

EXECUTIVE SUMMARY

The West End Multi-Modal Planning Study is the result of a collaborative effort between the Billings-Yellowstone County Metropolitan Planning Organization (MPO), the City of Billings, Yellowstone County and the consultant Project Team (Sanderson Stewart and Fehr & Peers). The purpose statement for the study is as follows:

To evaluate the cumulative effect of ongoing and projected future land development and population growth on the multi-modal transportation system for the area of Billings west of Shiloh Road

This document provides guidance in terms of cost and prioritization for multi-modal transportation system projects in the study area based on a pair of land development projection scenarios for the 20-year period leading up to the study Horizon Year of 2035.

Study Area

The study area for the West End Multi-Modal Planning Study is depicted at right in **Figure ES1**. The areas shown in light blue are in the City of Billings, while all other areas have not yet been annexed. The areas shaded in red have been identified for potential annexation by 2018, while the areas in yellow-orange have been identified for potential longer-term annexation. The orange dotted line represents the MPO planning jurisdictional boundary.

Methodology

The Project Team inventoried existing multi-modal transportation system features within the study area, collected traffic counts and crash history data and performed a comprehensive analysis of existing conditions to utilize as a baseline for the study. In addition to evaluating operations and safety for vehicular travel, the team evaluated conditions for the bicycle and pedestrian environment using latent demand and level of traffic stress (LTS) metrics.

Two (2) Horizon Year (2035) land development projection scenarios were calculated; one that approximated a continuation of recent historical development in the area, including a mixture of City and County subdivisions; and a second scenario that projected more aggressive annexation of study area property, thereby resulting in denser development and growth.

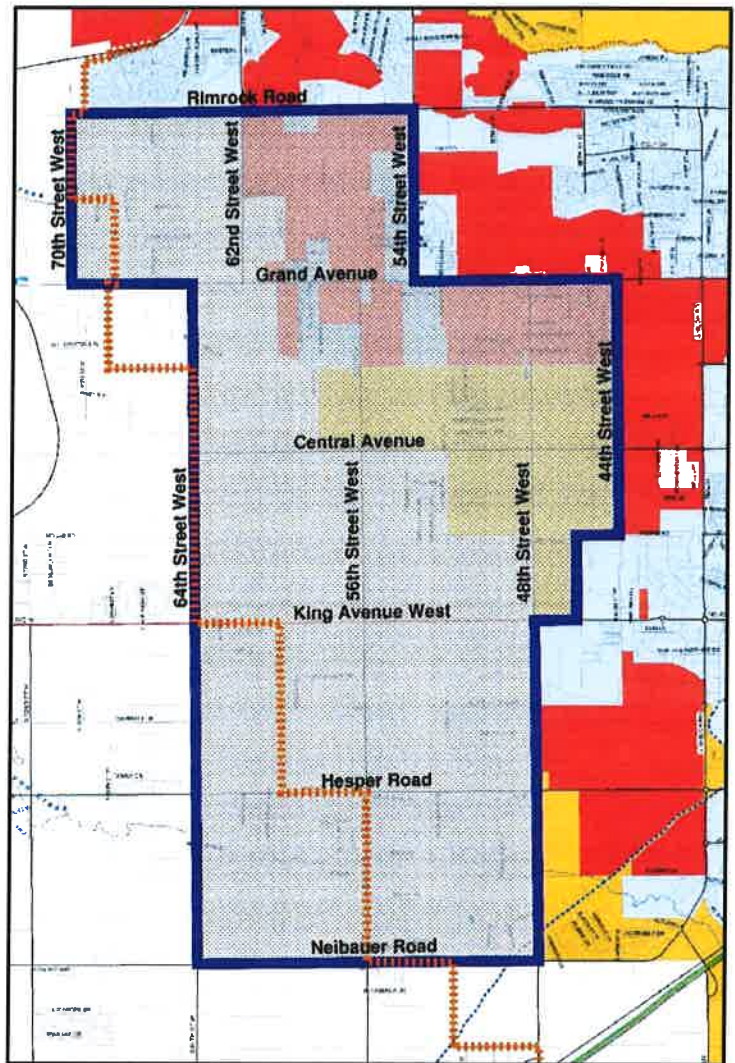


FIGURE ES1. STUDY AREA

The parameters for the two growth scenarios were provided to the Montana Department of Transportation (MDT) for analysis in the Transcad transportation model for Yellowstone County. MDT returned link-specific average daily traffic (ADT) volume projections for both scenarios to be utilized for the Horizon Year (2035) analyses.

The Project Team analyzed future multi-modal operations for both of the growth scenarios. Based on the results of those efforts and the crash history analysis for the study area, the team developed a series of prioritized short-term and long-term project recommendations with high-level approximate construction cost ranges estimates.

Analysis Results

Existing Conditions

For the Existing Conditions (2015) scenario, all of the study area intersections and street corridor segments were found to operate at acceptable levels of service (LOS) during all periods of a typical day. However, an evaluation of crash history for study area intersections for the 5-year period from 2010-2014 revealed that there are seven (7) intersections with crash rates higher than 1.0 crashes/million vehicles entering (MVE), which is a threshold number that MDT uses to determine when an intersection may be of concern. The following three (3) of those intersections exhibited crash rates greater than 1.50 crashes/MVE:

- Rimrock Road & 62nd Street West
- Neibauer Road & 48th Street West
- Neibauer Road & 56th Street West

There were no fatalities reported as a result of any of the crashes during the 5-year analysis period. However, crash severity, which takes into account how many injuries and/or fatalities have occurred as a result of a sample of crashes, was found to be elevated for six (6) intersections. The two Neibauer Road intersections listed above had the highest crash severity rates.

From an active transportation (bicycle/pedestrian) standpoint, the availability of sidewalks, side paths, trails, or bike lanes in the study area is very limited with the exception of sidewalks internal to masterplanned communities. In general, the study area lacks connectivity to low stress bike/pedestrian facilities. A level of traffic stress (LTS) analysis showed that all of the major streets in the study area exhibit the highest LTS scores, thereby making them uninviting to typical bicyclists and pedestrians. This is generally due to the high speeds and narrow or non-existent shoulders in the study area.

Future Conditions (2035)

Under land use growth Scenario 1 (typical growth), most roadways in the study area continue to experience a LOS D or better. However, three of the primary east-west arterials (Rimrock Road, Grand Avenue, King Avenue West) are not projected to meet that standard. Of the north-south arterials, only 62nd Street West, north of Rimrock Road, is projected to operate below LOS D. **Figure ES2** on the following page provides a graphical illustration of the corridor LOS conditions for Scenario 1. Figure ES2 also shows the intersections that are projected to operate below an acceptable LOS C during one or both peak hour periods for Scenario 1.

Under the higher-growth Scenario 2 (aggressive growth), Central Avenue joins Rimrock Road, Grand Avenue and King Avenue West in having one or more segments exhibiting LOS E or worse conditions. For the north-south corridors, 62nd Street West, north of Rimrock Road degrades to LOS F, while 54th Street West is projected at LOS D north of Rimrock Road and LOS E south of Rimrock Road. **Figure ES3**, also on the following page, illustrates the corridor LOS analysis results for Scenario 2 and also shows graphically which intersections are projected to fail under that scenario.

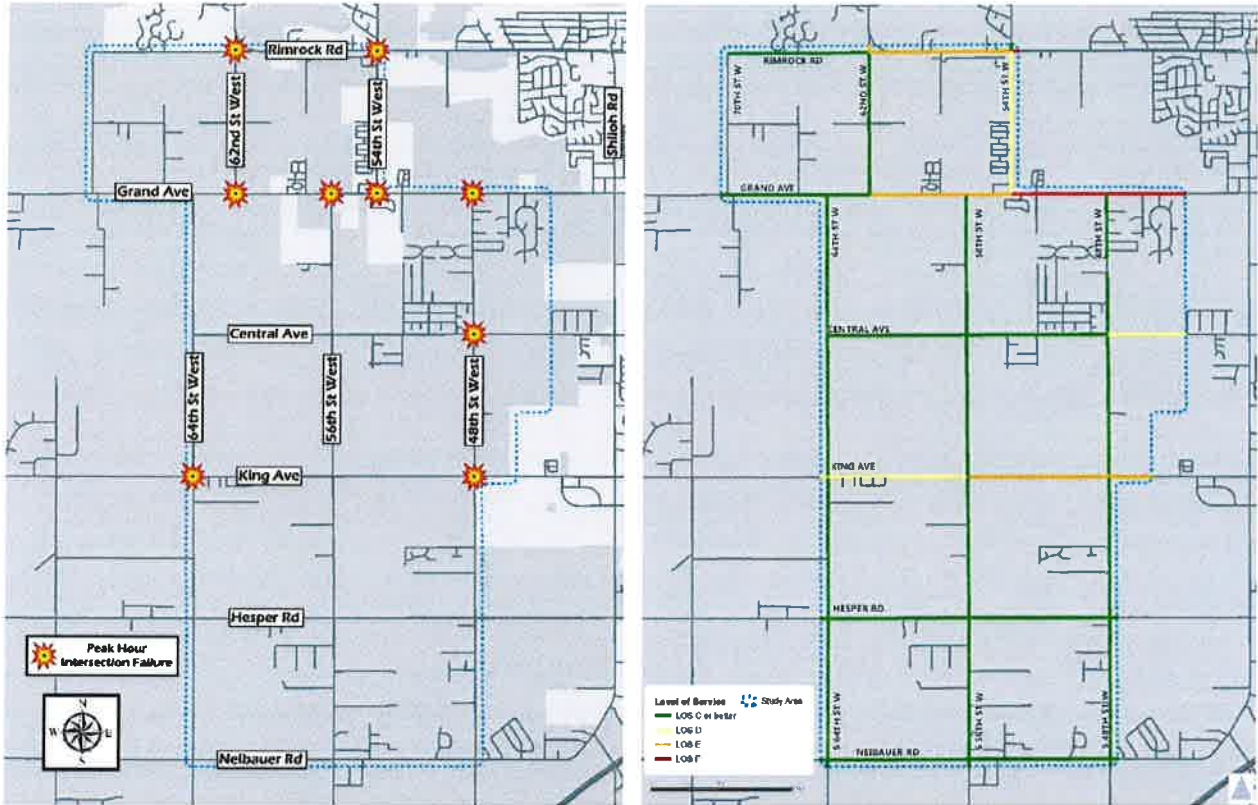


FIGURE ES2. SCENARIO 1 (2035) INTERSECTION AND CORRIDOR LOS ANALYSIS RESULTS

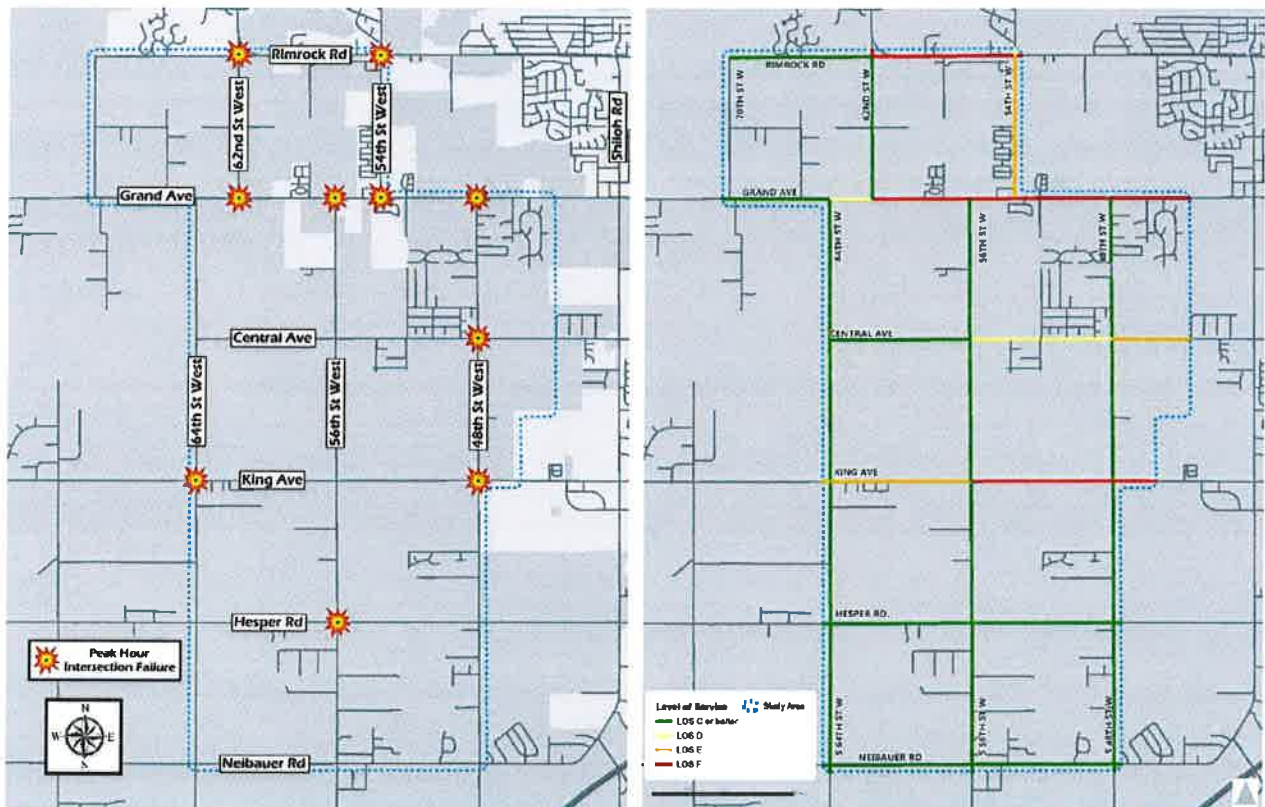


FIGURE ES3. SCENARIO 2 (2035) INTERSECTION AND CORRIDOR LOS ANALYSIS RESULTS

A Latent Demand Model was used to provide a logical analysis framework to prioritize attention and investment for active transportation. Based on the growth projections, demand for active transportation is expected to increase significantly. Most of the study area north of King Avenue and east of 56th Street will generate demand, with the highest concentrations along 54th Street and Grand Avenue. **Figure ES4** below illustrates the projected change in active transportation demand from Existing Conditions (2015) to Scenario 2 (2035)

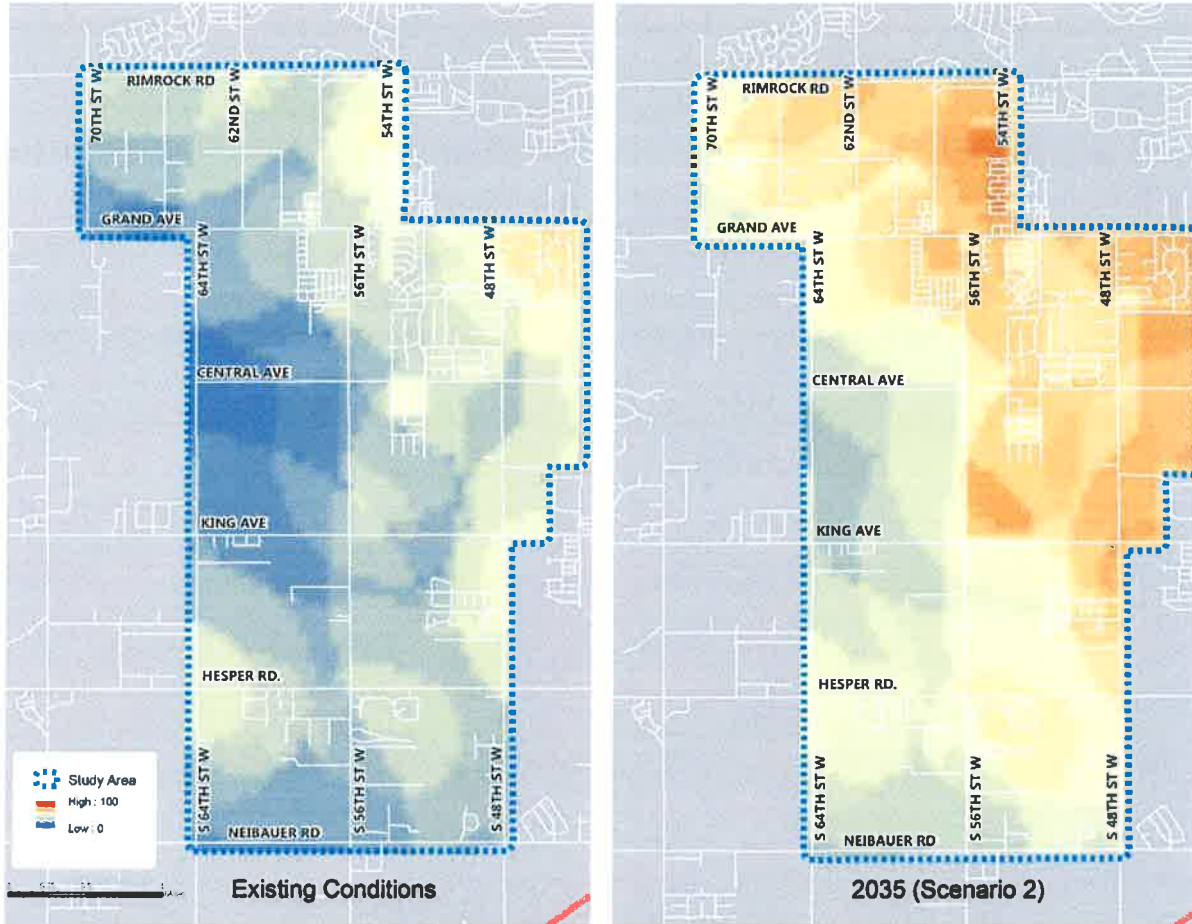


FIGURE ES4. LATENT DEMAND MODEL ANALYSIS RESULTS

Study Recommendations

Streets & Intersections

The priority project recommendations for this study were broken down into short-term and long-term categories. Short-term priority projects are those that could be necessary in order to maintain safe and efficient operations during the first half of the 20-year study period. Long-term priority projects are more likely to be needed during the second half of that period. However, it should be noted that there are many factors related to land development that could change the priority, location and cost considerations that are summarized in these recommendations. As such, the recommendations are to be utilized as a guideline for planning and not as a hard and fast committed projects list.

Tables ES1-ES4 and **Figure ES5-ES6** on the following pages list and illustrate the short term and long-term priority project recommendations for street and intersection improvements. In addition to details about each recommended project, the tables provide estimated construction cost ranges. The estimated costs do not consider right-of-way, irrigation systems modifications or street lighting other than as associated directly with traffic signals or roundabouts.

TABLE ES1. SHORT-TERM INTERSECTION PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Neibauer Rd. & 56th St. West	All-Way Stop Control/OH Flashing Beacons/Transverse Rumble Strips	\$120,000-\$200,000
2	Neibauer Rd. & 48th St. West	OH Flashing Beacons/Transverse Rumble Strips	\$120,000-\$200,000
3	Rimrock Rd. & 54th St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
4	King Ave. West & 64th St. West	Auxiliary Turn Lanes	\$400,000-\$600,000
5	Grand Ave. & 48th St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
6	Molt Rd./Rimrock Rd./62nd St. West	Design Study	\$20,000-\$30,000
7	Grand Ave. & 56th St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000

TABLE ES2. SHORT-TERM CORRIDOR PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Grand Ave. - Shiloh Rd. to 52nd St. West	Widening/Reconstruction (3-lane section)	\$2,800,000-\$4,500,000
2	Rimrock Rd. - 50th St. West to 54th St. West	Widening/Reconstruction (3-lane section)	\$1,000,000-\$1,600,000
3	King Ave. West - MT Sapphire Dr. to 48th St. West	Widening/Reconstruction (3-lane section)	\$1,300,000-\$2,000,000
4	Grand Ave. - Wilderness Dr. to 62nd St. West	Widening/Reconstruction (3-lane section)	\$900,000-\$1,400,000

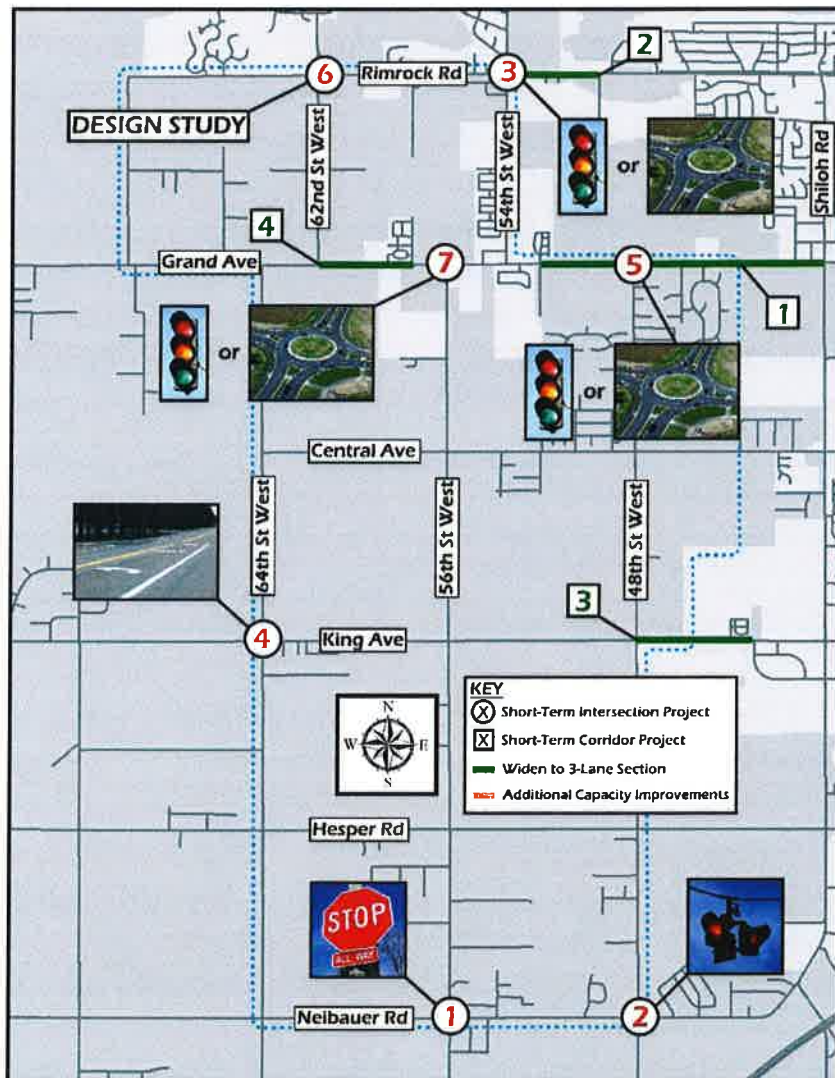


FIGURE ES5. SHORT-TERM INTERSECTION & CORRIDOR PROJECT RECOMMENDATIONS

TABLE ES3. LONG-TERM INTERSECTION PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Molt Rd./Rimrock Rd./62nd St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
2	King Ave. West & 48th St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
3	Central Ave. & 48th St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
4	King Ave. West & 64th St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
5	Grand Ave. & 62nd St. West	Traffic Signal or Roundabout	\$400,000-\$1,500,000
6	Hesper Rd. & 56th St. West	All-Way Stop	\$4,000-\$200,000

TABLE ES4. LONG-TERM CORRIDOR PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Grand Ave. - Shiloh Rd. to 62nd St. West	Widening/Reconstruction (5-lane section)	\$7,500,000-\$11,000,000
2	Rimrock Rd. - Shiloh Rd. to 62nd St. West	Widening/Reconstruction (5-lane section/3-lane section)	\$6,900,000-\$10,300,000
3	King Ave. West - MT' Sapphire Dr. to 64th St. West	Widening/Reconstruction (5-lane section/3-lane section)	\$6,100,000-\$9,300,000
4	54th St. West - Grand Ave. to Rimrock Rd.	Widening/Reconstruction (3-lane section)	\$2,100,000-\$3,300,000
5	Central Ave. - Shiloh Rd. to 48th St. West	Widening/Reconstruction (3-lane section)	\$2,000,000-\$3,100,000
6	62nd St. West - Rimrock Rd. to Western Bluffs Dr.	Widening/Reconstruction (3-lane section)	\$700,000-\$1,100,000

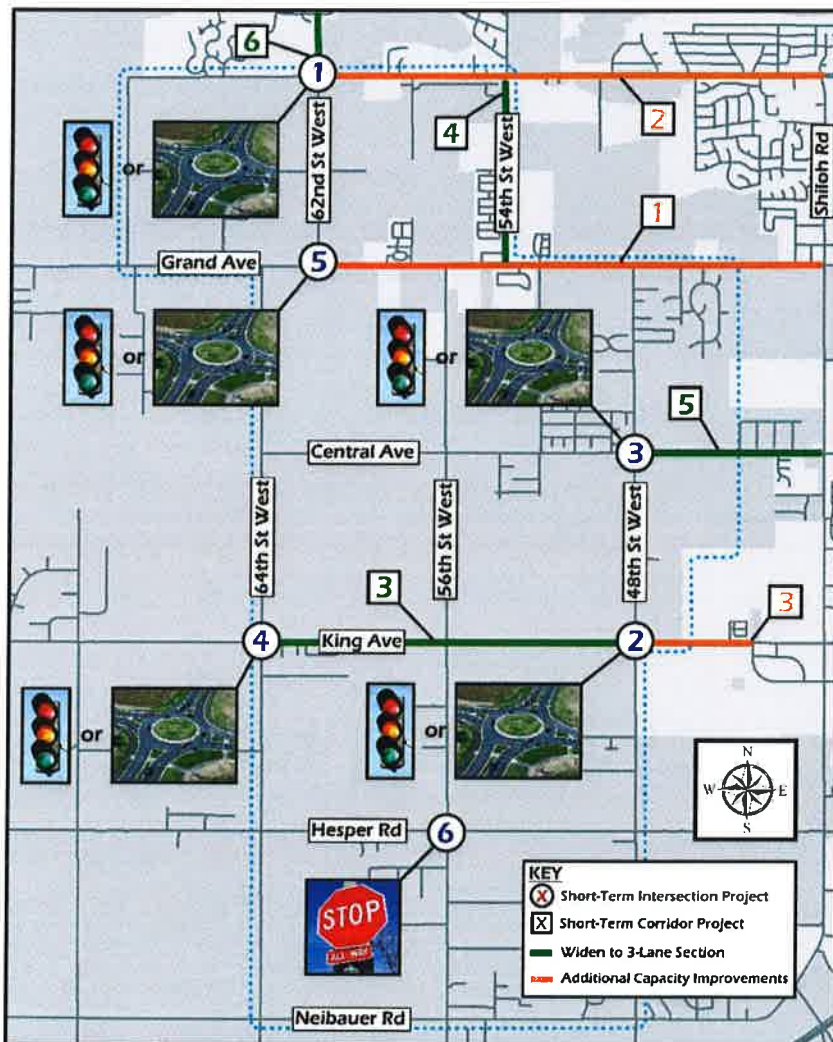


FIGURE ES6. LONG-TERM INTERSECTION & CORRIDOR PROJECT RECOMMENDATIONS

The City and County should also strongly consider the implementation of access control as a tool for extending the life (in terms of capacity) for roadway corridors in this area. Closely spaced driveways with no restrictions on turning movements can greatly degrade the throughput capacity for an arterial. A well-conceived access control plan can improve arterial capacity and also provide safety benefits by reducing conflict points in high-mobility corridors.

Active Transportation Systems

The Project Team recommends the implantation of short-term bicycle facility improvements in the following locations:

- 54th Street from Rimrock Road to Grand Avenue
- 48th Street from Central Avenue to Grand Avenue
- Grand Avenue from 58th Street to Shiloh Road
- Central Avenue from 56th Street to Shiloh Road

Specific improvements could include shoulder widening to provide rideable space (5-8 ft of pavement outside of the shoulder stripe), protected bike lanes (“cycletrack”), and sidewalks or sidepaths. The provision of parallel multi-use pathways designed to serve both pedestrians and bicycles should also be a focus to better accommodate the needs of multiple user groups.

Near-term improvements for pedestrian facilities should focus on improving sidewalk connectivity with neighborhoods and providing crosswalks and related signage to make drivers aware of crossing locations. The following locations should be considered in the short-term for crossing improvements:

- Grand Ave/54th St: crosswalk enhancements, possibly a traffic signal, to improve pedestrian safety near school zone
- Grand Avenue midway between 56th Street West and 58th Street West: pedestrian actuated mid-block beacon, possibly a pedestrian hybrid beacon (“HAWK signal”) or rectangular rapid flashing beacon (RRFB)
- 54th Street West at terminus of multi-use path (north end of Cottonwood Park): pedestrian actuated mid-block beacon, possibly a pedestrian hybrid beacon (“HAWK signal”) or rectangular rapid flashing beacon (RRFB)
- Rimrock Road/54th St: crosswalk enhancements, possibly a traffic signal, to connect multi-use paths

The following corridors should be considered in the short-term for sidewalk or multi-use path improvements:

- Multi-use path on Grand Ave from 52nd Street West to west boundary of Trails West Subdivision
- Sidewalk on Grand Ave from west boundary of Foxtail Subdivision to HAWK signal
- Multi-use path from Grand Avenue to north boundary of Cottonwood Park along west side of 54th Street West
- Sidewalk along east side of 54th Street West from Grand Avenue to north boundary of Grand Peaks Subdivision

Figure ES7 on the following page illustrates the recommended locations for short-term active transportation system improvements.

Longer-term, it is recommended that a “layered network” principle be implemented as a way as to provide comfortable and efficient bike and pedestrian connectivity via lower-stress streets instead of force-fitting all modes onto the arterial corridors. Since many of these future collector corridors are platted but not built, it is an ideal time to establish the roadway standards that incorporate bike lanes, sidewalks and modest speed limits. A key consideration regarding this concept is cooperation between the City of Billings and Yellowstone County in terms of developing and implanting development requirements that will require construction of well-planned and consistent facilities as property develops in the study area. In the event that some of the major arterials become more urbanized over time, with speed limit reductions and bike facilities they could also become useful low-stress bikeways.

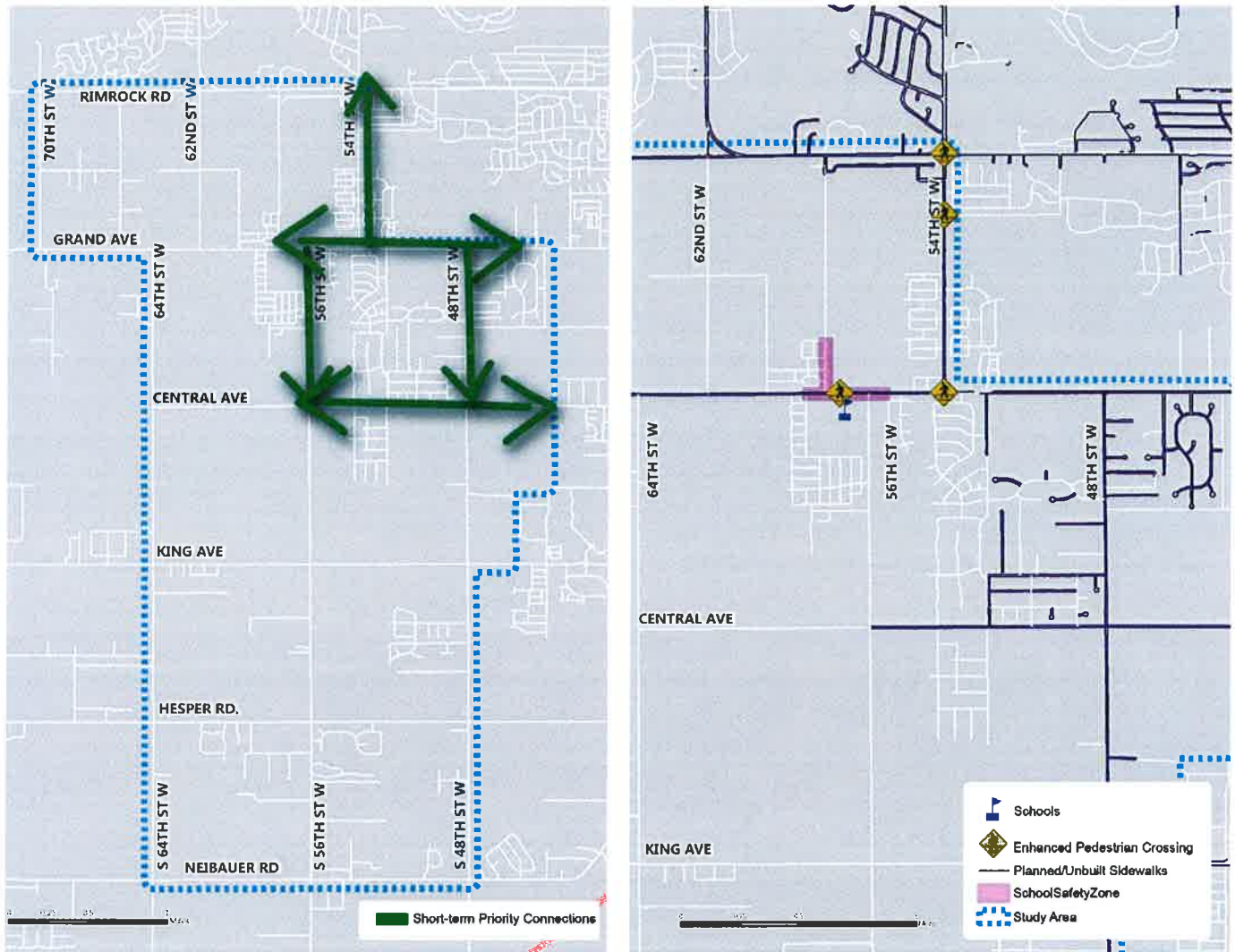


FIGURE ES7. SHORT-TERM IMPROVEMENTS FOR ON-STREET BICYCLE AND PEDESTRIAN FACILITIES

Recommended long-term low-stress corridors include:

- 58th Street West - Rimrock Road to Grand Avenue
- 66th Street West - Rimrock Road to Grand Avenue
- 60th Street West
- 52nd Street West
- Monad Road
- Broadwater Avenue
- Colton Boulevard

Future pathway segments should be prioritized based on the proximity to high demand areas and the ability of the segment to provide connectivity through barriers and gaps in the street system. **Figure ES8** on the following page illustrates the locations for recommended long-term active transportation projects. For more detail on all of the project conclusions and recommendations, please see the report body.

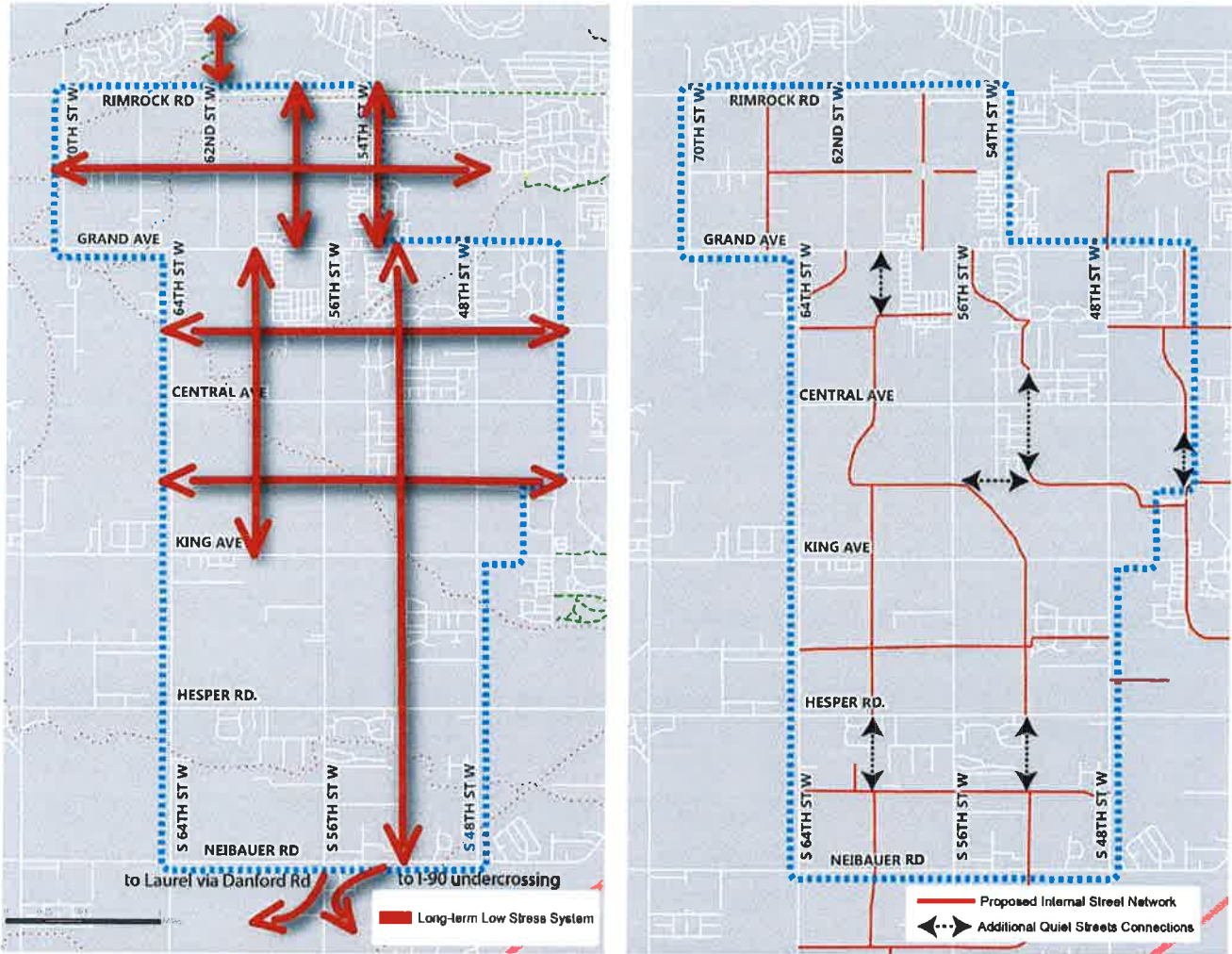


FIGURE ES8. LONG-TERM ACTIVE TRANSPORTATION STRATEGIES