sixthstreetstudy

prepared for:

Rapid City Area Metropolitan Planning Organization

Sixth and Omaha

Crossing Feasibility Study

June 2020 DRAFT

DRAFT
Sixth & Omaha Crossing Feasibility Study

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Rapid City Area Metropolitan Planning Organization

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1.0 Introduction

The ability of Sixth Street to serve as a high-functioning multimodal corridor is integral to sustaining and growing the reputation of Rapid City's core as a walkable, bikeable, and livable place. Many of the City's key activity centers – Main Street Square, Memorial Park, Rushmore Plaza Civic Center, the Milo Barber Transportation Center, and the Rapid City Public Library, to name a few – lie along the corridor, highlighting its importance as a gathering place for both residents and visitors. With significant additional development underway all along the corridor, the importance of providing a safe, comfortable, and convenient experience for all users is only going to magnify in the future.

Omaha Street is an imposing barrier dividing the corridor between downtown and Memorial Park. Walking or biking at-grade across a wide, high-speed arterial, even when the crossing is signalized, will never be a particularly comfortable experience and will always come with safety concerns. Past attempts to improve the Sixth & Omaha crossing have proven only marginally successful. Additionally, the current signalized crossing was implemented, through an agreement between local and state officials, as a temporary solution for bicycle and pedestrian movements – its configuration is in conflict with eventual intersection improvements planned for the intersection of Fifth & Omaha, where additional turn lane storage will become necessary as traffic volumes continue to increase.

A grade-separated crossing of Omaha Street for bicyclists and pedestrians – conceptualized in the *6th Street Promenade Conceptual Plan* – would truly unite the entire Sixth Street corridor and provide a focal point for the City to promote and build off of. Prior to designing and constructing such a crossing, however, an assessment of the safety and operations-related outcomes of implementation is critical to understanding how grade separation at Sixth & Omaha would affect the overall transportation system. A grade-separated crossing would effectively remove that intersection from the street network, requiring users of all modes to adjust their movements across and along the corridor. The following report is divided into distinct sections focused on the three components of Rapid City's transportation system that would be most impacted by a potential grade-separated crossing at Sixth & Omaha: bicycle and pedestrian network connectivity, traffic operations, and transit operations.

2.0 Feasibility Study Process

Project Oversight

A Study Advisory Team composed of staff from the Rapid City Area Metropolitan Planning Organization (MPO), the City of Rapid City, the South Dakota Department of Transportation, and community representatives helped guide the Sixth & Omaha Crossing Feasibility Study. This group met monthly to coordinate, review findings, and discuss progress on primary study tasks. Additionally, the SAT was critical to ensuring the study was consistent with past planning efforts for the City.

Previous Plans & Studies

Recent plans and studies that pertain to transportation in downtown Rapid City served as a starting point for understanding how all modes use the area currently and provided information on what changes are envisioned for the future. Key documents that were reviewed included:

- *RapidTRIP 2040 Long Range Transportation Plan*
- *6th Street Promenade Conceptual Plan*
- *Rapid City Downtown Area Master Plan*
- *Rapid City Area Bicycle and Pedestrian Master Plan*

The data and recommendations included in these studies helped to establish priorities for mobility through downtown, identify what transportation issues exist in downtown, and what ideas have already been proposed and supported for enhancing safety, accessibility, and convenience.

Figure 1 - Study Area

Data Collection & Analysis

The Sixth & Omaha Feasibility Study was primarily driven through the collection and analysis of field data – traffic volumes, bicycle/pedestrian crash history, existing cross-section characteristics, and current transit route patterns were all considered to assess how reconfiguration of the existing at-grade pedestrian crossing at Sixth & Omaha might impact operations through downtown for all modes. The following chapters describe the analyses conducted for bicycle and pedestrian network connectivity, traffic operations, and transit operations and the respective findings from each.

3.0 Bicycle and Pedestrian Network Connections

Downtown is a focal point of Rapid City's growing bicycle and pedestrian network. With numerous major destinations and close proximity to Memorial Park, the area has the potential to attract substantial biking and walking activity with proper accommodations for active users. Sixth Street is a particularly critical link for active travel through downtown – many of the major destinations are directly adjacent to the corridor, and it ties into the existing Omaha Street pedestrian crossing. As such, ensuring the potential grade-separated crossing at Sixth & Omaha does not disrupt the flow of bicyclists and pedestrians into and out of downtown is of paramount importance. This study also presents an opportunity to identify and address existing challenges for bicyclists and pedestrians along the entire Sixth Street corridor.

3.1 Crossing Omaha

The potential grade separation at Sixth & Omaha represents a significant opportunity for eliminating a major barrier in Rapid City's active transportation network. Major street crossings – even those that are signalized – are stressful for most active users; their very presence may dissuade some otherwise interested bicyclists and pedestrians from traveling by foot.

Omaha Street, with six lanes of traffic, a 35 miles per hour speed limit, and over 28,000 motor vehicles per day, is particularly imposing for bicyclists and pedestrians in Rapid City. An initial round of public engagement for this study revealed the Omaha Street crossing to be a concern for many – while the existing pedestrian signal provides active users a dedicated phase for getting across, crossing still involves close interaction with motor vehicles over a relatively long distance and separation only through the raised median area. Bicyclists and pedestrians are also able to cross Omaha Street during dedicated phases at the Mount Rushmore Road and Fifth Street intersections, but the Sixth Street promenade through Memorial Park is the most comfortable active facility to the north so Sixth is the optimal crossing point.

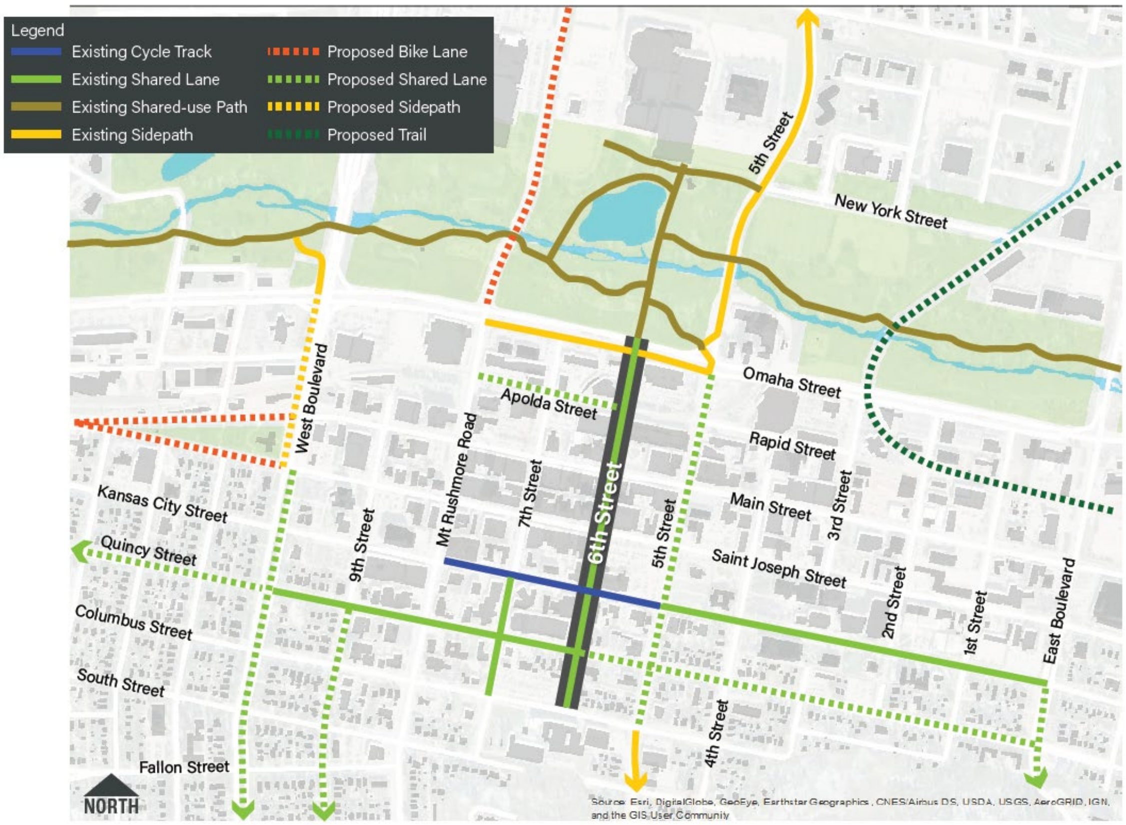
Despite the signalization, crashes have occurred at the crossing – two involving bicyclists and pedestrians and four others involving only motor vehicles in the vicinity of the Sixth and Omaha intersection since November 2016. Both reported bike/ped collisions occurred in the existing crosswalk, underscoring the desire for greater separation between active users and motor vehicles at such a critical juncture for bicycle and pedestrian traffic. The need for crossing bicyclists and pedestrians to wait for a signal also gives the experience of biking or walking between downtown and Memorial Park a disjointed, incongruous feel in conflict with Rapid City's desire to unify the entire Sixth Street corridor

The challenges presented by Omaha Street to bicyclists and pedestrians year-round are amplified on days with major events such as Civic Center concerts, downtown festivals, and Memorial Park gatherings. On these days, significant foot traffic is moving between the Memorial Park and downtown sides of Omaha Street; this presents both a safety issue as people crowd into the limited pedestrian space at the intersection waiting for a signal and while crossing, and a traffic flow issue for Omaha Street as the pedestrian push-buttons are actuated frequently.

3.2 Sixth Street and the Bicycle Network

The 2011 *Rapid City Area Bicycle and Pedestrian Master Plan* established a vision for a comprehensive network of bicycle and pedestrian facilities throughout the MPO's planning area. The network development process considered factors including traffic stress, public input, and roadway geometry in identifying appropriate facility types and locations. **Figure 2** presents the network of bicycle facilities – existing and proposed – in downtown Rapid City.

Figure 2 – Downtown Rapid City Bicycle Facilities



Level of Traffic Stress (LTS) is a tool developed by the Mineta Transportation Institute to assess the comfort level associated with bicycling on specific on-street facilities based on traffic speeds and volumes, number of through lanes, and, if applicable, bike lane width; streets are graded on a scale of 1 to 4, with LTS 1 representing a facility most users would feel comfortable bicycling on and LTS 4 representing a facility only the most dedicated and confident bicyclists (approximately 4-7% of the general population) would use; LTS 1 and 2 facilities are considered low-stress. Based on their current characteristics, the streets of downtown Rapid City have the following scores:

Omaha Street • • • 4
Mouth Rushmore Road • • • 4
Main Street • • • 4
St. Joseph Street • • • 4
Fifth Street • • • 4
Columbus Street • • • 2
Quincy Street • • • 2
Kansas City Street • • • 1/2
Seventh Street • • • 1
Sixth Street • • • 1

Together, the network map and LTS scores demonstrate how integral Sixth Street is to bicycle connectivity throughout downtown Rapid City and beyond. Sixth Street and Seventh Street are the only low-stress north/south streets through the downtown core (Seventh lacks the connectivity north of Omaha Street that Sixth has) and Sixth Street crosses three high-stress streets; the map in particular clearly shows how Sixth Street is envisioned as the spine of the bicycle network between Columbus Street and the Civic Center. Comfortable existing east/west facilities on the south end – Kansas City Street and Quincy Street – and the north end – the greenway path along Rapid Creek – both tie into Sixth Street, greatly expanding the area accessible to bicyclists along the corridor. Future plans for bicycle facilities along Mount Rushmore Road, Main Street, West Boulevard, and East Boulevard will further enhance the connectivity offered by Sixth Street; establishing Sixth Street as a prominent active transportation corridor may even provide an impetus for implementing some of these other recommendations.

Though Sixth Street grades out as a comfortable LTS 1 facility for bicycling, there are still some issues along the corridor which less-confident bicyclists may have concerns with. Sixth Street is a relatively low-volume, low-speed road for which shared-lane markings (or 'sharrows') are an appropriate treatment, but the numerous intersections between the Performing Arts Center and Omaha Street – where bicyclists are most exposed to traffic conflicts – are largely lacking bicycle-specific treatments. Additional bulb-outs, bicycle-specific signals, and bike boxes are all elements to consider during development of a conceptual plan for the corridor. Angled parking is also a potential hazard for bicyclists as their visibility to drivers backing out is limited; reconfiguration of parking and/or additional signage to boost awareness may be appropriate in certain portions of the corridors.

3.3 Pedestrian Considerations

From the pedestrian perspective, Sixth Street is largely a well-functioning corridor as is. Continuous – and mostly detached – sidewalks, accessible directional curb ramps, and clearly defined crosswalks throughout, combined with low traffic volumes. make for an overall comfortable walking environment. This is in stark contrast to the pedestrian experiences along Mt. Rushmore Road and Fifth Street, where attached sidewalks directly adjacent to high-speed, high-volume lanes of traffic provide little sense of comfort; as with the bicycle network, Sixth Street is the optimal corridor for north-south walking trips through downtown.

The portion of Sixth Street through the core of downtown – between Kansas City Street and Main Street – has the most robust pedestrian infrastructure, with some landscaping and street furniture, bulb-outs at all intersections, and 8-10' wide sidewalks. Further north and south, sidewalks are still present and in good condition, but these additional pedestrian elements are mostly absent. The crossings of Quincy Street and Columbus Street are between 60 and 70 feet wide, a relatively long distance for an urban setting that may be a particular concern for people with disabilities; crossings through the core, for comparison, are only 30 to 40 feet wide with the bulb-outs that have been built. The sidewalks on the south end are not supplemented with landscaping elements and amenities to enhance the pedestrian experience. The railroad crossing just south of Apolda Street has the necessary signage and accessibility elements but merits consideration for supplemental safety features – the *Rapid City Quiet Zone Assessment* (2018) included concepts for widening the sidewalk crossing on the east side of Sixth Street and/or adding fencing to prohibit pedestrians from crossing on the west side.

4.0 Traffic Operations

Actions taken to remove and reconfigure the current Sixth Street at-grade pedestrian crossing would result in the closure of the Omaha Street & Sixth Street intersection. This closure would force vehicular traffic onto alternate routes to reach Omaha Street. To assess the impacts of the proposed changes, traffic operations were assessed for existing and future conditions at the following intersections:

- Omaha Street & Mount Rushmore Road
- Omaha Street & Sixth Street
- Omaha Street & Fifth Street
- Sixth Street & City Hall Access

Existing conditions were evaluated, as well as two future scenarios in Year 2045. The first scenario evaluated future traffic conditions if no project were to occur (no action). The second future scenario considers closure of the Omaha Street & Sixth Street intersection, and all anticipated rerouting of vehicular traffic.

4.1 Traffic Operations Methodology

In accordance with the *Methods and Assumptions* document for the study, operational analyses were based on procedures documented in the *Highway Capacity Manual (HCM), 6th Edition* (Transportation Research Board, 2016). Synchro software (version 10) was used to conduct the HCM evaluations. Peak hour factors (PHFs), which are used to account for the variation of traffic arrivals within a peak hour, were calculated for each approach of an intersection. Evaluation of future year scenarios used existing PHF's or a minimum 0.90. The SDDOT Road Design Manual permits using a saturation traffic flow rate of 1,900 vehicles per hour per lane (vphpl). However, in an effort to provide a conservative estimate of traffic operations, and since saturation flow rate was not measured in the field for this study, a value of 1,800 vphpl was used.

Level of Service (LOS), a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay, was determined for all movements which must yield right-of-way to other traffic movements. LOS is described by a letter designation ranging from LOS A to LOS F, with LOS A representing nearly free-flow travel and LOS F representing congested conditions. City of Rapid City standards stipulate that LOS C (or better) shall be the design objective for all signalized intersections and roadway segments.

4.2 Data Collection

Traffic volumes collected by the City of Rapid City within the study area were analyzed to determine which periods of a typical weekday would be most impacted by closing the Omaha Street & Sixth Street intersection. This analysis found that weekday Mid-Day and PM peak hours experienced the highest volumes with the study area and would be most impacted by the project.

Accordingly, Mid-Day and PM peak hour intersection turning movement counts were conducted at the study intersections in March 2020. Seasonal factors developed by the City of Rapid City were used to increase the counted volumes to imitate volumes of peak travel (late summer) due to increased tourism.

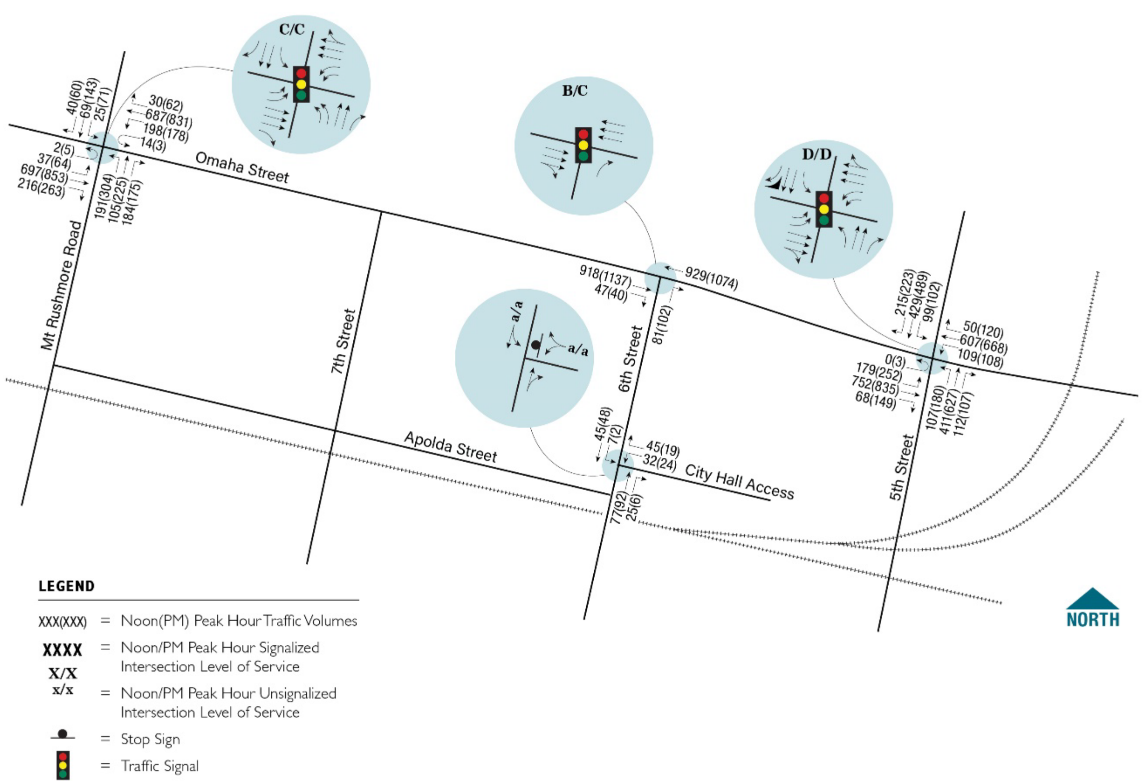
Detailed traffic count data are provided in **Appendix A**.

4.3 Existing Conditions

Within the Sixth Street study area, Omaha Street (Highway 44) currently serves approximately 28,800 vehicles per day (vpd). **Figure 3** displays existing traffic volumes (factored to consider seasonal variations) and associated traffic operations for Mid-Day and PM peak hours. As shown on the figure, the Mount Rushmore Road and Sixth Street intersections with Omaha Street operate at LOS C or better during peak hours. The Omaha Street & Fifth Street intersection operates at LOS D during both peak hours, which does not meet Rapid City standards. All movements at the unsignalized City Hall access to Sixth Street currently operate at LOS A during both peak hours.

The estimated average vehicle delay at the Mount Rushmore Road intersection during the PM peak hour lies close to the threshold for LOS C/LOS D. Since saturation flow rate was not measured in the field and may actually be lower than the 1,800 vphpl assumption, it is possible that this intersection currently operates at LOS D during the PM peak hour, which would not meet Rapid City standards. LOS worksheets for existing conditions are found in **Appendix B**.

Figure 3 - Existing Traffic Conditions



Volume-to-capacity (v/c) ratios and 95th percentile vehicle queues were also evaluated for Mid-Day and PM peak hours where LOS did not meet Rapid City standards. At the Omaha Street & Fifth Street intersection, all v/c ratios are less than 0.89 for both peak hours. Eastbound vehicle queues nearly extend back to the Sixth Street intersection during the PM peak hour. Westbound queues extend beyond the existing railroad grade crossing of Omaha Street east of Fifth Street during both peak hours, and northbound queues extend past the railroad grade crossing of Fifth Street south of Omaha Street during the PM peak hour. These queueing issues would likely persist or worsen as traffic volumes grow in the future. **Appendix B** also shows v/c ratios and 95th percentile vehicle queues for existing conditions.

4.4 Future Conditions

Estimates of future traffic volumes using the Rapid City Area Metropolitan Planning Organization (RCAMPO) regional travel demand model. The 2013 model was used as a base year and the forecast year was defined as 2045. Using these model parameters and Rapid City traffic counts from 2019, traffic volumes were forecasted to grow by less than 1% per year throughout most of the study area.

To create a conservative estimate of future traffic conditions, the growth rate was increased to a minimum of 1% per year. The exceptions to this minimum were along Mount Rushmore Road, which is expected to grow at a rate of 1.25% per year south of Omaha Street and 1.50% per year north of Omaha Street. Based on these forecasts, Omaha Street would be expected to serve 37,300 vpd by the Year 2045.

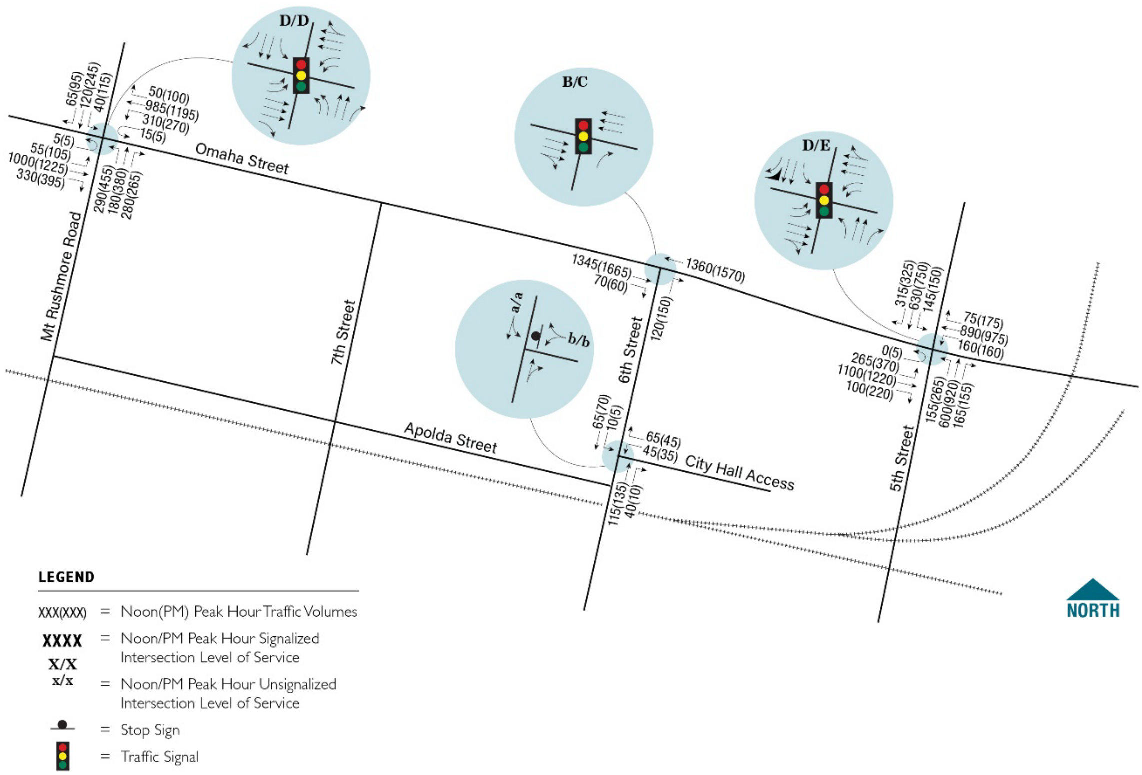
No Action Conditions

The 2045 No Action scenario considers a condition where the Omaha Street & Sixth Street intersection would remain open to vehicular traffic and signalized. Regional background traffic growth would occur as anticipated in the previously described forecasts. **Figure 4** displays Mid-Day and PM peak hour traffic volumes and associated traffic operations for the 2045 No Action scenario.

As shown, the PM peak hour LOS at the Omaha Street & Mount Rushmore Road and Omaha Street & Fifth Street intersections would degrade compared to existing conditions – with the Mount Rushmore Road intersection going from LOS C to LOS D during both peak hours and the Fifth Street intersection going from LOS D to LOS E during the PM peak hour. Operations at Omaha Street & Mount Rushmore Road during the Mid-Day peak hour are estimated to be close to the LOS C/LOS D delay threshold. The true operation may vary depending how measured saturation flow rates change in the future. LOS worksheets for 2045 No Action conditions are found in **Appendix C**.

In addition to poor LOS, some signalized intersection movements are anticipated to experience high v/c ratios and lengthy vehicle queues in the 2045 No Action scenario. At the Omaha Street & Mount Rushmore Road intersection, the northbound left-turn movement would operate at LOS F, have a v/c ratio greater than 1.0, and have 95th percentile queues extending beyond the nearby railroad tracks during both Mid-Day and PM peak hours. At the Sixth Street signalized intersection, eastbound queues would spill back into the Seventh Street intersection during the Mid-Day peak, and westbound queues would spill back into the Fifth Street intersection during the PM peak. Finally, at the Omaha Street & Fifth Street intersection, eastbound queues would backup past Sixth Street and westbound queues would back up through the adjacent railroad tracks during both the Mid-day and PM peak hours. Northbound and southbound left-turn and through movement v/c ratios would be higher than 1.0 during the PM peak hour and northbound 95th percentile vehicle queues would backup beyond the adjacent railroad tracks during the PM peak hour.

Figure 4 - 2045 No Action Traffic Conditions

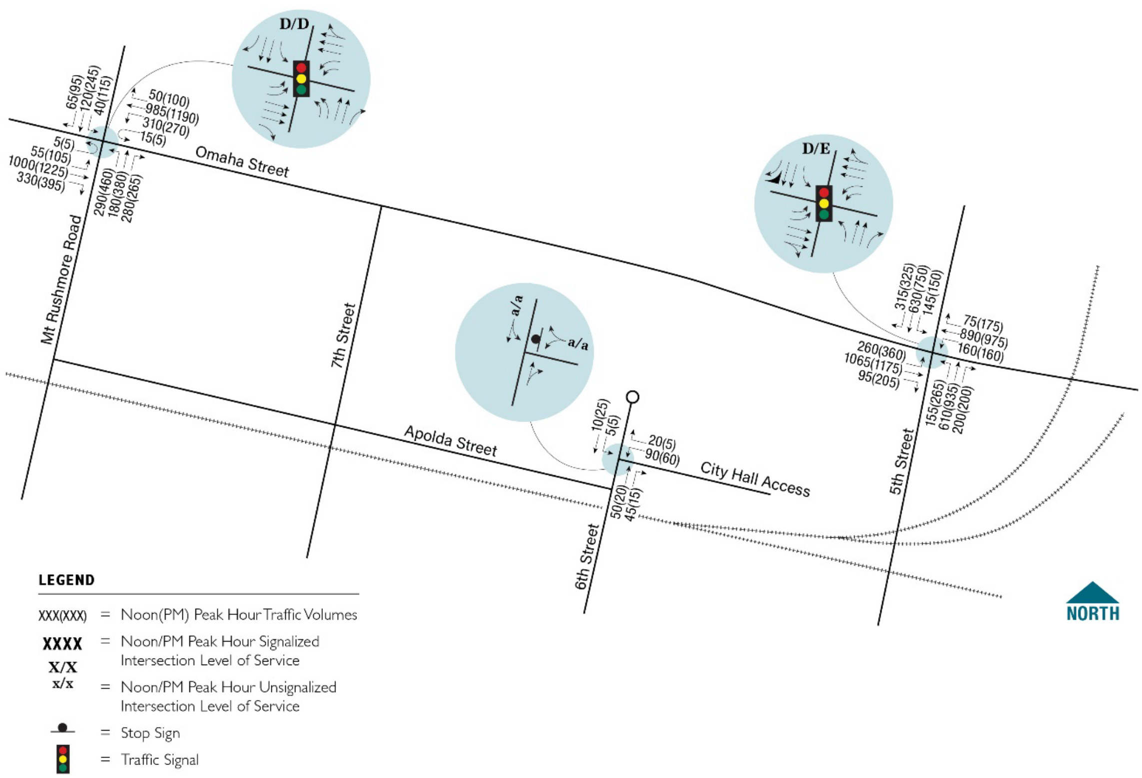


Proposed Conditions

In the 2045 Proposed scenario, traffic operations were assessed assuming that Sixth Street would be closed south of Omaha Street. As a result of the closure, the signal at the Omaha Street & Sixth Street intersection would be removed from the corridor and vehicles would need to find alternate routes, including some RapidRide buses. These traffic shifts were approximated using engineering judgement to find the next shortest path. Generally, vehicles who would have made eastbound right turns at Sixth Street were assumed to reroute to Seventh Street. Vehicles who would have made northbound right turns at Sixth Street were assumed to reroute to Mount Rushmore Road or Seventh Street via Apolda Street, or Fifth Street via St. Joseph Street depending on the shortest path available. Some intersections, such as St. Joseph Street & Fifth Street, may experience increased traffic volumes due to vehicle rerouting. However, these impacts were not evaluated, as they are outside of the designated study area and the rerouted traffic is expected to make up only a fraction of the total vehicular volume entering those intersections.

Figure 5 displays Mid-Day and PM peak hour traffic volumes and associated traffic operations for the 2045 Proposed scenario. As shown on the figure, signalized traffic operations at the Omaha Street & Mount Rushmore Road would maintain the LOS anticipated in the no action scenario. At the Omaha Street & Fifth Street intersection, the LOS is anticipated to remain the same to the no action scenario; however, average delay would decrease significantly (a 6.5-second per vehicle decrease during Mid-Day and a 14-second per vehicle decrease during the PM peak hour). This improvement would result from the reduction of volume on the eastbound approach that has been rerouted due to the closure of the Sixth Street intersection. LOS worksheets for 2045 Proposed conditions are found in **Appendix D**.

Figure 5 - 2045 Proposed Traffic Conditions



Vehicle queues and v/c ratios were also evaluated at the study intersections in the 2045 Proposed conditions. As in the No Action scenario, the northbound left-turn movement at the Omaha Street & Mount Rushmore Road intersection would operate at LOS F, have a v/c ratio greater than 1.0, and have 95th percentile queues extending beyond the nearby railroad tracks during both Mid-Day and PM peak hours. The northbound approach of the Omaha Street & Fifth Street intersection would only experience high v/c ratios and lengthy queues during the PM peak period. Since the Sixth Street intersection would be removed, eastbound queues would no longer present operational concerns.

Traffic analyses of the study intersections demonstrate that, while some substandard movements and intersections are found during peak hours, actions taken to remove and reconfigure the current Sixth Street at-grade pedestrian crossing would not degrade the quality of traffic flow.

5.0 Rapid Transit System

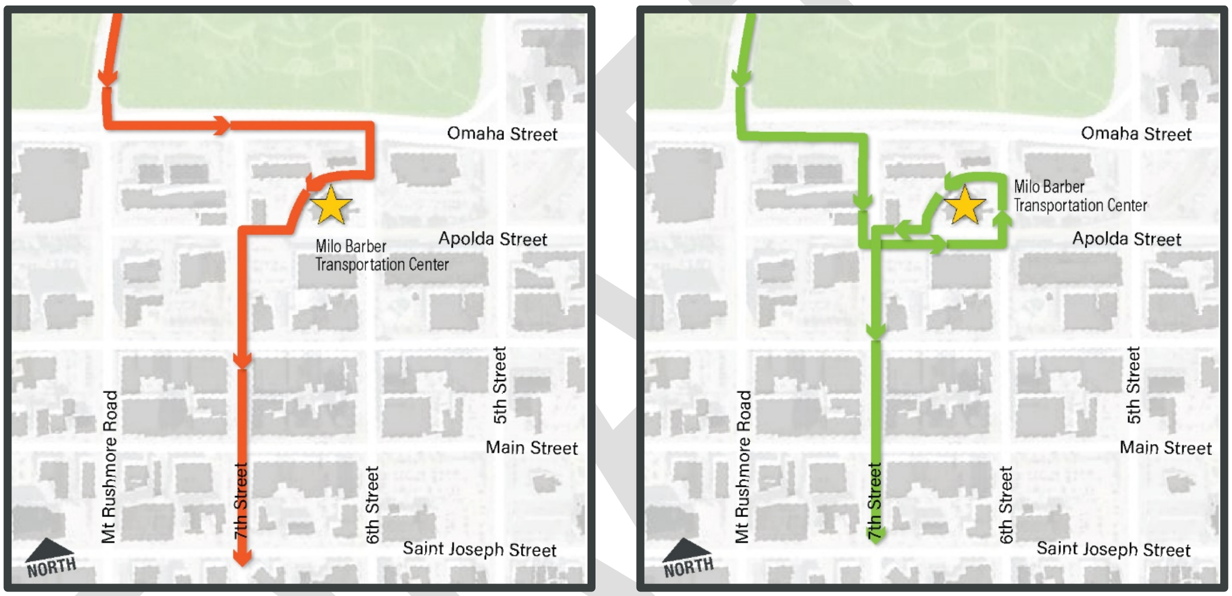
The third major component of this feasibility study was to identify potential transit route modifications and assess the effects. The Milo Barber Transportation Center (MBTC), Rapid City's central public transportation hub, is located in the southwest corner of the Sixth & Omaha intersection. All twelve of RapidRide's fixed bus patterns – two for each of the City's six named routes (Coolidge North & South, Jefferson Northeast & Southeast, etc.) – begin and end their runs at MBTC, resulting in over fifty bus trips in and out every day. Four of these patterns currently utilize the intersection of Sixth and Omaha – Coolidge North, Coolidge South, and Roosevelt Southeast all turn right from Omaha to Sixth in order to access MBTC, and Lincoln North turns right from Sixth to Omaha after leaving MBTC. Removal and reconfiguration of the at-grade crossing at Sixth & Omaha would require rerouting these four bus patterns away from that intersection, which introduces potential cost and schedule implications.

RapidRide system schedules and turn-by-turn route profiles were reviewed to understand how both individual routes and the system as a whole operate. The six routes operate in a pulse system – they all arrive at and depart from MBTC at the same times throughout the date to facilitate transfers. Buses operating the Coolidge, Jefferson, and Roosevelt routes all utilize the southeast side of the MBTC depot island while those operating the Borglum, Lincoln, and Washington routes utilize the northwest side; maintaining this same division is preferred to minimize the number of routes impacted by realignment away from Sixth and Omaha. The unique configuration of the depot at MBTC also makes the alley off of Sixth Street important to retain for transit functionality purposes, so any designs for the potential grade-separation will need to accommodate that access.

5.1 Coolidge North

Buses operating the Coolidge North route pattern currently access MBTC through the alley off of Sixth Street (stopping on the southeast side of the depot island) after turning right from Omaha Street, and then continue south on Seventh Street to operate the Coolidge South route pattern. The proposed route modification starting from Mt. Rushmore Road, shown below, is: ***Left on Omaha Street, Right on Seventh Street, Left on Apolda Street, Left on Sixth Street, Left into MBTC***. This routing would keep the Coolidge buses on the southeast side of the depot island and have negligible impacts on scheduling.

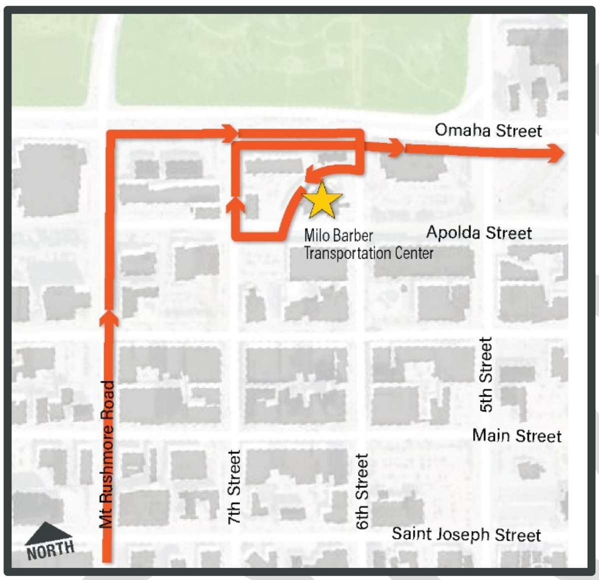
Figure 6 - Coolidge North Route Modification

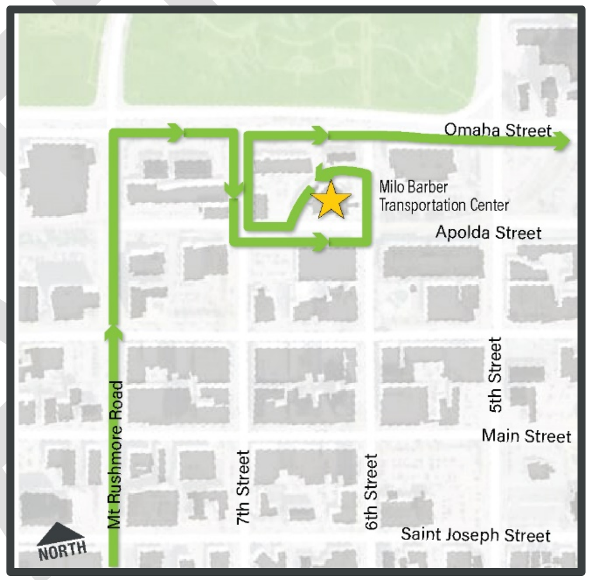


5.2 *Coolidge South*

Buses operating the Coolidge South route pattern currently access MBTC through the alley off of Sixth Street (stopping on the southeast side of the depot island) after turning right from Omaha Street, and then continue east on Seventh Street to operate the Coolidge North route pattern. The proposed route modification starting from Mt. Rushmore Road, shown below, is: ***Right on Omaha Street, Right on Seventh Street, Left on Apolda Street, Left on Sixth Street, Left into MBTC***. This routing would keep the Coolidge buses on the southeast side of the depot island and have negligible impacts on scheduling.

Figure 7 - Coolidge South Route Modification

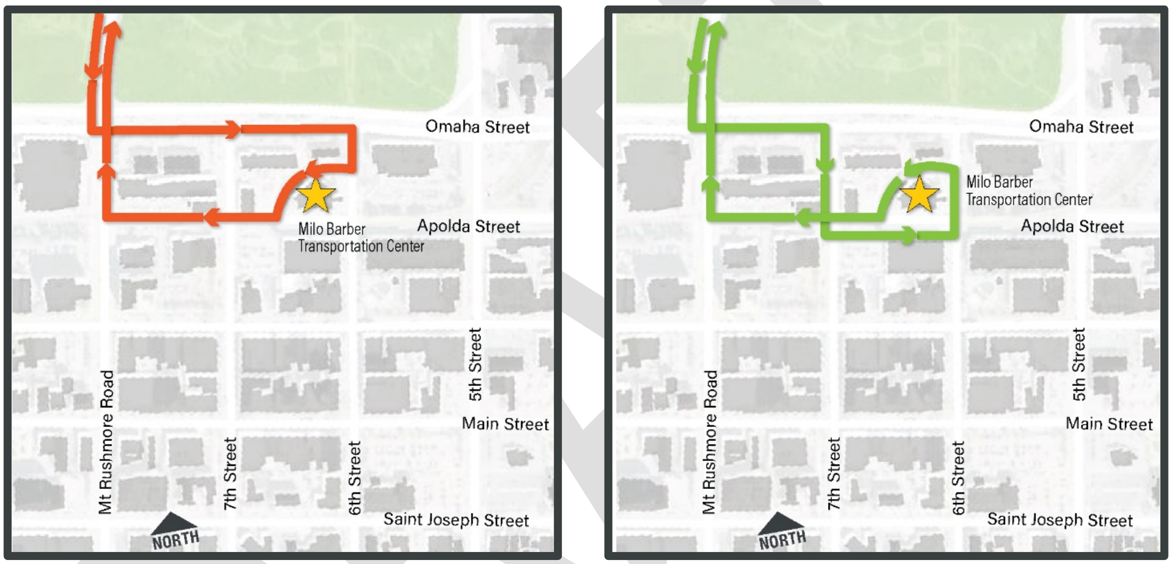




5.3 Roosevelt Southeast

Buses operating the Roosevelt Southeast route pattern currently access MBTC through the alley off of Sixth Street (stopping on the southeast side of the depot island) after turning right from Omaha Street, and then continue north on Mt. Rushmore Road to operate the Roosevelt Northeast route pattern. The proposed route modification starting from Mt. Rushmore Road, shown below, is: ***Left on Omaha Street, Right on Seventh Street, Left on Apolda Street, Left on Sixth Street, Left into MBTC***. This routing would keep the Roosevelt buses on the southeast side of the depot island and have negligible impacts on scheduling.

Figure 8 – Roosevelt Southeast Route Modification



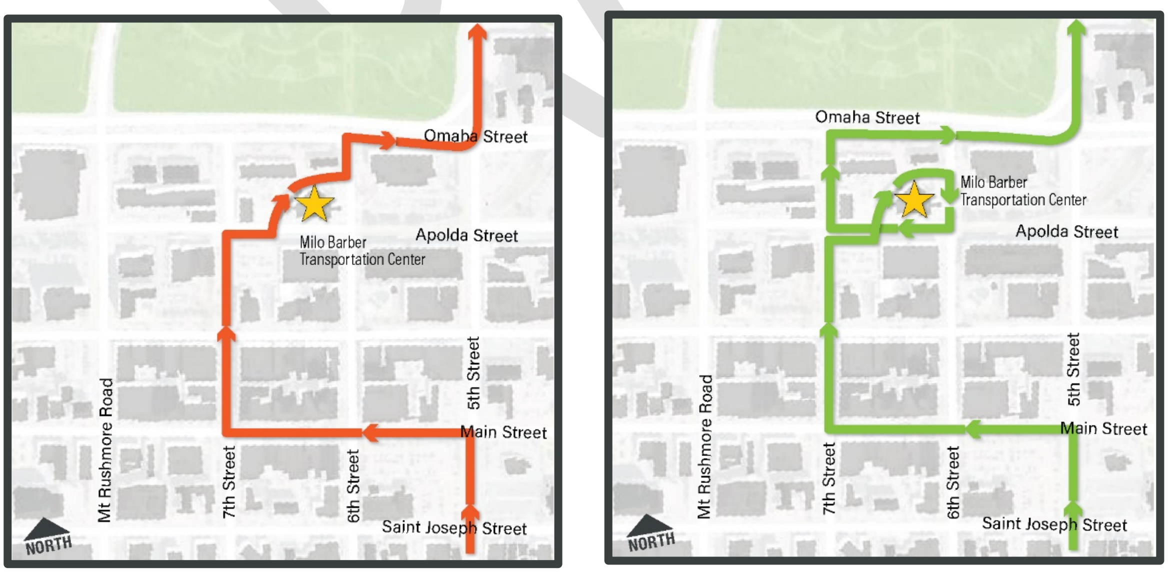
5.4 Lincoln North

Buses operating the Lincoln North route pattern currently access MBTC from Apolda Street (stopping on the northwest side of the depot island), and then turn right from Sixth Street onto Omaha Street to operate the Roosevelt Northeast route pattern. The proposed route modification starting from MBTC, shown below, is: ***Right on Sixth Street, Right on Apolda Street, Right on Seventh Street, Right on Omaha Street***.

The adjustment to Lincoln North has larger implications for scheduling than the other three because it affects the beginning – rather than the end – of the route pattern. To assess the magnitude of the schedule impact, two test-runs of the modified route were made. On average the modified Lincoln North route pattern took two minutes longer to complete than the existing pattern; this is enough of an increase to require updating schedule brochures and signs at MBTC and each stop for the Lincoln North and Lincoln South route patterns.

The Lincoln North and Lincoln South route patterns have 20 and 45 existing stops, respectively, where new signage would be needed. Several new signs at MBTC for the Lincoln route would be needed as well, and extra signs should be planned for in order to replace those that become damaged over time, so RapidRide should expect to need 80 new Lincoln signs with the route adjustment. Based on historical construction cost data from SDDOT (and including a contingency), replacing a road sign such as those RapidRide uses costs approximately $100. Brochure orders for RapidRide have typically cost between $3,000 and $5,000. In total, RapidRide should plan to budget for $13,000 in signage and brochure replacement expenses for this route adjustment once a definitive timeline for the reconfiguration of Sixth & Omaha is known.

Figure 9 – Lincoln North Route Modification



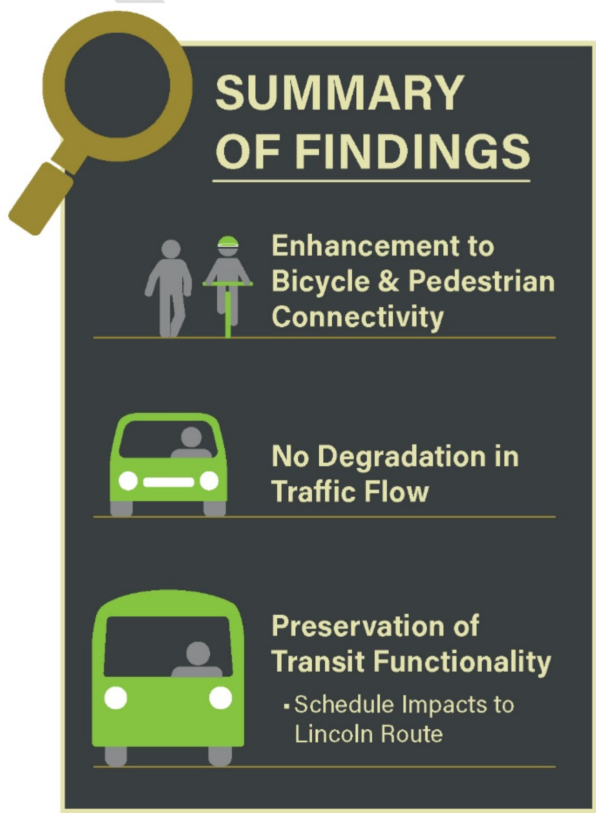
6.0 Conclusion and Next Steps

Sixth Street is a vital corridor for supporting active mobility through downtown Rapid City. Close proximity to many key destinations, connectivity to Memorial Park and numerous other bike/ped facilities, and much lower motor vehicle traffic than other north-south oriented streets in the area are all reasons why Sixth Street is so important for bicyclists and pedestrians. The same goes for the Sixth & Omaha intersection – it is the optimal place for crossing Omaha Street on foot. However, the existing at-grade crossing has a number of safety, comfort, and convenience issues and also presents problems for maintaining efficient traffic flow along Omaha Street.

This feasibility study was conducted in order to assess the potential impacts of removing and reconfiguring the existing at-grade pedestrian crossing at Sixth & Omaha on all modes of transportation. Bicyclists, pedestrians, buses, and cars all utilize that intersection today, and potential grade-separation would require all of them to adjust their travel patterns. The most potentially consequential ramification would be the inability of motor vehicles to make right turns between Sixth Street and Omaha Street, so ensuring traffic and transit operations can still be maintained through alternate routes is critical. Bicyclists and pedestrians would also have to adapt to a new way of crossing Omaha Street.

Summary of Findings

For active users, the potential grade separation presents a substantial opportunity for enhanced safety and comfort. While there is a dedicated pedestrian signal at Sixth & Omaha today, there is a history of crashes at the crossing and the environment is not comfortable for most people; the at-grade nature also contributes to a disconnect between the downtown and Memorial Park sides of Omaha Street. As long as the grade separation is accessible for people of all ages and abilities (a critical consideration during future design phases), it would be a marked improvement over the current condition. Conditions for biking and walking along the rest of Sixth Street were assessed for this study as well. While generally a comfortable active facility, there is room for improvement – some intersections are lacking treatments which facilitate safe crossings, the angled parking presents a visibility concern for on-street bicyclists, and amenities and landscaping are sparse along the south end of the corridor.



Reconfiguration of the at-grade pedestrian crossing would close the Sixth & Omaha intersection to motor vehicle traffic, requiring drivers who currently use that intersection for accessing Omaha Street or downtown to find alternate routes. Traffic congestion is already a concern along Omaha Street today, with the Fifth & Omaha intersection operating at a level of service below Rapid City's standards and experiencing queues that back up to the Sixth & Omaha intersection – reinforcing the temporary designation of the existing pedestrian crossing. Traffic operations at Fifth & Omaha are expected to decline further by 2045 with no changes to the street network. With Sixth & Omaha closed to motor vehicles, operations are anticipated to improve at Fifth & Omaha by 2045, with the expected level of service during mid-day hours even higher than what is currently experienced – a result of an expected reduction in eastbound traffic volumes on Omaha Street. Other streets through and surrounding downtown including Seventh Street, Apolda Street, and Mt. Rushmore Road provide practical and convenient alternatives to Sixth Street for driving. The City Hall access off of Sixth Street would continue to be functional with the potential grade separation.

The closure of Sixth & Omaha to motor vehicle traffic would also impact RapidRide operations, as four of the City's twelve fixed-route bus patterns currently utilize that intersection to either access or depart from the Milo Barber Transportation Center. RapidRide's pulse system requires a high degree of coordination between all routes and even minor routing changes could have wide-ranging implications for transit operations if scheduling is affected. The three patterns that currently turn right from Omaha Street to Sixth Street – Coolidge North, Coolidge South, Roosevelt Northeast – would instead have to turn right onto Seventh Street to access MBTC, a modification that would not significantly impact scheduling. Proposed modifications to the Lincoln North route pattern would have enough of an impact on scheduling to necessitate new schedule brochures and bus stop signage – RapidRide will need to plan for this expense once a definitive timeline for reconfiguration of the Sixth & Omaha crossing is known.

Next Steps

The Sixth & Omaha Crossing Feasibility Study is a critical first step in reconfiguring the at-grade pedestrian crossing of Omaha Street to improve safety and mobility, potentially with a grade-separated crossing. By demonstrating that, from a transportation perspective, closing the Sixth & Omaha intersection to motor vehicle traffic is feasible, this study sets the stage for funding pursuits, detailed engineering analysis and design, and ultimately, construction.

In addition to the transportation feasibility of the reconfiguration (this study's focus), an engineering feasibility assessment of providing grade separation is another critical step in moving the project forward. The South Dakota Department of Transportation previously developed a series of conceptual profiles showing a lowering of Omaha Street and a raising of Sixth Street to demonstrate that the required clearance for a highway overpass could be achieved at the proposed crossing location, but more much detailed analysis will be necessary moving forward. Key engineering challenges to address will include potential drainage issues given the close proximity of Rapid Creek, accessibility standards for the crossing, and circulation for buses and other motor vehicles to MBTC and the adjacent alleyway.

Funding has not yet been identified for design and construction of the potential grade-separation, but there are several sources to consider. The project could be a promising candidate for a federal Better Utilizing Investments to Leverage Development (BUILD) grant. BUILD grants are awarded to significant and innovative multi-modal, multi-jurisdictional infrastructure projects. The Transportation Alternatives Program (TAP) and general funds are other potential funding sources for the project. Existing planning documents which support the proposed project are looked at favorably in competitive grant applications.