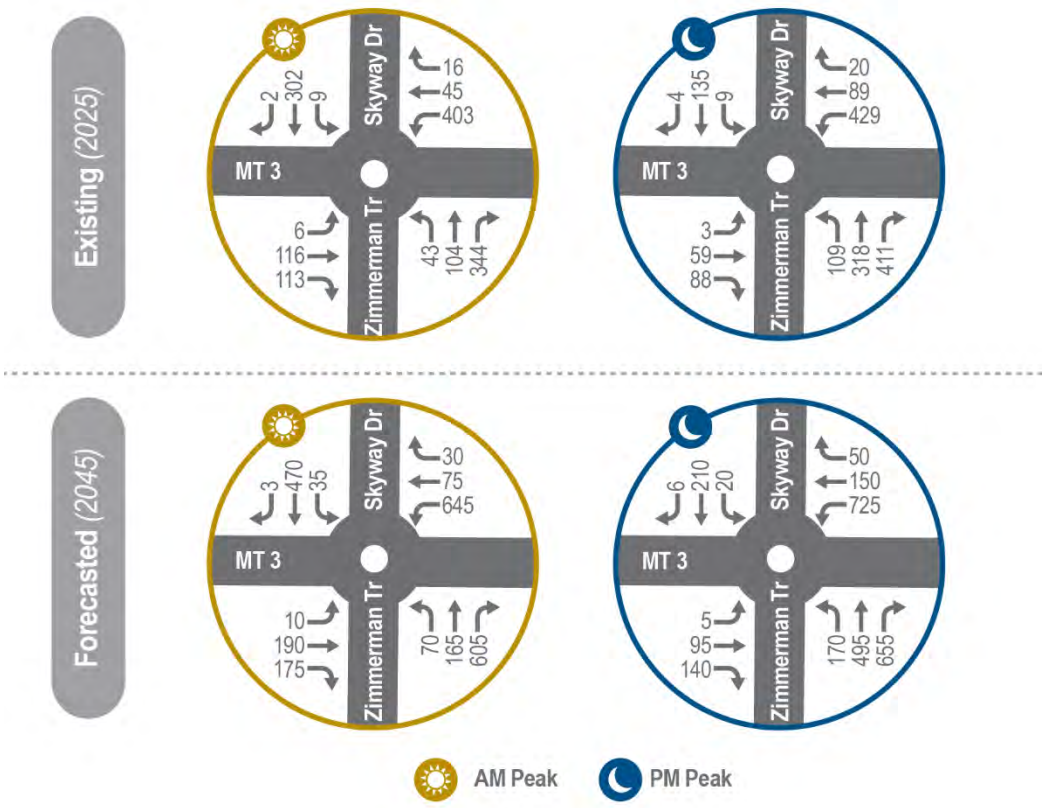

Figure 2: Zimmerman Trail Existing and Forecasted Volumes

Figure 3 depicts the existing intersection laneage, along with proposed laneage (of note, figures are conceptual, not-to-scale, and do not show roundabout geometry or splitter islands). The following improvements and timelines are recommended to improve traffic operations:

- Long-Term (by 2045): The recommended full-build configuration provides a two-lane approach on each leg of the roundabout with a single exit lane. The two-lane entry threshold is met for all approaches. Of note, this option is expected to operate at LOS E in the PM peak hour in 2045 due to the high westbound left-turn movement.

An alternative intersection configuration was considered which provided dual westbound left-turn lanes with a lane drop occurring 500 feet south of the intersection. However, this alternative was not proposed due to concerns regarding lane utilization and the feasibility of widening the south leg of the intersection.

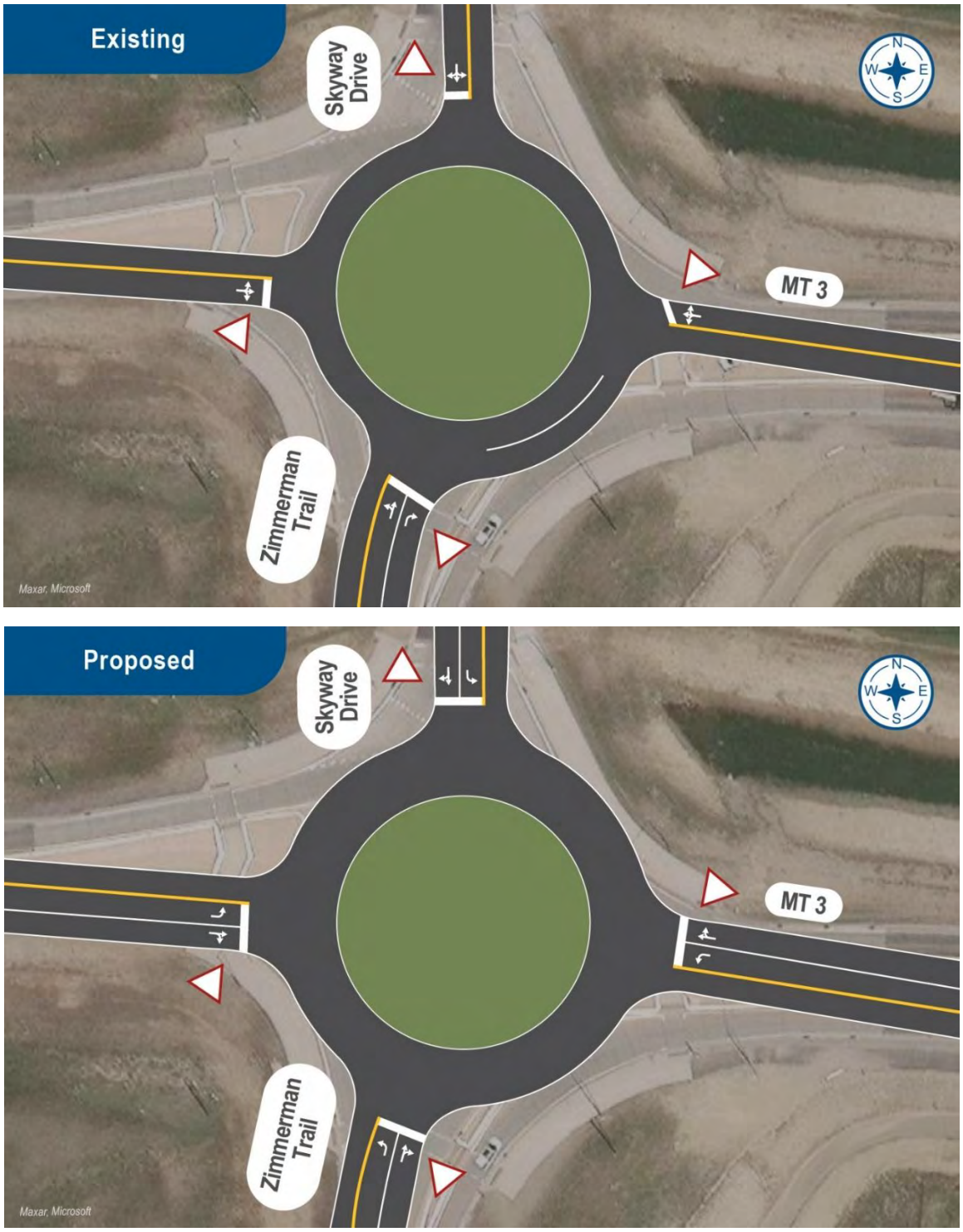

Figure 3: Zimmerman Trail Intersection Improvements

Table 3 summarizes the intersection delay (seconds per vehicle [sec/veh]) with the existing and proposed options. The two-lane approach roundabout is expected to operate at LOS E or better in the AM and PM peak hours in 2045. The highest delay expected in 2045 is for the heavy westbound left-turn movement (725 vehicles) in the PM peak hour. Roundabout metering could be considered to further improve traffic operations at the Zimmerman Trail roundabout in 2045.

Table 3: Zimmerman Trail LOS and Delay (sec/veh)

Scenario	Description	2024		2035		2045	
		AM	PM	AM	PM	AM	PM
Existing	Single-Lane Roundabout with Northbound Right	A/9	A/9	C/15	E/37	E/46	F/100
Proposed	Two-Lane Approach Roundabout	A/7	A/8	B/12	C/15	C/22	E/42

A sensitivity analysis was conducted due to uncertainty related to future traffic volumes on Skyway Drive. The existing traffic volumes on Skyway Drive are close to or exceed 5,000 vpd and the *Inner Belt Loop Corridor Study*[8] projected 10,000 vpd on Skyway Drive in 2040 (4.6% annual traffic growth), or 13,000 vpd with an aggressive growth scenario (6.7% annual traffic growth), therefore a significant amount of growth is expected over the next 15 years. The proposed laneage would likely accommodate additional traffic expected on Skyway Drive. However, it is recommended that roundabout laneage be re-evaluated to better understand traffic patterns as development occurs on Skyway Drive.

Zimmerman Trail is expected to operate near capacity in 2045. Of note, the Molt Road/Highway 3 Connector would improve connectivity between the west end of Billings and the airport/downtown area and is expected to relieve traffic demand on Zimmerman Trail. The *Billings Long Range Transportation Plan*[9] includes a recommendation to update the Molt Road/Highway 3 feasibility study from 2004.[10]

Recommendation: Provide a two-lane approach roundabout at MT 3 and Zimmerman Trail in the long-term (within 20 years).

Key Considerations:

- MT 3 / Zimmerman pedestrian and bicycle underpass (see **M1**) would be completed as part of this modification.
- Drainage modifications are required due to the change in the roundabout footprint. The detention pond in the northeast quadrant may be impacted due to the increased size of the roundabout.
- Access to Zimmerman Park west of this intersection may be impacted by construction-related activities.
- Private utilities are in the area and could include power, gas, and communications lines.
- Permits may be needed for impacts related to farmland conversion.
- ROW acquisition is expected to impact one parcel.

Implementation Partners:	**Implementation Timeframe / Estimated Cost:**
MDT	Long-term: $18.7 M

Potential Funding Sources: NH, HSIP, CMAQ, TA

S2. Rod and Gun Club Road Intersection

Rod and Gun Club Road is a TWSC intersection located 0.43 miles east of Zimmerman Trail. Exclusive eastbound left- and westbound right-turn lanes are provided at the intersection in the existing condition. The north leg provides access to the Rod and Gun Club and Rehberg Ranch Subdivision, while the south leg is a private residential driveway. Turning movements onto MT 3 are significantly higher in the AM peak hour, while turning movements onto Rod and Gun Club Road are significantly higher in the PM peak hour. The intersection currently operates at LOS D during the PM peak hour and is forecasted to fail in 2035 and 2045 peak hours. The delay during the AM and PM peak hours is highest on the southbound approach. Figure 4 depicts the existing and forecasted 2045 turning movements in the AM and PM peak hours.

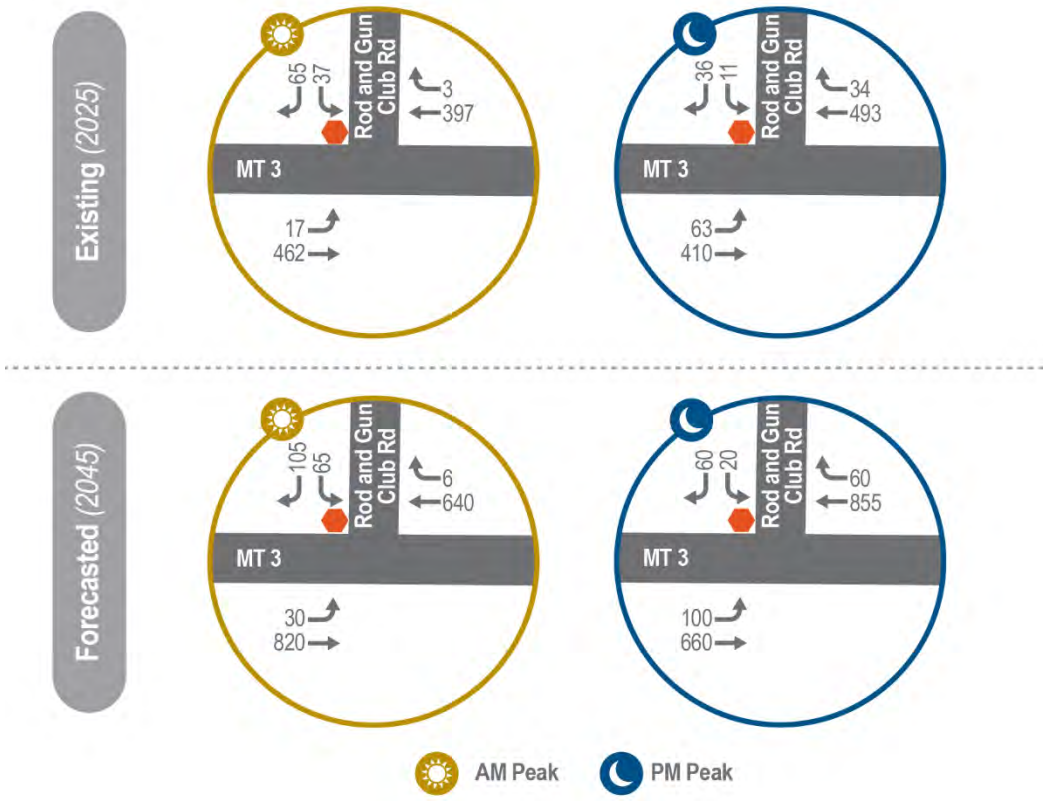

Figure 4: Rod and Gun Club Road Existing and Forecasted Traffic Volumes

Figure 5 depicts the existing and proposed intersection laneage. The following improvements are recommended to meet LOS D or better:

- Mid- to Long-Term (by 2045): As side street and mainline volumes increase, it is recommended that a single lane roundabout be installed. This intersection improvement option reduces delay for vehicles on the side-street approach and enhances intersection safety. Based on the sum of the entry and conflicting circulating volumes, one entry lane is expected to be sufficient on all roundabout approaches.

Two driveways exist on the south leg of the intersection with 65-foot spacing; it is recommended that these closely spaced driveways be consolidated with the intersection improvement.

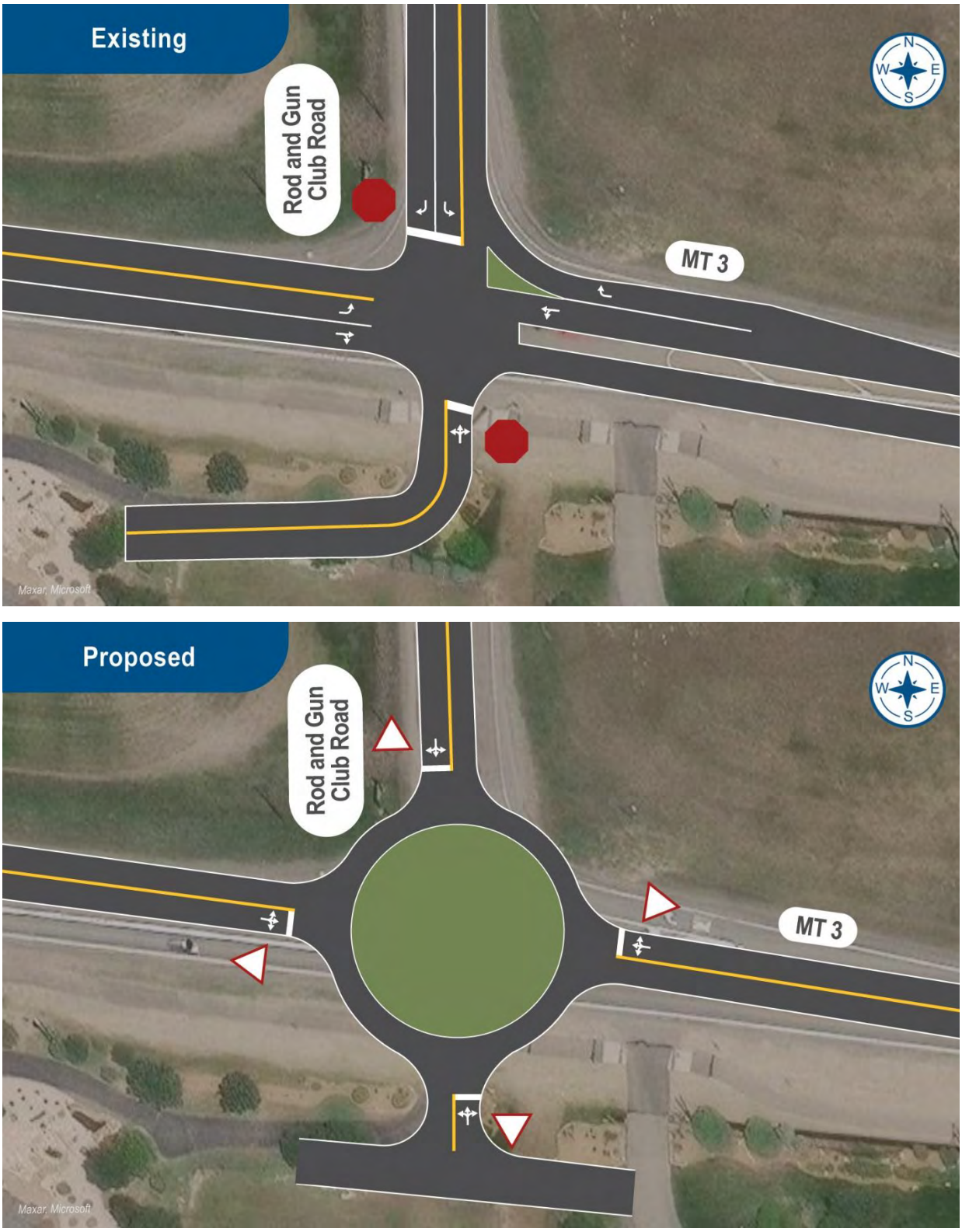

Figure 5: Rod and Gun Club Road Intersection Improvements

Table 4 summarizes the delay with the existing and proposed options. A single-lane roundabout is expected to operate at LOS B in 2045 AM and PM peak hours.

Table 4: Rod and Gun Club Road LOS and Delay (sec/veh)

Scenario	Description	2024		2035		2045	
		AM	PM	AM	PM	AM	PM
Existing	TWSC	D/26	D/31	F/56	F/60	F/253	F/201
Proposed	Single-Lane Roundabout	A/7	A/7	A/9	B/10	B/12	B/15

The peak hour volume signal warrant was analyzed based on projected peak hour traffic volumes at Rod and Gun Club Road. The peak hour volume warrant is only used in special cases, as most signals are warranted based on four to eight hours of data. However, if the peak hour warrant is met for ordinary traffic peaking conditions, it is likely the four-hour and eight-hour warrants are close to being met. Table 5 lists the volume inputs for the AM and PM peak hour signal warrant analysis. The 70% factor was used for the peak hour signal warrant analysis as the posted speed limit is 50 miles per hour (mph) on this section of MT 3. The 2035 and 2045 AM peak hour volumes are expected to exceed the peak hour signal warrant thresholds, indicating that a roundabout is warranted based on expected mainline and side street volumes. The warrant is close to being met with existing peak hour volumes.

Table 5: Peak Hour Signal Warrant Volumes at Rod and Gun Club Road

Year	Peak Period	Major Street Volume – Both Approaches (vph)	Minor Street Volume – Highest Approach (vph)	Meets Peak Hour Warrant
2035	AM	1,230	130	Yes
	PM	1,380	60	No
2045	AM	1,496	170	Yes
	PM	1,675	80	No

Recommendation: Provide a single-lane roundabout at MT 3 and Rod and Gun Club Road in the mid- to long-term (within 20 years).

Key Considerations:

- Shift roundabout north to avoid conflicts with Skyline Trail on the south side.
- Consolidation is required for the two driveways on the south leg of the roundabout.
- Drainage improvements are required due to the increase in impervious areas. These improvements are subject to water quality requirements.
- Impacts to local businesses and residences are anticipated during construction-related activities.
- Public and private utilities are in the area and could include water, sanitary sewer, storm drain, power, gas, and communications lines.
- Permits may be needed for impacts related to farmland conversion.
- ROW acquisition is expected to impact four parcels.

Implementation Partners: MDT

Implementation Timeframe / Estimated Cost: Mid- to Long-Term: $14.5 M

Potential Funding Sources: NH, HSIP, CMAQ

S3. AJ Way Intersection

MT 3 and AJ Way is a TWSC intersection approximately 0.75 miles east of Rod and Gun Club Road. The BRIC and YLCP developments are planned on the north leg of the intersection, with AJ Way providing access to/from MT 3. Figure 6 depicts the existing and forecasted 2045 turning movements in the AM and PM peak hours. The intersection currently operates at LOS D in the AM peak hour and is forecasted to fail in the 2035 and 2045 peak hours with the existing TWSC.

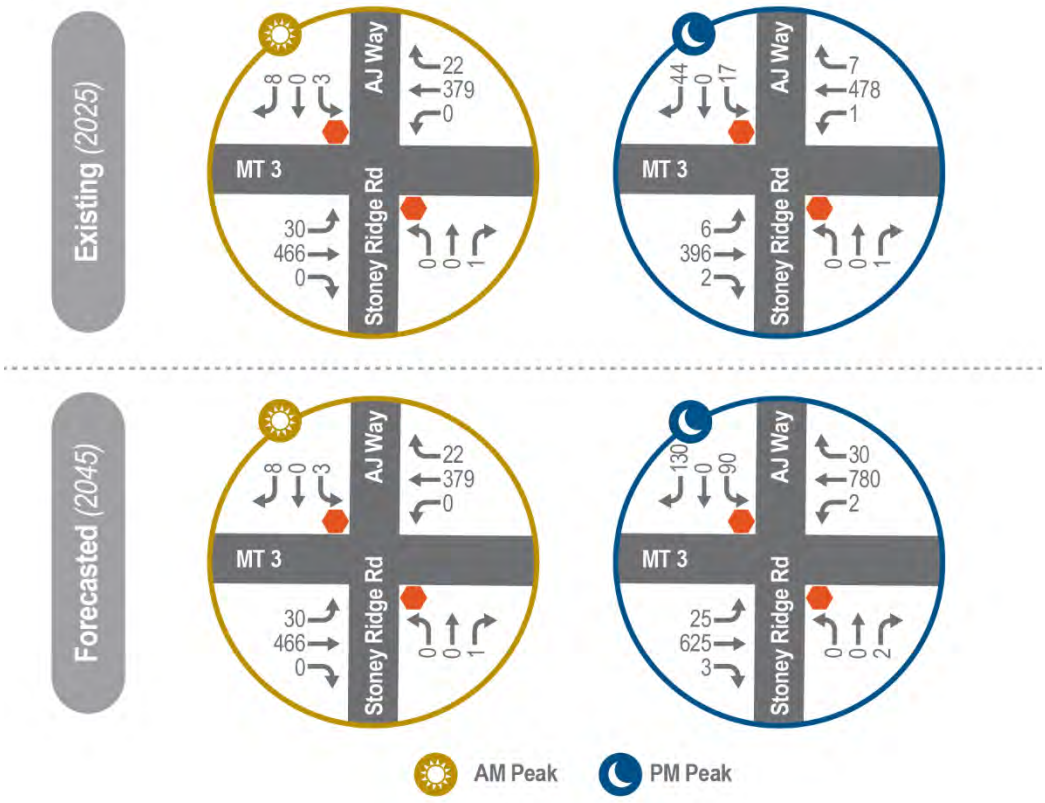

Figure 6: AJ Way Existing and Forecasted Traffic Volumes

The BRIC traffic impact study recommended a new eastbound left-turn lane and a new westbound right-turn lane at this intersection in the interim condition, with a roundabout provided to meet future traffic demand once the BRIC is fully built out. However, it is recommended that the roundabout be implemented first (without providing interim-turn lanes) to avoid constructing improvements that would be replaced soon afterward. Interim condition turn lanes could be reconsidered if development timelines change.

Figure 7 depicts the existing and proposed intersection configuration. The following improvements are recommended to meet LOS D or better:

- Mid-Term (by 2035): The proposed configuration provides a single-lane roundabout at AJ Way. The two-lane entry roundabout threshold is not met for any approach in the peak hour. A westbound right-turn lane is provided to prevent queuing due to traffic volumes associated with ingress during BRIC drill weekend trainings (occurring seven to 12 weekends per year). Without the westbound right-turn lane, the intersection is expected to operate at LOS F (83 seconds of delay) during the drill weekend ingress.

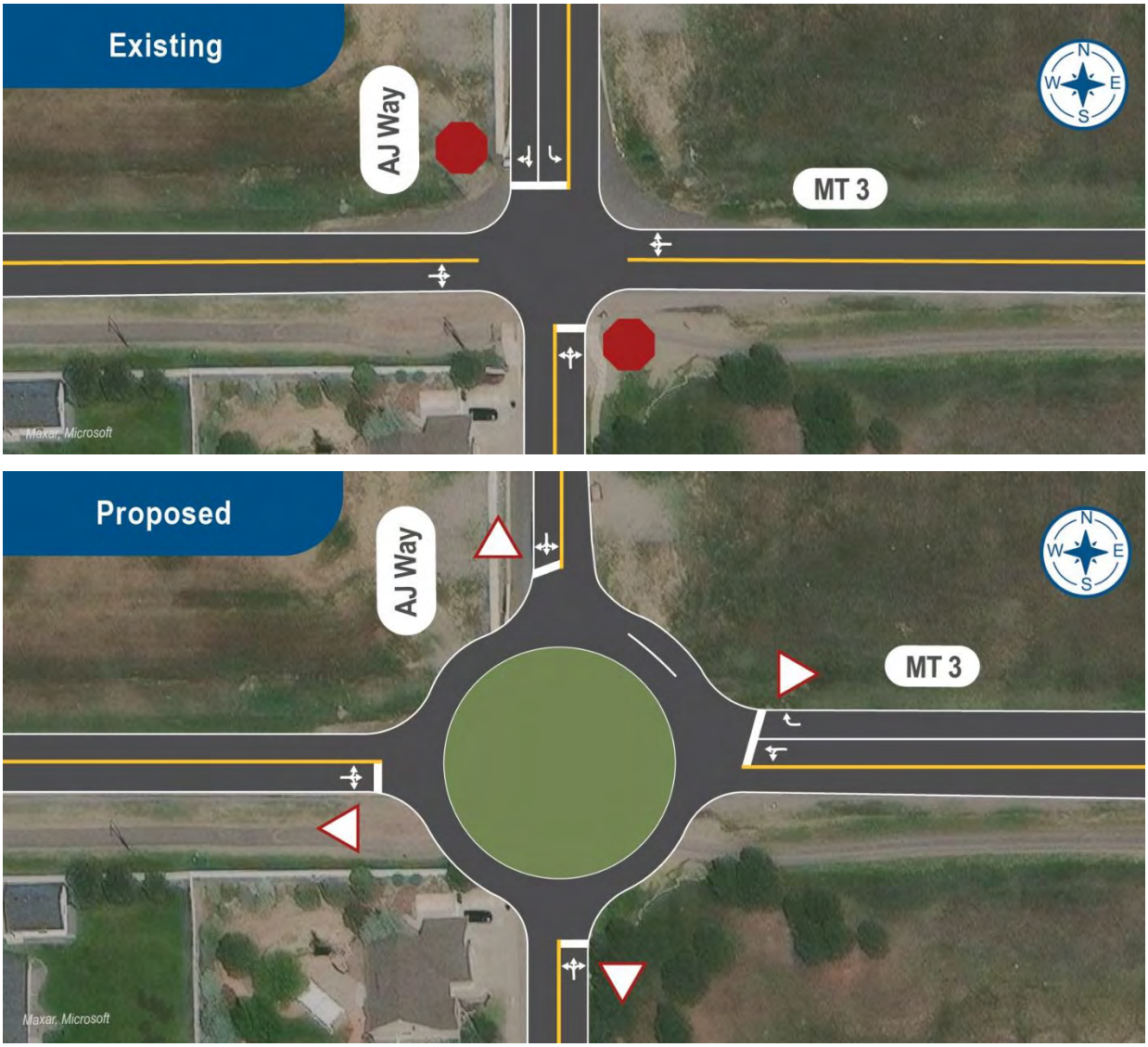

Figure 7: AJ Way Intersection Improvements

Of note, the roundabout is expected to fail on the southbound approach during drill weekend egress. However, it is expected that southbound queuing and delay can be mitigated by adjusting schedules for drill egress or re-routing some traffic to use Huey Way during drill egress. Table 6 summarizes the delay with the existing and proposed options. The roundabout is expected to operate at LOS A in the 2035 peak hours and LOS B in the 2045 peak hours.

Table 6: AJ Way LOS and Delay (sec/veh)

Scenario	Description	2024		2035		2045	
		AM	PM	AM	PM	AM	PM
Existing	TWSC	D/27	C/24	F/85	F/77	F/>300	F/>300
Proposed	Single-Lane Roundabout, with Westbound Right	A/7	A/6	A/9	A/8	B/12	B/11

The peak hour volume signal warrant was analyzed based on projected peak hour traffic volumes at AJ Way. Table 7 lists the volume inputs for the AM and PM peak hour signal warrant analysis, using the 70% factor as the posted speed limit is 50 mph on MT 3. The 2035 and 2045 PM peak hour volumes are expected to exceed the peak hour signal warrant thresholds, indicating that a roundabout is warranted based on expected mainline and side street volumes. The warrant is not met with existing peak hour volumes.

Table 7: Peak Hour Signal Warrant Volumes at AJ Way

Year	Peak Period	Major Street Volume – Both Approaches (vph)	Minor Street Volume – Highest Approach (vph)	Meets Peak Hour Warrant
2035	AM	1,310	55	No
	PM	1,204	195	Yes
2045	AM	1,575	60	No
	PM	1,465	220	Yes

Recommendation: Provide a single-lane roundabout at MT 3 and AJ Way with westbound right-turn lane in the mid-term (within 10 years).

Key Considerations:

- Shift roundabout north to avoid conflicts with Skyline Trail on the south side of MT 3.
- Masterson Circle approach west of AJ Way would require restricted right-in, right-out access due to roundabout approach median.
- Traffic exiting Huey Way could also use the AJ Way roundabout to facilitate U-turns.
- Drainage improvements are required due to the increase in impervious areas. These improvements are subject to water quality requirements.
- Impacts are anticipated to local businesses and residences including construction-related activities.
- Public and private utilities are in the area and could include water, sanitary sewer, storm drain, power, gas, and communications lines.
- Permits may be needed for impacts related to farmland conversion.
- ROW acquisition is expected to impact six parcels.

Implementation Partners:	**Implementation Timeframe / Estimated Cost:**
MDT, Private	Mid-Term: $13.0 M

Potential Funding Sources: NH, HSIP, CMAQ, Private

S4. Huey Way Intersection

MT 3 and Huey Way is a TWSC intersection approximately 0.25 miles east of AJ Way. The BRIC and YLCP developments are expected north of the intersection, with Huey Way providing secondary access to AJ Way, given the east-west road (Supercub Way) that will connect AJ Way and Huey Way north of MT 3. Figure 8 depicts the existing and forecasted 2045 turning movements in the AM and PM peak hours. The intersection currently operates at LOS C in the peak hours and is forecasted to fail in the 2035 and 2045 peak hours with the existing TWSC.

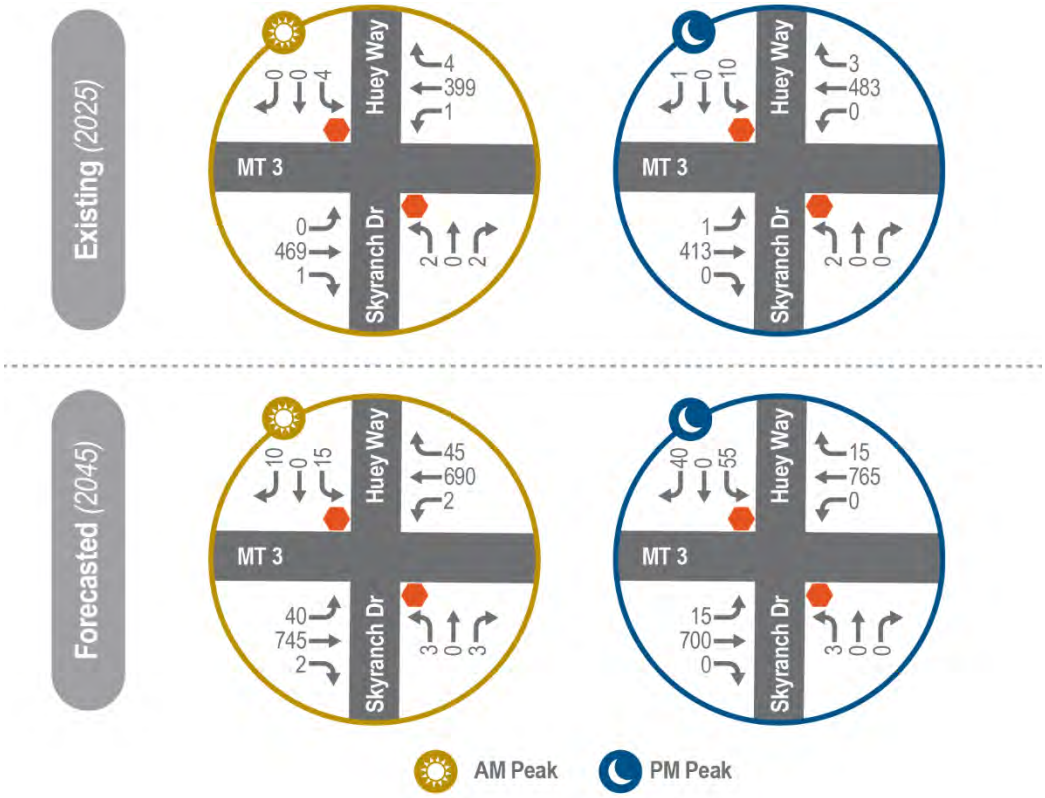

Figure 8: Huey Way Existing and Forecasted Traffic Volumes

Figure 9 depicts the existing and proposed intersection configuration. The following improvements are recommended to improve intersection safety and operations:

- Short-Term (by 2030): Eastbound left-turn (EBL) and westbound right (WBR) turn lanes are recommended at the Huey Way intersection. These turn lanes are warranted based on forecasted development traffic volumes. Left-turn and right-turn lanes improve safety and operations by removing turning vehicles from the travel lane on MT 3. Although not required by the developer, it is recommended that a westbound left (WBL) turn lane be added to provide access to the residential area on the south leg.

Table 8 summarizes the delay with the existing and proposed options. The proposed condition is expected to operate at LOS F in the 2045 AM and PM peak hours. It is important to note that traffic would re-reroute from Huey Way to use the roundabout at AJ Way when side-street delay is high. Supercub Way will provide an east-west connection, between Huey Way and AJ Way, allowing traffic to re-route to AJ Way to access MT 3.

Table 8: Huey Way LOS and Delay (sec/veh)

Scenario	Description	2024		2035		2045	
		AM	PM	AM	PM	AM	PM
Existing	TWSC	C/22	C/22	D/31	E/47	F/73	F/187
Proposed	TWSC with EBL, WBL and WBR Turn Lanes	C/22	C/22	D/30	E/46	E/48	F/132

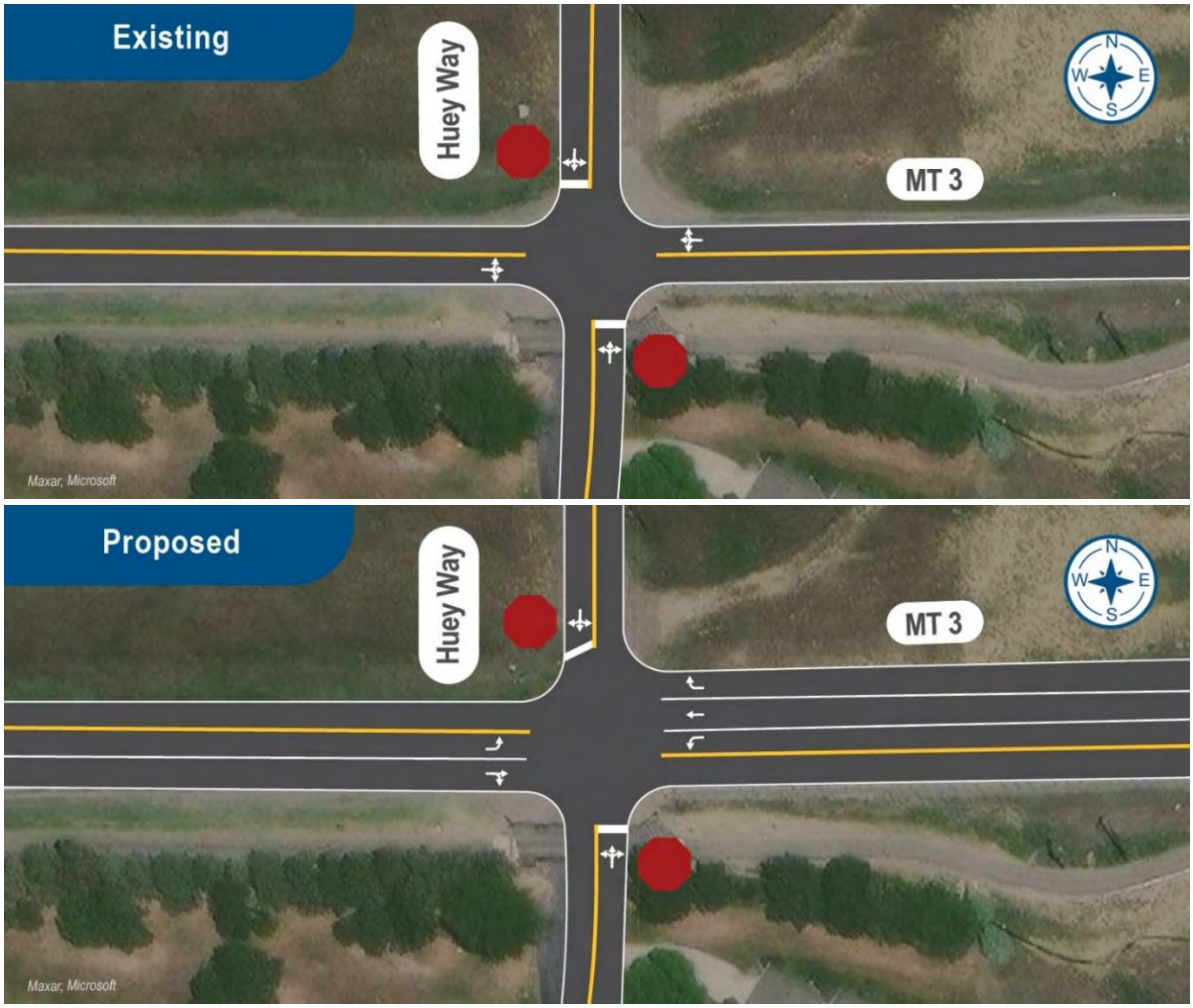

Figure 9: Huey Way Intersection Improvements

Recommendation: Add eastbound left, westbound left, and westbound right turn lanes at MT 3 and Huey Way in the short-term (within 5 years). However, the construction timeline for this improvement may be connected to the timeline for AJ Way intersection improvements.
Key Considerations: • Widen to the north to avoid conflicts with Skyline Trail on the south side of MT 3. • Consider restricting side street left and through movements when warranted in the future. • Drainage improvements are required due to the increase in impervious areas. These improvements are subject to water quality requirements. • Impacts are anticipated to local businesses and residences including construction-related activities. • Public and private utilities are in the area and could include water, sanitary sewer, storm drain, power, gas, and communications lines. • Permits may be needed for impacts related to farmland conversion. • ROW acquisition is expected to impact six parcels.

Implementation Partners:	**Implementation Timeframe / Estimated Cost:**
MDT, Private	Short-Term: $5.5 M
Potential Funding Sources: NH, HSIP, Private	

Southview Drive and Overlook Drive Intersection Improvements

*Eastbound left-turn lanes at Southview Drive and Overlook Drive intersections are recommended as part of the corridor widening project (**R1**) which adds a center turn lane and widened shoulders on MT 3 east of Rod and Gun Club Road (mid- to long-term improvement).*

The Southview Drive and Overlook Drive intersections are TWSC intersections providing access to the west side of Billings Logan International Airport; the intersections are approximately 0.5 miles and 0.7 miles east of Huey Way, respectively. Traffic counts were not collected at either intersection; however, these intersections were noted as intersections of concern given their use by airport visitors and staff. It is recommended that eastbound left-turn lanes be added at the two intersections, with the proposed corridor widening project (**R1**) which would add a center turn lane on MT 3 east of Rod and Gun Club Road. Additional improvement options would be considered if warranted by future development at the airport; however, a traffic impact study is recommended to further analyze planned development. Figure 10 and Figure 11 depict the existing and proposed laneage with eastbound left-turn lanes.

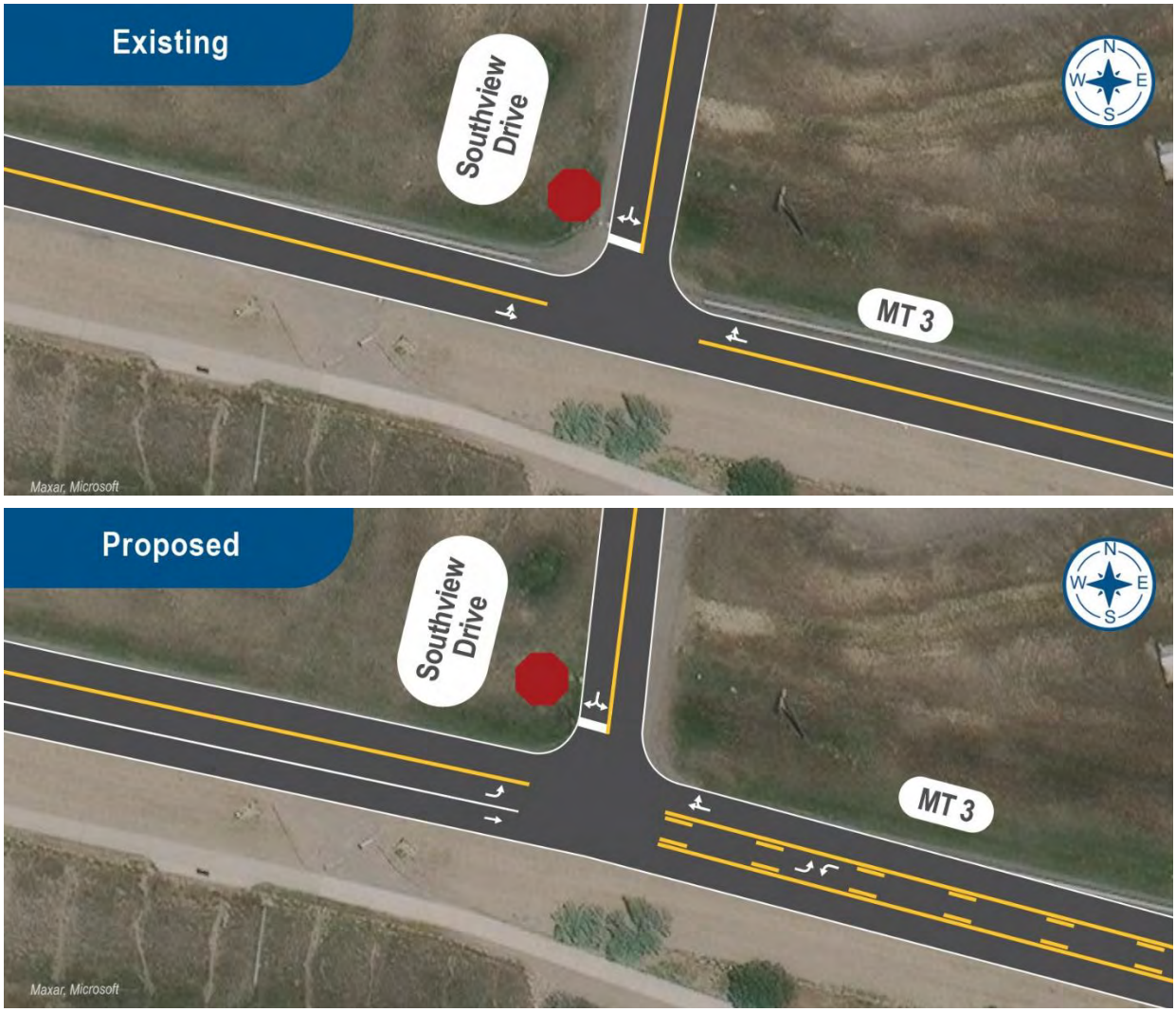

Figure 10: Southview Drive Intersection Improvements

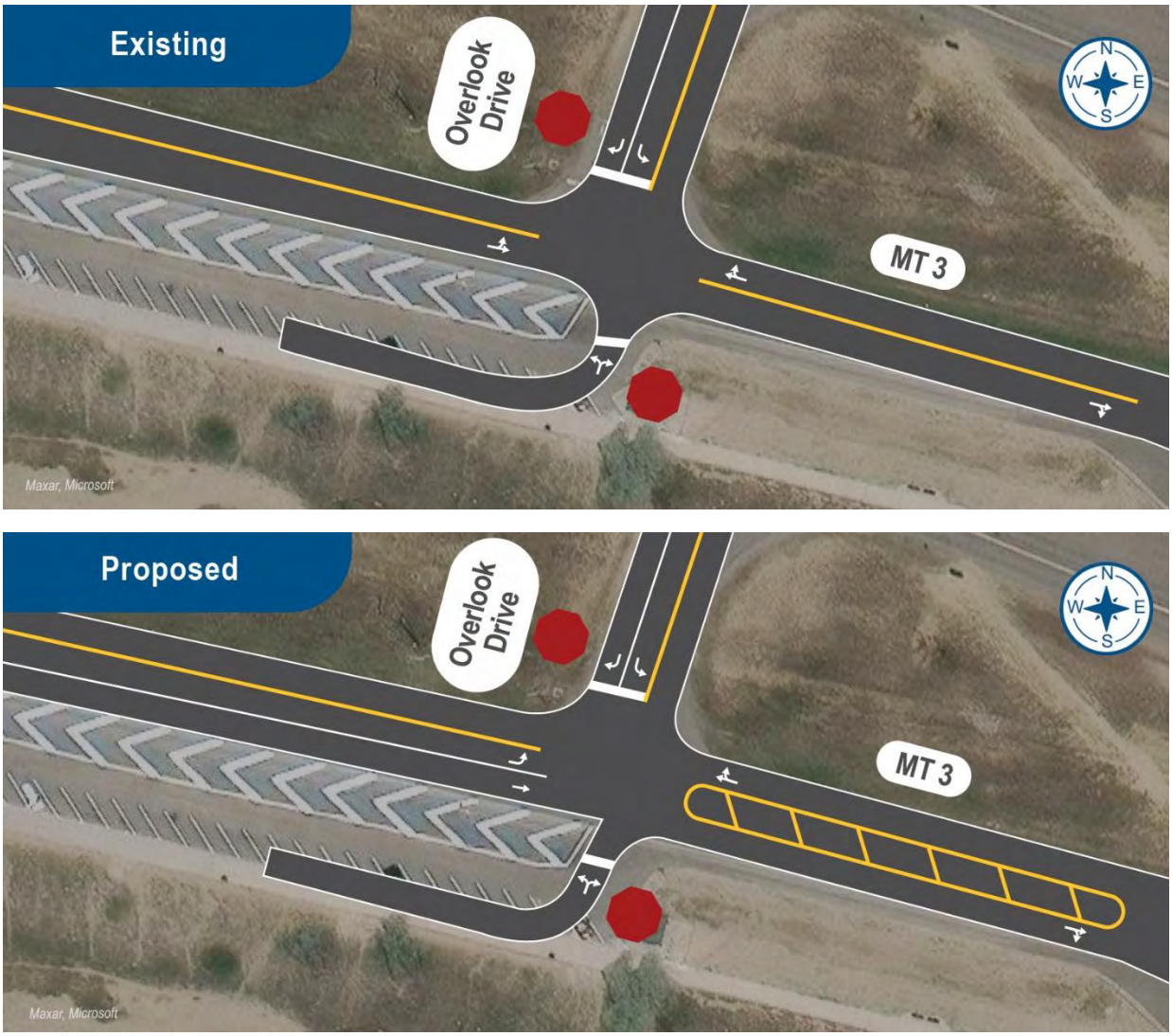

Figure 11: Overlook Drive Intersection Improvements

Summary of Intersection Improvement Options

Figure 12 depicts the existing and proposed roundabout locations, while Figure 13 depicts the 2045 AM and PM peak hour LOS and delay with the proposed intersection improvements. All study intersections are expected to operate at LOS D or better in 2045, except the Zimmerman Trail and Huey Way intersections. It is recommended that traffic counts be collected at the Southview Drive, Overlook Drive, and Zimmerman Park trailhead intersections to better understand traffic demand and the need for future improvements at these intersections.

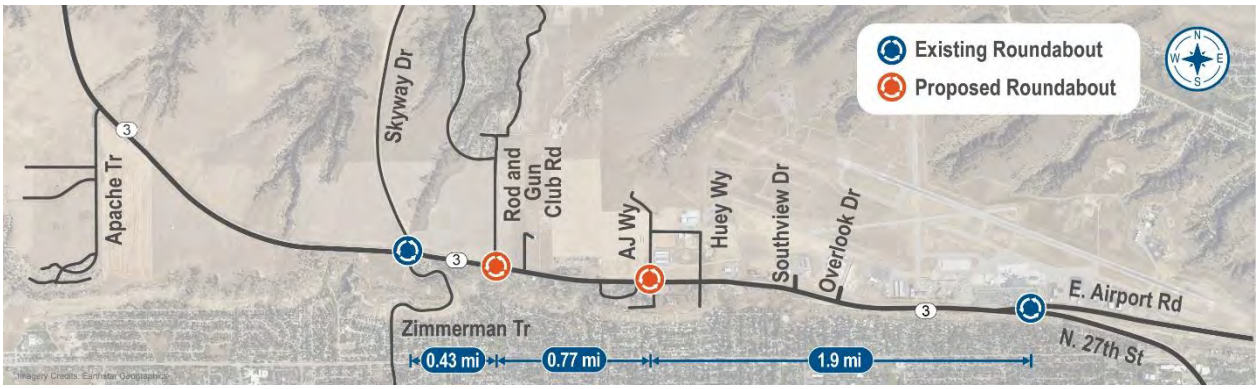

Figure 12: Existing and Proposed Roundabouts

Figure 13: Intersection LOS in 2045 with Recommended Improvement Options

2.2 Roadway Widening

The following improvement option aims to increase capacity and improve traffic operations and traffic safety on MT 3 by widening to provide a center turn lane east of Rod and Gun Club Road. Reducing vehicular traffic on MT 3 is unlikely over the planning horizon, therefore roadway safety and traffic operations can be improved by increasing capacity.

R1. Widening of MT 3 East of Rod and Gun Club Road

It is recommended that the corridor be widened to provide a three-lane cross-section (one lane in each direction with a center turn lane) from Rod and Gun Club Road to west of the E. Airport Road / N. 27th Street roundabout (2.3 miles). Figure 14 depicts the extent of the corridor widening. It is recommended that the corridor be widened to the north, maintaining the existing edge of pavement on the south side of the road.

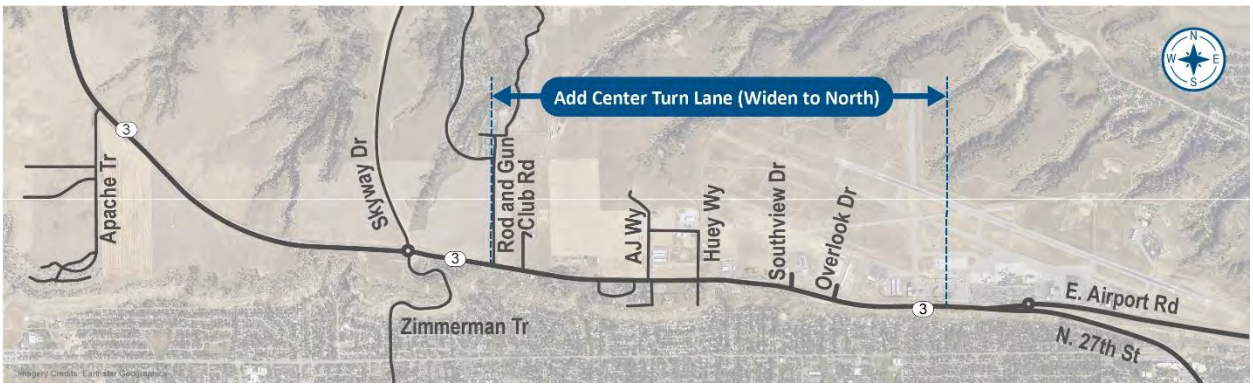

Figure 14: Extent of Corridor Widening

The adjacent land use and constraints vary along the north and south side of MT 3.

- ***South Side Land Use and Constraints:*** The south side of MT 3 is zoned as open space, parks, recreation, and suburban neighborhood. A shared use path and scenic pullouts exist south of MT 3 within the widening extents. Overhead powerlines exist on the south side of MT 3 from Zimmerman Trail to AJ Way. North-south overhead powerline crossings occur on MT 3 just east of Hickok Circle and just east of Huey Way.
- ***North Side Land Use and Constraints***: The north side of MT 3 has agriculture, heavy commercial, public campus, public-civic, and institutional land uses. Within the widening extents, overhead powerlines exist on the north side of MT 3 from Southview Drive to about 700 feet east of Overlook Drive. Significant earthwork would be needed to accommodate widening from about 700 feet east of Overlook Drive to E. Airport Road.

Figure 15 depicts the existing cross-section laneage and shoulders. A two-lane cross-section exists from east of Rod and Gun Club Road intersection to the E. Airport Road / N. 27th Street intersection. The existing cross section has 3.5-foot-wide shoulders, which does not align with baseline design criteria for urban principal arterials. Figure 16 depicts the proposed cross-section east of Rod and Gun Club Road, which provides 6-foot shoulders with a 14-foot center two-way left-turn lane (TWLTL). Of note, the striping would vary throughout the widened section; some sections would provide designated left-turn lanes, while other sections would provide a striped median in the center turn lane to prohibit left-turn movements.

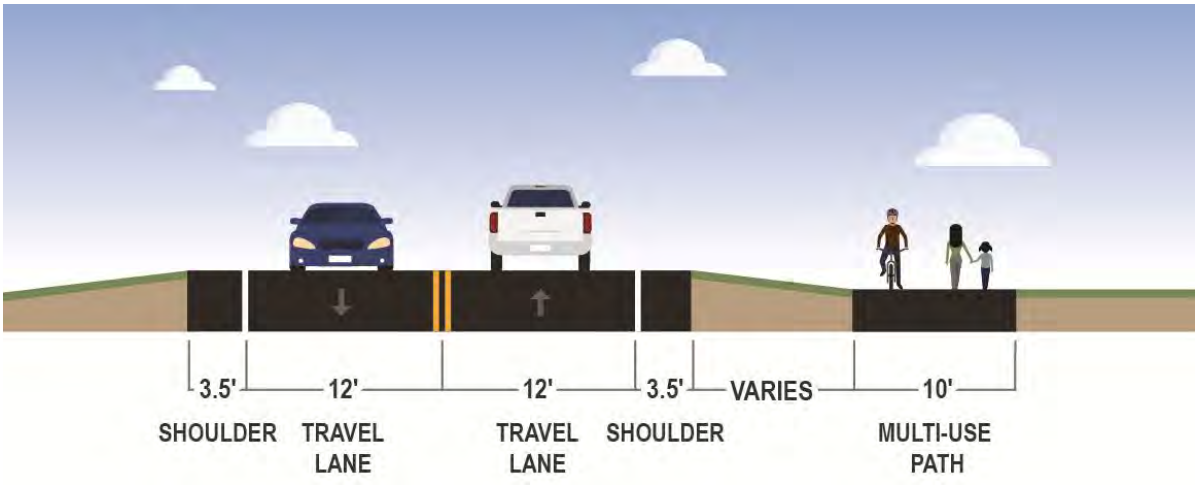

Figure 15: Existing Cross Section on MT 3, East of Rod and Gun Club Road

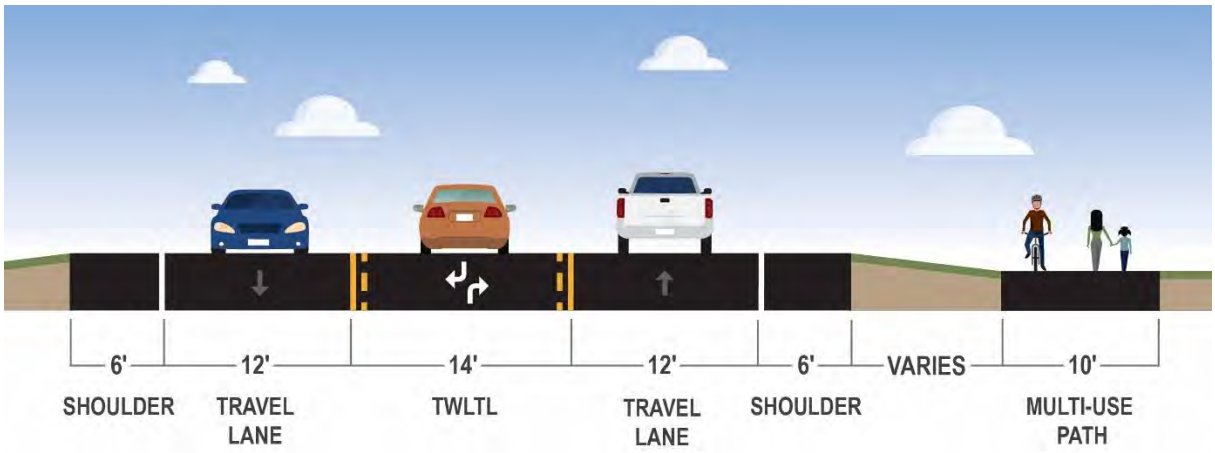

Figure 16: Proposed Cross Section on MT 3, East of Rod and Gun Club Road

Recommendation: Widen MT 3 to a three-lane cross-section from Rod and Gun Club Road to west of the E. Airport Road / N. 27th Street roundabout (2.3 miles).
Key Considerations: • Widen to the north to reduce impacts to residential properties, multi-use path, and utilities located south of the corridor. Impacts to the multi-use path may require additional geotechnical considerations. • 8-foot-wide shoulders (4-feet of additional ROW acquisition) could be considered to accommodate a potential future raised median, beyond the 20-year planning horizon. • There are currently two school bus stops on MT 3; a permanent 10-foot-wide bus pullout could be considered on MT 3 (pullout location to be identified based on long-term need). • Shoulder rumble strips could be considered on MT 3 to reduce roadway departure crashes, given the proximity of the roadway to the adjacent Skyline trail. • Significant drainage improvements are required with the increased impervious areas. These improvements are subject to water quality requirements. • Public and private utilities are in the area and could include water, sanitary sewer, storm drain, power, gas, and communications lines. • Impacts are anticipated to local businesses and residences including temporary construction-related activities. • Permits may be needed for impacts related to farmland conversion. • ROW acquisition is expected to impact 19 parcels.

Implementation Partners: MDT	**Implementation Timeframe / Estimated Cost:** Mid- to Long-Term: $39.8 M
Potential Funding Sources: NH, Local, Private	

2.3 Multimodal Improvements

M1. MT 3 / Zimmerman Trail Underpass

Currently, a Rectangular Rapid Flashing Beacon (RRFB) facilitates north-south crossings on the east leg of the MT 3 and Zimmerman Trail roundabout. A pedestrian and bicycle underpass is recommended on the east leg of the roundabout to allow for uninterrupted north-south crossings, connecting the Skyline Trail to the multi-use path along Skyway Drive. This improvement aligns with recommendations in the *Billings Long Range Transportation Plan.*

The Zimmerman Trail intersection currently provides the only north-south pedestrian crossing on the project corridor. It is recommended that future north-south pedestrian crossing needs be evaluated corridor-wide, particularly as the north side of the corridor develops. Providing pedestrian crossings at roundabouts reduces the distance a pedestrian must travel to cross safely. An east-west non-motorized connection should also be considered along the north side of MT 3 to connect Rod and Gun Club Road to the Zimmerman Trail roundabout.

Existing RRFB on the East Leg of the Zimmerman Trail Roundabout

Existing Underpass on the South Leg of the Zimmerman Trail Roundabout

Recommendation: Provide a pedestrian and bicycle underpass on the east leg of the Zimmerman Trail roundabout to improve multimodal connectivity between Skyline Trail and multi-use path along Skyway Drive.

Key Considerations:

- Implemented with two-lane roundabout at MT 3 / Zimmerman Trail **(S1)**
- Improves connectivity between existing regional multi-use paths.
- The Stagecoach Trail project is planned for construction in 2028 and will provide an 8-foot-wide pedestrian and bicycle path on the east side of Zimmerman Trail, from Rimrock Road to MT 3. This trail would also intersect with the proposed underpass.
- Connection to Skyway Drive trail may require shifting the location of the existing detention pond. The underpass could be shifted further east of the detention pond, if there are concerns regarding the vertical drop between the path elevation and the underpass close to the intersection.

Implementation Partners:	**Implementation Timeframe / Estimated Cost:**
MDT, Yellowstone County, City of Billings, Billings MPO	Long-Term: $4.1 M

Potential Funding Sources: NH, HSIP, TA

M2. Skyline Trail Crossing Improvements

There are safety concerns at the Skyline Trail crossings on the south side of MT 3, related to conflicts between vehicles and non-motorized trail users. Figure 17 depicts the ten existing bicycle/pedestrian crossings along Skyline Trail.

Figure 17: Bicycle/Pedestrian Crossings Along Skyline Trail

Table 9 provides additional details regarding each trail crossing side-street approach, including the number of residences served and the presence of side-street stop signs.

Table 9: Side Street Characteristics for Crossings Along Skyline Trail

Crossing ID	Side Street Description	Number of Residences	Side Street Stop Sign
1	Private access - Gated	1	None
2	Zimmerman Place – Gated	10	Stop sign north of path
3	Private access	1	None
4	Private access	1	None
5	Private access	2	None
6	Hickok Circle	9	Stop sign south of path
7 & 8	Masterson Circle	17	Stop sign north of path
9	Stony Ridge Road	8	Stop sign south of path
10	Sky Ranch Drive (Private access)	12	None

*Highlighted rows denote public approaches with stop signs.

The City of Billings recently made improvements at these trail crossings, including striped crosswalks and “crossing ahead” warning signs / pavement markings for non-motorized users. Figure 18 depicts the existing signing and pavement markings at the crossings, based on recent updates. It is recommended that safety concerns continue to be monitored at these crossings, and that sight lines be cleared and unobstructed for both motorists and trail users, as tall vegetation and snow piles can block the visibility of approaching vehicles or trail users.

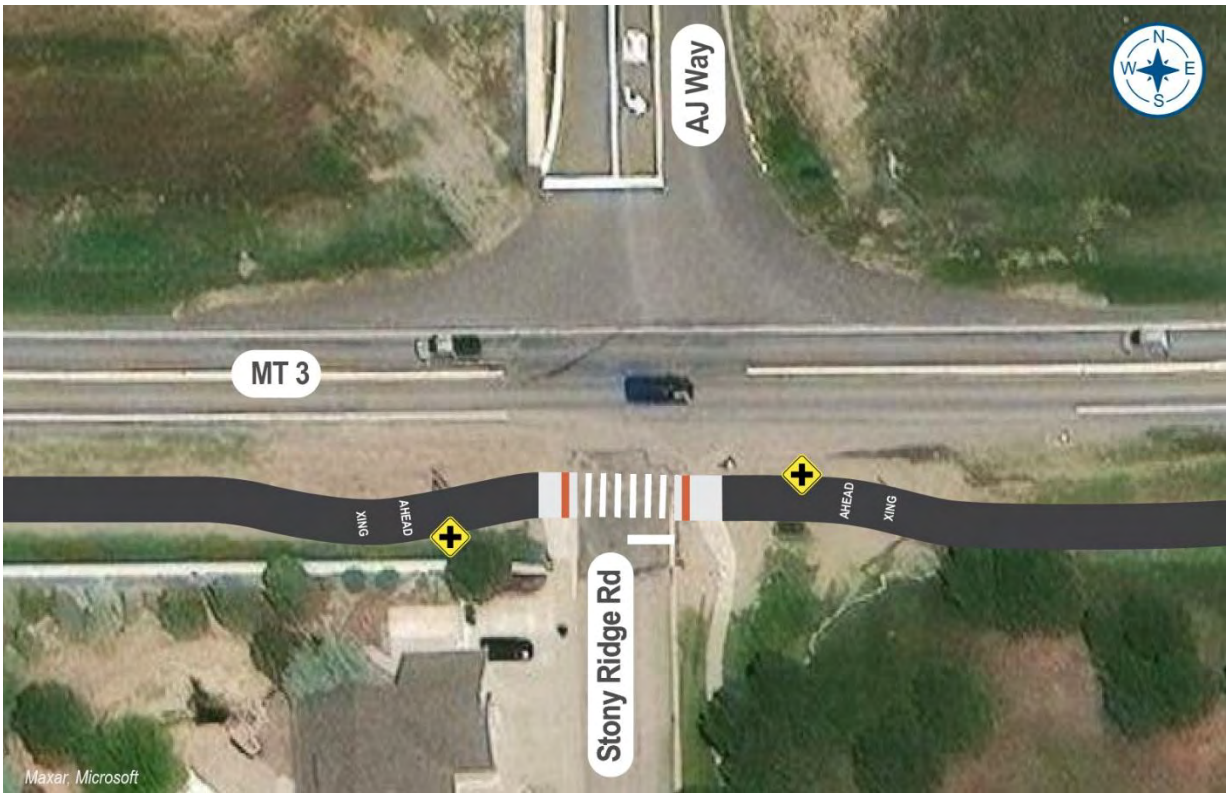

Figure 18: Existing Signing and Pavement Markings at Skyline Trail Crossings

Recommendation: Continue to monitor safety concerns and improve sight distance at the ten Skyline Trail crossings on the south side of MT 3.	
Key Considerations: • Not enough room to store a stopped vehicle north of the crosswalk, given the proximity of Skyline Trail to MT 3. • Westbound left-turn vehicles will have a turn pocket with the future center turn lane, which would improve safety by providing a lane to stop and yield to pedestrians. • Eastbound right-turn lanes are likely not warranted at trail crossing intersections based on existing and forecasted right-turn volumes (less than three right-turning vehicles per hour). • Consider an 8-foot widened shoulder on the south side of MT 3 in the section where eastbound right-turning vehicles may be stopped and waiting for non-motorized users in the crosswalk.	
Implementation Partners: MDT, City of Billings	**Implementation Timeframe / Estimated Cost:** Short-Term: Variable cost
Potential Funding Sources: HSIP, Local	

2.4 Travel Demand Management

T1. Travel Demand Management Strategies

Travel demand management (TDM) strategies are recommended to improve corridor traffic operations. The overarching goal of TDM is to reduce peak hour vehicle trips on the corridor. TDM strategies could include encouraging employers to allow flexible work hours, compressed work weeks, and telecommuting. In addition, encouraging transit, carpooling, and non-motorized

travel also reduces peak hour vehicle demand. Lastly, strategies should be developed to manage traffic during special events in the corridor (e.g., future National Guard training events or drill weekends).

Recommendation: Employ TDM strategies to reduce peak hour travel demand.	
Key Considerations: • Collaborate with large employers to allow for and incentivize TDM strategies.	
Implementation Partners: City of Billings, Yellowstone County, National Guard, Private	**Implementation Timeframe / Estimated Cost:** Short-Term: Variable cost
Potential Funding Sources: Local, Private	

2.5 Access Management

A1. Side Street and Approach Movement Restriction

The *Access Management Plan* for the study corridor identifies locations where restricted side-street access should be considered (e.g., prohibiting left-turn or through movements from the side street). This plan should be referenced for specific recommendations regarding approach restriction.

Recommendation: Prohibit side-street through and left-turn movements at locations of concern by adding a raised median and signing.	
Key Considerations: • Reduces delay for right-turning vehicles on side street approaches and enhances intersection safety. • Lighting would be required for raised medians on side street approaches.	
Implementation Partners: MDT, City of Billings, Yellowstone County, Private	**Implementation Timeframe / Estimated Cost:** Short-Term: $56,000 per approach for raised median with signing
Potential Funding Sources: Local, Private	

A2. Approach Consolidation

The *Access Management Plan* for the study corridor identifies locations where consolidation of closely spaced approaches should be considered to improve corridor safety. This plan should be referenced for specific recommendations regarding approach consolidation.

Recommendation: Recommend consolidation of closely spaced approaches on MT 3.	
Key Considerations: • Improves traffic safety by reducing the number of conflict points along the corridor. • Conflicts can arise in the TWLTL at closely spaced intersections when opposing northbound/southbound left-turn vehicles attempt to make left turns at the same time.	
Implementation Partners: City of Billings, Yellowstone County, Private	**Implementation Timeframe / Estimated Cost:** Short-Term: Variable cost
Potential Funding Sources: Local, Private	

2.6 Options Eliminated from Further Consideration

The intent of the study is to provide feasible improvement options that meet the needs and objectives within the 20-year planning horizon. Many improvement options were considered through the process with the intent of addressing the needs and objectives of the study corridor. Through review of these improvement options with stakeholders and the public, and comparison of performance and ability to meet the needs and objectives of the corridor, some options were eliminated from the study. The following provides background for the options that were considered but are not recommended for further consideration.

Frontage Road north of MT 3

A frontage road was considered along the north side of MT 3 to connect AJ Way and Rod and Gun Club Road. This option was not recommended as there are safety and operational concerns with frontage road intersections close to MT 3. In addition, this improvement option appears to conflict with the National Guard development planned north of MT 3.

Raised Median providing Right-in / Right-out or Three-Quarter Access

The 2015 *Highway 3 Corridor Planning Study*[11] recommended access control be considered on MT 3, with a raised or depressed median extending from Zimmerman Trail to E. Airport Road. As a result, several intersections would be limited to three-quarter access where left- and right-turn movements are allowed onto the side street, but access to MT 3 from the side street is limited to right turns only (see example depicted in Figure 19).

MT 3 has an existing Average Annual Daily Traffic (AADT) of 12,300 vehicles per day, with 19,400 vehicles per day expected in 2045. In general, the use of a raised median is considered when AADT is greater than 20,000 vehicles per day.[12] This is based on prior research from *NCHRP Report 395*, which found that raised medians result in fewer crashes, especially if the AADT is greater than 20,000 vehicles per day.[13] A raised median is not recommended at this time, however corridor traffic volumes should be monitored to determine if a raised median would be appropriate in the future.

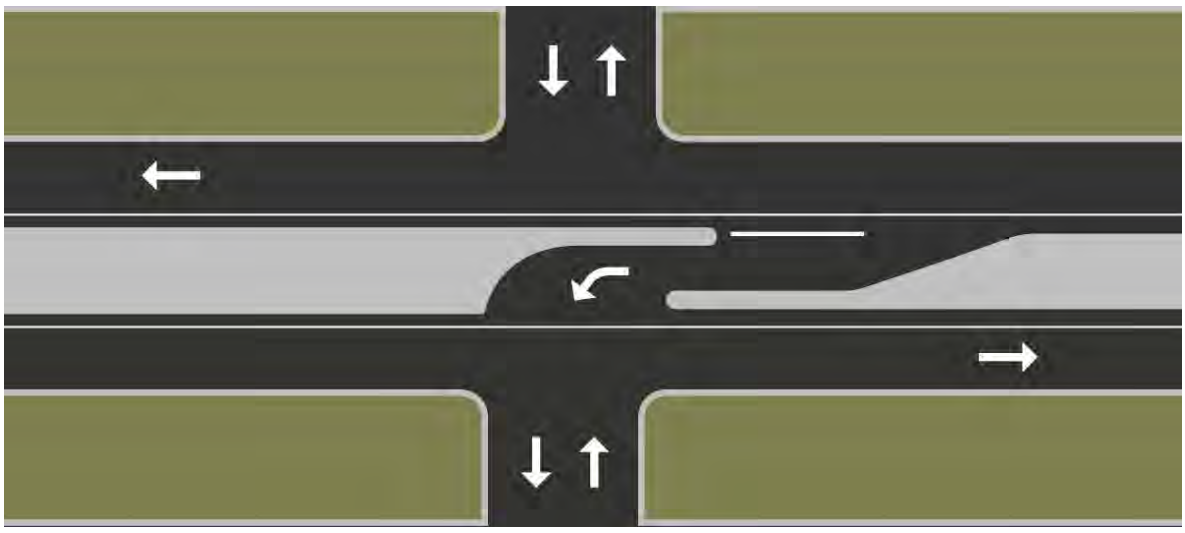

Figure 19: Example of Raised Median with Restricted Side Street Access

2.7 Summary of Recommended Improvements

This report identifies recommended improvement options within the study corridor. These improvement options were developed to meet the needs and objectives of the corridor considering the 20-year study horizon. While the recommended improvements have been considered independently, it may be feasible to combine options if funding becomes available. This may result in cost savings and other efficiencies in the project delivery process. A summary of recommended improvement options is provided in Table 10.

Table 10: Recommended Improvements

Improvement Option		Description	Implementation Timeframe	Potential Funding Source	Cost * Estimate
Intersection Improvements					
S1	Zimmerman Trail	Install two-lane roundabout	Long-Term	NH, HSIP, CMAQ	$18.7 M
S2	Rod and Gun Club Road	Install single-lane roundabout	Mid- to Long-Term	NH, HSIP, CMAQ, Private	$14.5 M
S3	AJ Way	Install single-lane roundabout with westbound right-turn lane	Mid-Term	NH, HSIP, CMAQ, Private	$13.0 M
S4	Huey Way	Install eastbound left-turn, westbound right-turn, and westbound left-turn lanes	Short-Term	NH, HSIP, Private	$5.5 M
Roadway Widening					
R1	MT 3 east of Rod and Gun Club Road	Widen MT 3 to accommodate 6-foot shoulder width and 14-foot center turn lane (2.3 miles)	Mid- to Long-Term	NH, Local, Private	$39.8 M
Multimodal Improvements					
M1	MT 3 / Zimmerman Trail Underpass	Construct pedestrian and bicycle underpass on east leg of the Zimmerman Trail roundabout	Long-Term	NH, HSIP, TA	$4.1 M
M2	Skyline Trail Crossing Improvements	Monitor safety concerns and clear sight distance where Skyline Trail intersects with side-street approaches	Short-Term	HSIP, Local	Variable
Travel Demand Management					
T1	Travel Demand Management	Encourage large employers to use TDM strategies	Short-Term	Local, Private	Variable
Access Management					
A1	Side Street and Approach Movement Restriction	Restriction of side-street movements through signing or channelized islands	Short-Term	Local, Private	$56,000 per approach
A2	Approach Consolidation	Consolidate closely spaced driveways to improve traffic operations	Mid-Term	Local, Private	Variable

*Cost estimates are not reported in current dollars and reflect costs anticipated in the year of construction.

REFERENCES

[1] Billings TrailNet, Yellowjacket Trail. https://www.billingstrailnet.org/yellowjacket-trail/

[2] Billings Readiness & Innovation Campus (BRIC) Traffic Impact Study. December 2023.

[3] Yellowstone Landing Commercial Park (YLCP) Traffic Impact Study. April 2021.

[4] Billings Logan International Airport Draft Master Plan, City of Billings. 2025. https://www.flybillings.com/1412/Master-Plan

[5] Cost Estimation Procedure for Highway Design Projects, MDT. November 2016. https://www.mdt.mt.gov/other/webdata/external/cadd/report_templates_guidance/costest_procedure.pdf

[6] Highway Capacity Manual 7th Edition, Transportation Research Board. 2022. Exhibit 19-11.

[7] NCHRP Report 1043, Guide for Roundabouts. 2023. https://nap.nationalacademies.org/catalog/27069/guide-for-roundabouts

[8] Inner Belt Loop Corridor Study. November 2020. https://www.billingsmt.gov/DocumentCenter/View/45108/2020-Inner-Belt-Loop-Corridor-Study_Final

[9] Billings Urban Area Long Range Transportation Plan. July 2023. https://billingslrtp.com/project-documents

[10] Molt Road/Highway 3 Collector Road Planning Feasibility Study. June 2004. https://www.billingsmt.gov/DocumentCenter/View/1993/Molt-Hwy-3-Final-Study-Report

[11] Highway 3 Corridor Study. April 2015. https://www.billingsmt.gov/DocumentCenter/View/26772/Hwy-3-Study

[12] Development of Guidelines for Operationally Effective Raised Medians and the Use of Alternative Movements on Urban Roadways. 2013. https://library.ctr.utexas.edu/hostedpdfs/tsu/0-6644-1.pdf

[13] NCHRP Report 395, Capacity and Operational Effects of Midblock Left-Turn Lanes. 1997. https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_395.pdf

ATTACHMENT 1: PRELIMINARY COST ESTIMATES

INTERSECTION IMPROVEMENT OPTIONS

Zimmerman Trail Two-Lane Roundabout (S1) **2045 construction** **$ 16,100,000.00**

TYPE	UNITS	QUANTITY		UNIT PRICE		COST
MISCELLANEOUS WORK	UNIT	12,694.1	$	1.25	$	15,868.00
EXCAVATION-UNCLASSIFIED	CUYD	34,958.0	$	23.75	$	830,253.00
EXCAVATION-UNCLASS BORROW	CUYD	3,495.8	$	21.25	$	74,286.00
SPECIAL BORROW-EXCAVATION	CUYD	1,747.9	$	22.75	$	39,765.00
TOPSOIL-SALVAGING AND PLACING	CUYD	4,559.4	$	10.50	$	47,874.00
TEMPORARY EROSION CONTROL	UNIT	5,000.0	$	1.25	$	6,250.00
CRUSHED AGGREGATE COURSE	CUYD	15,764.6	$	65.25	$	1,028,643.00
COVER - TYPE 1	SQYD	20,016.0	$	1.00	$	20,016.00
TRAFFIC GRAVEL	CUYD	1,334.3	$	51.50	$	68,719.00
PLANT MIX BIT SURF GR S-3/4 IN	TON	6,757.6	$	58.75	$	397,011.00
HYDRATED LIME	TON	95.0	$	330.25	$	31,374.00
ASPHALT CEMENT PG 64-28	TON	364.9	$	719.50	$	262,554.00
EMULS ASPHALT CRS-2P	TON	35.8	$	1,100.00	$	39,380.00
GUARD RAIL-STEEL	LNFT	134.1	$	30.25	$	4,055.00
GD RAIL-STL INT RDWY TERM SECT	LNFT	13.4	$	49.00	$	657.00
GUARD RAIL-OPTIONAL TERM SECT	EACH	0.4	$	3,282.00	$	1,341.00
FARM FENCE-TYPE F5W & F5M	LNFT	5,362.0	$	4.75	$	25,470.00
SEEDING AREA NO 1	ACRE	5.0	$	607.00	$	3,064.00
SEEDING AREA NO 2	ACRE	1.4	$	1,648.00	$	2,329.00
SEEDING AREA NO 3	ACRE	2.0	$	576.75	$	1,164.00
FERTILIZING AREA NO 1	ACRE	5.0	$	210.75	$	1,064.00
FERTILIZING AREA NO 2	ACRE	1.4	$	319.75	$	452.00
CONDITION SEEDBED SURFACE	ACRE	7.1	$	166.50	$	1,176.00
MULCH	ACRE	1.4	$	5,325.00	$	7,525.00
SIGNS - RURAL	MILE	0.51	$	9,000.00	$	4,570.00
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.51	$	9,000.00	$	4,570.00
DRAINAGE PIPE - RURAL	MILE	0.51	$	90,200.00	$	45,800.00
LIGHTS - URBAN	MILE	0.51	$	192,500.00	$	97,745.00
	Subtotal 1				$	3,062,975.00
TRAFFIC CONTROL				10%	$	306,298.00
	Subtotal 2				$	3,369,273.00
MOBILIZATION				10%	$	336,927.00
	Subtotal 3				$	3,706,200.00
CONTINGENCY				30%	$	1,111,860.00
	Subtotal 4				$	4,818,060.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES				30%	$	1,445,418.00
	Subtotal 5				$	6,263,478.00
TOTAL RIGHT-OF-WAY					$	235,960.75
	Subtotal 6				$	6,499,438.75
INFLATION		YEARS	20.0	3%	$	5,239,270.60
	Subtotal 7				$	11,738,709.35
CONSTRUCTION ENGINEERING (CE)				10%	$	1,173,870.93
PRELIMINARY ENGINERING (PE)				15%	$	1,760,806.40
	Subtotal 8				$	14,673,386.68
INDIRECT COSTS (IDC)				9.66%	$	1,417,449.15
	TOTAL				**$**	**16,090,835.84**

INTERSECTION IMPROVEMENT OPTIONS

Rod and Gun Club Road Roundabout (S2) **2045 construction** **$ 9,900,000.00**

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
MISCELLANEOUS WORK	UNIT	8,759.5	$ 1.25	$	10,949.00
EXCAVATION-UNCLASSIFIED	CUYD	21,739.0	$ 23.75	$	516,301.00
EXCAVATION-UNCLASS BORROW	CUYD	2,173.9	$ 21.25	$	46,195.00
SPECIAL BORROW-EXCAVATION	CUYD	1,087.0	$ 22.75	$	24,728.00
TOPSOIL-SALVAGING AND PLACING	CUYD	3,146.2	$ 10.50	$	33,035.00
TEMPORARY EROSION CONTROL	UNIT	5,000.0	$ 1.25	$	6,250.00
CRUSHED AGGREGATE COURSE	CUYD	10,033.3	$ 65.25	$	654,674.00
COVER - TYPE 1	SQYD	12,258.0	$ 1.00	$	12,258.00
TRAFFIC GRAVEL	CUYD	817.2	$ 51.50	$	42,083.00
PLANT MIX BIT SURF GR S-3/4 IN	TON	4,163.8	$ 58.75	$	244,624.00
HYDRATED LIME	TON	59.0	$ 330.25	$	19,485.00
ASPHALT CEMENT PG 64-28	TON	224.8	$ 719.50	$	161,777.00
EMULS ASPHALT CRS-2P	TON	21.9	$ 1,100.00	$	24,090.00
GUARD RAIL-STEEL	LNFT	92.5	$ 30.25	$	2,798.00
GD RAIL-STL INT RDWY TERM SECT	LNFT	9.3	$ 49.00	$	453.00
GUARD RAIL-OPTIONAL TERM SECT	EACH	0.3	$ 3,282.00	$	925.00
FARM FENCE-TYPE F5W & F5M	LNFT	3,700.0	$ 4.75	$	17,575.00
SEEDING AREA NO 1	ACRE	3.5	$ 607.00	$	2,114.00
SEEDING AREA NO 2	ACRE	1.0	$ 1,648.00	$	1,607.00
SEEDING AREA NO 3	ACRE	1.4	$ 576.75	$	803.00
FERTILIZING AREA NO 1	ACRE	3.5	$ 210.75	$	734.00
FERTILIZING AREA NO 2	ACRE	1.0	$ 319.75	$	312.00
CONDITION SEEDBED SURFACE	ACRE	4.9	$ 166.50	$	812.00
MULCH	ACRE	1.0	$ 5,325.00	$	5,193.00
SIGNS - RURAL	MILE	0.35	$ 9,000.00	$	3,153.00
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.35	$ 9,000.00	$	3,153.00
DRAINAGE PIPE - RURAL	MILE	0.35	$ 90,200.00	$	31,604.00
LIGHTS - URBAN	MILE	0.35	$ 192,500.00	$	67,448.00
Subtotal 1				$	1,935,133.00
TRAFFIC CONTROL			10%	$	193,513.00
Subtotal 2				$	2,128,646.00
MOBILIZATION			10%	$	212,865.00
Subtotal 3				$	2,341,511.00
CONTINGENCY			30%	$	702,453.00
Subtotal 4				$	3,043,964.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES			30%	$	913,189.00
Subtotal 5				$	3,957,153.00
TOTAL RIGHT-OF-WAY				$	38,489.28
Subtotal 6				$	3,995,642.28
INFLATION	YEARS	20.0	3%	$	3,220,932.13
Subtotal 7				$	7,216,574.41
CONSTRUCTION ENGINEERING (CE)			10%	$	721,657.44
PRELIMINARY ENGINERING (PE)			15%	$	1,082,486.16
Subtotal 8				$	9,020,718.01
INDIRECT COSTS (IDC)			9.66%	$	871,401.36
TOTAL				**$**	**9,892,119.37**

INTERSECTION IMPROVEMENT OPTIONS

AJ Way Roundabout (S3) — **2035 construction** — **$ 10,000,000.00**

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
MISCELLANEOUS WORK	UNIT	10,061.6	$ 1.25	$ 12,577.00
EXCAVATION-UNCLASSIFIED	CUYD	30,190.0	$ 23.75	$ 717,013.00
EXCAVATION-UNCLASS BORROW	CUYD	3,019.0	$ 21.25	$ 64,154.00
SPECIAL BORROW-EXCAVATION	CUYD	1,509.5	$ 22.75	$ 34,341.00
TOPSOIL-SALVAGING AND PLACING	CUYD	3,613.9	$ 10.50	$ 37,945.00
TEMPORARY EROSION CONTROL	UNIT	5,000.0	$ 1.25	$ 6,250.00
CRUSHED AGGREGATE COURSE	CUYD	12,062.0	$ 65.25	$ 787,047.00
COVER - TYPE 1	SQYD	14,951.0	$ 1.00	$ 14,951.00
TRAFFIC GRAVEL	CUYD	996.7	$ 51.50	$ 51,330.00
PLANT MIX BIT SURF GR S-3/4 IN	TON	5,062.7	$ 58.75	$ 297,431.00
HYDRATED LIME	TON	71.0	$ 330.25	$ 23,448.00
ASPHALT CEMENT PG 64-28	TON	273.4	$ 719.50	$ 196,699.00
EMULS ASPHALT CRS-2P	TON	26.7	$ 1,100.00	$ 29,370.00
GUARD RAIL-STEEL	LNFT	106.3	$ 30.25	$ 3,214.00
GD RAIL-STL INT RDWY TERM SECT	LNFT	10.6	$ 49.00	$ 521.00
GUARD RAIL-OPTIONAL TERM SECT	EACH	0.3	$ 3,282.00	$ 1,063.00
FARM FENCE-TYPE F5W & F5M	LNFT	4,250.0	$ 4.75	$ 20,188.00
SEEDING AREA NO 1	ACRE	4.0	$ 607.00	$ 2,428.00
SEEDING AREA NO 2	ACRE	1.1	$ 1,648.00	$ 1,846.00
SEEDING AREA NO 3	ACRE	1.6	$ 576.75	$ 923.00
FERTILIZING AREA NO 1	ACRE	4.0	$ 210.75	$ 843.00
FERTILIZING AREA NO 2	ACRE	1.1	$ 319.75	$ 358.00
CONDITION SEEDBED SURFACE	ACRE	5.6	$ 166.50	$ 932.00
MULCH	ACRE	1.1	$ 5,325.00	$ 5,965.00
SIGNS - RURAL	MILE	0.40	$ 9,000.00	$ 3,622.00
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.40	$ 9,000.00	$ 3,622.00
DRAINAGE PIPE - RURAL	MILE	0.40	$ 90,200.00	$ 36,302.00
LIGHTS - URBAN	MILE	0.40	$ 192,500.00	$ 77,474.00
Subtotal 1				$ 2,431,857.00
TRAFFIC CONTROL			10%	$ 243,186.00
Subtotal 2				$ 2,675,043.00
MOBILIZATION			10%	$ 267,504.00
Subtotal 3				$ 2,942,547.00
CONTINGENCY			30%	$ 882,764.00
Subtotal 4				$ 3,825,311.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES			30%	$ 1,147,593.00
Subtotal 5				$ 4,972,904.00
TOTAL RIGHT-OF-WAY				$ 446,501.52
Subtotal 6				$ 5,419,405.52
INFLATION	YEARS	10.0	3%	$ 1,863,822.32
Subtotal 7				$ 7,283,227.84
CONSTRUCTION ENGINEERING (CE)			10%	$ 728,322.78
PRELIMINARY ENGINERING (PE)			15%	$ 1,092,484.18
Subtotal 8				$ 9,104,034.81
INDIRECT COSTS (IDC)			9.66%	$ 879,449.76
TOTAL				**$ 9,983,484.57**

INTERSECTION IMPROVEMENT OPTIONS

Huey Way Turn Lanes (S4) — **2030 construction** — **$ 4,600,000.00**

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
MISCELLANEOUS WORK	UNIT	8,000.0	$ 1.25	$ 10,000.00
EXCAVATION-UNCLASSIFIED	CUYD	7,999.4	$ 23.75	$ 189,987.00
EXCAVATION-UNCLASS BORROW	CUYD	799.9	$ 21.25	$ 16,999.00
SPECIAL BORROW-EXCAVATION	CUYD	400.0	$ 22.75	$ 9,099.00
TOPSOIL-SALVAGING AND PLACING	CUYD	2,873.4	$ 10.50	$ 30,171.00
TEMPORARY EROSION CONTROL	UNIT	5,000.0	$ 1.25	$ 6,250.00
CRUSHED AGGREGATE COURSE	CUYD	7,585.5	$ 65.25	$ 494,952.00
COVER - TYPE 1	SQYD	8,636.0	$ 1.00	$ 8,636.00
TRAFFIC GRAVEL	CUYD	575.7	$ 51.50	$ 29,649.00
PLANT MIX BIT SURF GR S-3/4 IN	TON	2,980.8	$ 58.75	$ 175,121.00
HYDRATED LIME	TON	42.0	$ 330.25	$ 13,871.00
ASPHALT CEMENT PG 64-28	TON	161.0	$ 719.50	$ 115,813.00
EMULS ASPHALT CRS-2P	TON	15.5	$ 1,100.00	$ 17,050.00
GUARD RAIL-STEEL	LNFT	84.5	$ 30.25	$ 2,556.00
GD RAIL-STL INT RDWY TERM SECT	LNFT	8.4	$ 49.00	$ 414.00
GUARD RAIL-OPTIONAL TERM SECT	EACH	0.3	$ 3,282.00	$ 845.00
FARM FENCE-TYPE F5W & F5M	LNFT	3,379.2	$ 4.75	$ 16,051.00
SEEDING AREA NO 1	ACRE	3.2	$ 607.00	$ 1,931.00
SEEDING AREA NO 2	ACRE	0.9	$ 1,648.00	$ 1,468.00
SEEDING AREA NO 3	ACRE	1.3	$ 576.75	$ 734.00
FERTILIZING AREA NO 1	ACRE	3.2	$ 210.75	$ 670.00
FERTILIZING AREA NO 2	ACRE	0.9	$ 319.75	$ 285.00
CONDITION SEEDBED SURFACE	ACRE	4.5	$ 166.50	$ 741.00
MULCH	ACRE	0.9	$ 5,325.00	$ 4,742.00
SIGNS - RURAL	MILE	0.32	$ 9,000.00	$ 2,880.00
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.32	$ 9,000.00	$ 2,880.00
DRAINAGE PIPE - RURAL	MILE	0.32	$ 90,200.00	$ 28,864.00
Subtotal 1				$ 1,182,659.00
TRAFFIC CONTROL			10%	$ 118,266.00
Subtotal 2				$ 1,300,925.00
MOBILIZATION			10%	$ 130,093.00
Subtotal 3				$ 1,431,018.00
CONTINGENCY			30%	$ 429,305.00
Subtotal 4				$ 1,860,323.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES			30%	$ 558,097.00
Subtotal 5				$ 2,418,420.00
TOTAL RIGHT-OF-WAY				$ 433,907.52
Subtotal 6				$ 2,852,327.52
INFLATION	YEARS	5.0	3%	$ 454,301.83
Subtotal 7				$ 3,306,629.35
CONSTRUCTION ENGINEERING (CE)			10%	$ 330,662.93
PRELIMINARY ENGINERING (PE)			15%	$ 495,994.40
Subtotal 8				$ 4,133,286.68
INDIRECT COSTS (IDC)			9.66%	$ 399,275.49
TOTAL				**$ 4,532,562.18**

ROADWAY WIDENING IMPROVEMENT OPTIONS

Widen MT 3 to provide Center Turn Lane and 6-foot Shoulders (R1) — 2045 construction — $ 32,800,000.00

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
MISCELLANEOUS WORK	UNIT	56,250.0	$ 1.25	$ 70,313.00
EXCAVATION-UNCLASSIFIED	CUYD	22,846.7	$ 23.75	$ 542,608.00
EXCAVATION-UNCLASS BORROW	CUYD	2,284.7	$ 21.25	$ 48,549.00
SPECIAL BORROW-EXCAVATION	CUYD	1,142.3	$ 22.75	$ 25,988.00
TOPSOIL-SALVAGING AND PLACING	CUYD	20,203.6	$ 10.50	$ 212,137.00
TEMPORARY EROSION CONTROL	UNIT	15,000.0	$ 1.25	$ 18,750.00
CRUSHED AGGREGATE COURSE	CUYD	45,927.9	$ 65.25	$ 2,996,796.00
COVER - TYPE 1	SQYD	48,708.0	$ 1.00	$ 48,708.00
TRAFFIC GRAVEL	CUYD	3,247.2	$ 51.50	$ 167,231.00
PLANT MIX BIT SURF GR S-3/4 IN	TON	17,099.8	$ 58.75	$ 1,004,614.00
HYDRATED LIME	TON	240.0	$ 330.25	$ 79,260.00
ASPHALT CEMENT PG 64-28	TON	923.4	$ 719.50	$ 664,379.00
EMULS ASPHALT CRS-2P	TON	87.0	$ 1,100.00	$ 95,700.00
GUARD RAIL-STEEL	LNFT	594.0	$ 30.25	$ 17,969.00
GD RAIL-STL INT RDWY TERM SECT	LNFT	59.4	$ 49.00	$ 2,911.00
GUARD RAIL-OPTIONAL TERM SECT	EACH	1.8	$ 3,282.00	$ 5,941.00
FARM FENCE-TYPE F5W & F5M	LNFT	23,760.0	$ 4.75	$ 112,860.00
SEEDING AREA NO 1	ACRE	22.4	$ 607.00	$ 13,575.00
SEEDING AREA NO 2	ACRE	6.3	$ 1,648.00	$ 10,320.00
SEEDING AREA NO 3	ACRE	8.9	$ 576.75	$ 5,159.00
FERTILIZING AREA NO 1	ACRE	22.4	$ 210.75	$ 4,713.00
FERTILIZING AREA NO 2	ACRE	6.3	$ 319.75	$ 2,002.00
CONDITION SEEDBED SURFACE	ACRE	31.3	$ 166.50	$ 5,213.00
MULCH	ACRE	6.3	$ 5,325.00	$ 33,345.00
SIGNS - RURAL	MILE	2.25	$ 9,000.00	$ 20,250.00
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	2.25	$ 9,000.00	$ 20,250.00
DRAINAGE PIPE - RURAL	MILE	2.25	$ 90,200.00	$ 202,950.00
Subtotal 1				$ 6,432,491.00
TRAFFIC CONTROL			5%	$ 321,625.00
Subtotal 2				$ 6,754,116.00
MOBILIZATION			10%	$ 675,412.00
Subtotal 3				$ 7,429,528.00
CONTINGENCY			30%	$ 2,228,858.00
Subtotal 4				$ 9,658,386.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES			30%	$ 2,897,516.00
Subtotal 5				$ 12,555,902.00
TOTAL RIGHT-OF-WAY				$ 653,830.07
Subtotal 6				$ 13,209,732.07
INFLATION	YEARS	20.0	3%	$ 10,648,513.43
Subtotal 7				$ 23,858,245.50
CONSTRUCTION ENGINEERING (CE)			10%	$ 2,385,824.55
PRELIMINARY ENGINERING (PE)			15%	$ 3,578,736.82
Subtotal 8				$ 29,822,806.87
INDIRECT COSTS (IDC)			9.66%	$ 2,880,883.14
TOTAL				**$ 32,703,690.02**

MULTIMODAL IMPROVEMENT OPTIONS

Underpass on East Leg of Zimmerman Trail Roundabout (M1) **2045 construction** **$ 4,100,000.00**

TYPE		UNITS	QUANTITY		UNIT PRICE		COST
MISCELLANEOUS WORK		UNIT	473.5	$	1.25	$	592.00
EXCAVATION-UNCLASSIFIED		CUYD	1,100.4	$	23.75	$	26,135.00
EXCAVATION-UNCLASS BORROW		CUYD	110.0	$	21.25	$	2,338.00
SPECIAL BORROW-EXCAVATION		CUYD	55.0	$	22.75	$	1,252.00
TOPSOIL-SALVAGING AND PLACING		CUYD	170.1	$	10.50	$	1,786.00
TEMPORARY EROSION CONTROL		UNIT	5,000.0	$	1.25	$	6,250.00
CRUSHED AGGREGATE COURSE		CUYD	133.8	$	65.25	$	8,728.00
GUARD RAIL-STEEL		LNFT	5.0	$	30.25	$	151.00
GD RAIL-STL INT RDWY TERM SECT		LNFT	0.5	$	49.00	$	25.00
GUARD RAIL-OPTIONAL TERM SECT		EACH	0.0	$	3,282.00	$	50.00
FARM FENCE-TYPE F5W & F5M		LNFT	200.0	$	4.75	$	950.00
SEEDING AREA NO 1		ACRE	0.2	$	607.00	$	114.00
SEEDING AREA NO 2		ACRE	0.1	$	1,648.00	$	87.00
SEEDING AREA NO 3		ACRE	0.1	$	576.75	$	43.00
FERTILIZING AREA NO 1		ACRE	0.2	$	210.75	$	40.00
FERTILIZING AREA NO 2		ACRE	0.1	$	319.75	$	17.00
CONDITION SEEDBED SURFACE		ACRE	0.3	$	166.50	$	44.00
MULCH		ACRE	0.1	$	5,325.00	$	281.00
SIGNS - RURAL		MILE	0.02	$	9,000.00	$	170.00
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.02	$	9,000.00	$	170.00
DRAINAGE PIPE - RURAL		MILE	0.02	$	90,200.00	$	1,708.00
PEDESTRIAN UNDERPASS - EAST LEG		LNFT	120.0	$	3,800.00	$	456,000.00
	Subtotal 1					$	506,931.00
TRAFFIC CONTROL					5%	$	25,347.00
	Subtotal 2					$	532,278.00
MOBILIZATION					10%	$	53,228.00
	Subtotal 3					$	585,506.00
CONTINGENCY					30%	$	175,652.00
	Subtotal 4					$	761,158.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES					30%	$	228,347.00
	Subtotal 5					$	989,505.00
TOTAL RIGHT-OF-WAY						$	653,830.07
	Subtotal 6					$	1,643,335.07
INFLATION		YEARS	20.0		3%	$	1,324,710.86
	Subtotal 7					$	2,968,045.93
CONSTRUCTION ENGINEERING (CE)					10%	$	296,804.59
PRELIMINARY ENGINERING (PE)					15%	$	445,206.89
	Subtotal 8					$	3,710,057.42
INDIRECT COSTS (IDC)					9.66%	$	358,391.55
	TOTAL					**$**	**4,068,448.96**

ACCESS MANAGEMENT IMPROVEMENT OPTIONS

Side Street Approach Movement Restriction (per approach) (A1) — 2030 construction — $ 55,000.00

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
MISCELLANEOUS WORK	UNIT	118.4	$ 1.25	$ 148.00
EXCAVATION-UNCLASSIFIED	CUYD	7.2	$ 23.75	$ 171.00
EXCAVATION-UNCLASS BORROW	CUYD	0.7	$ 21.25	$ 15.00
SPECIAL BORROW-EXCAVATION	CUYD	0.4	$ 22.75	$ 9.00
TOPSOIL-SALVAGING AND PLACING	CUYD	42.5	$ 10.50	$ 446.00
TEMPORARY EROSION CONTROL	UNIT	5,000.0	$ 1.25	$ 6,250.00
CRUSHED AGGREGATE COURSE	CUYD	19.1	$ 65.25	$ 1,246.00
COVER - TYPE 1	SQYD	88.0	$ 1.00	$ 88.00
TRAFFIC GRAVEL	CUYD	5.8	$ 51.50	$ 299.00
PLANT MIX BIT SURF GR S-1/2 IN	TON	9.3	$ 58.75	$ 546.00
HYDRATED LIME	TON	1.0	$ 330.25	$ 330.00
ASPHALT CEMENT PG 64-28	TON	0.5	$ 719.50	$ 360.00
EMULS ASPHALT CRS-2P	TON	0.2	$ 1,100.00	$ 220.00
SIDEWALK-CONCRETE 4"	SQYD	22.2	$ 117.75	$ 2,614.00
CURB AND GUTTER-CONC	LNFT	50.0	$ 53.25	$ 2,663.00
SEEDING AREA NO 1	ACRE	0.047	$ 607.00	$ 29.00
SEEDING AREA NO 2	ACRE	0.013	$ 1,648.00	$ 22.00
SEEDING AREA NO 3	ACRE	0.019	$ 576.75	$ 11.00
FERTILIZING AREA NO 1	ACRE	0.047	$ 210.75	$ 10.00
FERTILIZING AREA NO 2	ACRE	0.013	$ 319.75	$ 4.00
CONDITION SEEDBED SURFACE	ACRE	0.066	$ 166.50	$ 11.00
MULCH	ACRE	0.013	$ 5,325.00	$ 70.00
SIGNS - URBAN	MILE	0.005	$ 57,000.00	$ 270.00
STRIPING & PAVEMENT MARKINGS - URBAN	MILE	0.005	$ 52,000.00	$ 246.00
DRAINAGE PIPE - URBAN	MILE	0.005	$ 264,000.00	$ 1,250.00
LIGHTS - URBAN	MILE	0.005	$ 192,500.00	$ 912.00
Subtotal 1				$ 18,240.00
TRAFFIC CONTROL			5%	$ 912.00
Subtotal 2				$ 19,152.00
MOBILIZATION			10%	$ 1,915.00
Subtotal 3				$ 21,067.00
CONTINGENCY			30%	$ 6,320.00
Subtotal 4				$ 27,387.00
INCIDENTAL CONSTRUCTION (IC) - UTILITIES			30%	$ 8,216.00
Subtotal 5				$ 35,603.00
TOTAL RIGHT-OF-WAY				$ -
Subtotal 5				$ 35,603.00
INFLATION	YEARS	5.0	3%	$ 5,670.63
Subtotal 6				$ 41,273.63
CONSTRUCTION ENGINEERING (CE)			10%	$ 4,127.36
PRELIMINARY ENGINERING (PE)			10%	$ 4,127.36
Subtotal 7				$ 49,528.36
INDIRECT COSTS (IDC)			9.66%	$ 4,784.44
TOTAL				**$ 54,312.80**