Sheridan Lake Road Extension Study

West Main Street to Omaha Street & Deadwood Avenue

Rapid City, South Dakota

November, 2008

Prepared for:

City of Rapid City

Metropolitan Planning Organization

Growth Management Office

300 Sixth Street

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in cooperation with

South Dakota Department of Transportation

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Table of Contents

List of Tables

List of Figures

1.0 Introduction

Congestion on the Mountain View Road commercial corridor and the lack of accessible routes through "The Gap" to the downtown area led to the Jackson Boulevard Extension Corridor Analysis conducted in 2004. Two large hills in Rapid City serve as physical barriers that restrict east-west traffic flow on the west side of town. The narrow corridor between those two hills is commonly referred to as "The Gap" where West Main and Omaha Streets carry high amounts of traffic. The Jackson Boulevard Extension Corridor Analysis Report[1] found that the cost and Right-of-Way requirements of extending the roadway, from W. Main Street to W. Omaha Street, exceeded the benefit that would result from the extension. A recommendation from this report was to study the feasibility of extending Sheridan Lake Road from West Main Street north to W. Omaha and/or Deadwood Avenue.

The City of Rapid City, in joint effort with the Rapid City Area Metropolitan Planning Organization (MPO) and the South Dakota Department of Transportation (SDDOT), are moving forward with examining a Sheridan Lake Road extension to mitigate the traffic congestion caused by growth in the southwest side of town and the lack of accessible routes through "The Gap" and to the interstate system.

This Study will assess the viability of extending Sheridan Lake Road from W. Main Street to Deadwood Avenue. The assessment will be conducted through traffic analysis, development of alternative route alignments, impact assessments to public and private entities (such as businesses, residences, utilities, etc.), and project construction cost estimates.

This Study involves two components; (1) development of alternate alignments for the extension of Sheridan Lake Road; (2) evaluation of the existing road network from Jackson Boulevard to W. Main Street. Each of these components presents several unique challenges and the issues or complexities regarding the roadway extension include:

- Analyzing the traffic impacts and benefits of adding a Sheridan Lake Road extension to the existing road network.
- Traversing the steep topography between West Rapid Street and West Chicago Street and providing a crossing of the DM&E rail line while meeting vertical sight distance criteria and minimizing construction costs.
- Providing an at-grade intersection at West Chicago Street with a design that allows proper turning lane storage lengths at the intersection, while providing adequate separation distance from the existing bridge and adjacent intersections.
- Extending Sheridan Lake Road to Deadwood Avenue while minimizing land-use and utility impacts that would drive up the cost of the project.
- Increasing vehicle capacity along Sheridan Lake Road from Jackson Boulevard to W. Main Street.

The overall goal of this project is to identify all feasible alternatives of an extension of Sheridan Lake Road and analyze the benefits of those alternatives compared to their costs and impacts.

1.1. Study Scope and Objective

This feasibility study was established to analyze, determine, and/or evaluate the following:

- Sheridan Lake Road extension
  - Develop preliminary horizontal and vertical alignments
  - Determine Utility adjustments

[1] Jackson Boulevard Extension Corridor Analysis Report, Felsburg Holt & Ullevig and TSP, February 2004.

  - Determine approximate ROW impacts/requirements
- Other Roadways
  - Determine needed improvements of other study area intersections
  - Determine needed ROW for those improvements
- Traffic Analysis
  - Develop a preliminary traffic study to estimate the level of usage of a proposed Sheridan Lake Road extension
  - Investigate the conformity of the project with state and city transportation master plans
- Environmental Analysis
  - Perform an environmental investigation to determine the permits needed and the environmental constraints that exist within the study area
- Cost Estimate
  - Develop a construction cost estimate for each component of the project

The objective of this study is to provide an informative report containing an engineering analysis and a cost estimate that will enable others to determine whether the project is needed and can be funded, designed, and constructed.

1.2. Study Process

The process followed when performing the Study was:

- Document the existing traffic conditions of Sheridan Lake Road and other area streets;
- Develop traffic forecasts for the Study Area;
- Evaluate the future (Year 2030) baseline operation (No-Build option);
- Identify and evaluate options for improving traffic operations;
- Develop and analyze extension options; and
- Make recommendations for the Rapid City MPO and present them in a study report.

The schedule for the Sheridan Lake Road Corridor and Traffic Study extends from January, 2007 through May, 2008. A project kick-off meeting was held on January 11, 2007 to introduce the project team participants including team members from the City of Rapid City, South Dakota Department of Transportation (SDDOT), Federal Highway Administration (FHWA), and HDR. The Steering Committee held meetings at strategic times throughout the study process. Following is a summary of the Steering Committee and public involvement meetings:

- Steering Committee Meeting #1 (July 26, 2007); Purpose of the meeting was to discuss the traffic study, roadway network improvement options, and Sheridan Lake Road extension options.
- Rapid City Area Metropolitan Planning Organization (September 18, 2007): Project progress including Sheridan Lake Road widening and extension options was presented.
- Public Open House (September 18, 2007): The public open house was held to introduce the project to the public and to solicit public input on extension and widening options developed.
- Steering Committee Meeting #2 (November 20, 2007): Further discuss and ultimately reduce the number of options to carry forward.
- Steering Committee Meeting #3 (March 5th, 2008): Finalize improvement options and reach an agreement as the feasibility of extending Sheridan Lake Road.
- Public Open House (March 19, 2008): Update the public on the progress of the study with displays of the feasibly preferred improvement options.

1.3. Location of Project

The study area is located in west central Rapid City and consists of Sheridan Lake Road from Jackson Boulevard to W. Main Street as well as the study extension of Sheridan Lake Road to W. Chicago Street

and Deadwood Avenue. In addition to the Sheridan Lake Road corridor, several intersections are identified as possibly needing capacity improvements based on existing and project traffic volumes. The study intersections include:

- Sheridan Lake Road/Jackson Boulevard;
- Sheridan Lake Road/Canyon Lake Road;
- Sheridan Lake Road/W. Main Street;
- Sheridan Lake Road/Deadwood Avenue;
- Mountain View Road/Jackson Boulevard;
- Mountain View Road/Canyon Lake road;
- Mountain View Road/W. Main Street;
- Mountain View Road/Omaha Street;
- Jackson Boulevard/W. Main Street;
- W. Main Street/Sturgis Road;
- W. Chicago Street/Sturgis Road;
- W. Chicago Street/St. Onge Street; and
- Omaha Street/Deadwood Avenue.

An area map showing the location of the study area is shown in Figure 1.1.

Figure 1.1 – Study Area

= STUDY AREA

1.4. General Characteristics of Study Area

Sheridan Lake Road, which extends from highway 385 and serves several large residential neigborhoods southwest of Rapid City, is classified as a Principal Arterial from south of the Study Area to Jackson Boulevard. From Jackson Boulevard to W. Main Street, Sheridan Lake Road is classified as a Minor Arterial. The land adjacent to Sheridan Lake Road within the city limits of Rapid City is primarily developed consisting of multiple land uses. Land uses within the Study area consists of a tourist attraction (Story Book Island) and residences toward the south end of the area, city parks/baseball fields through the middle section of the area, and office/commercial including Camp Rapid National Guard Base between Canyon Lake Drive and West Main Street. Land north of W. Main Street consists of residential, commercial and light industrial. Sheridan Lake Road serves a variety of transportation uses and needs, providing commuter route by auto, bicycle, transit and foot.

1.5. Roadway Characteristics

The existing local roadway system within the study area is made up of collectors, minor arterials (Canyon Lake Drive and Sheridan Lake Road), and principal arterials (Jackson Boulevard, W. Main Street, W. Chicago Street, and Deadwood Avenue).

A brief description of existing roadways within the Study Area is provided in the following paragraphs and their roadway classifications are shown in Figure 1.2.

1.5.1. Sheridan Lake Road

Sheridan Lake Road is a two-lane roadway through a majority of the Study Area with widening occurring at intersections to accommodate turning lanes. Sheridan Lake Road is classified as a Principal Arterial south of the Study Area and a Minor Arterial within the Study Area.

1.5.2. Jackson Boulevard (State Highway 44)

Jackson Boulevard begins at US385 and travels primarily in an east/west direction. Within the City limits, Jackson Boulevard intersects with Sheridan Lake Road at the south end of the Study Area and continues to travel in a northeasterly/southwesterly direction to the east of Sheridan Lake Road ultimately intersecting with W. Main Street approximately 1-mile east of the Sheridan Lake Road/W. Main Street intersection. Jackson Boulevard consists of two lanes in each direction with a center two-way-left-turn-lane.

Development along Jackson Boulevard consists of a mixture of commercial and residential areas becoming primarily commercial east of Sheridan Lake Road. Jackson Boulevard is classified as a Principal Arterial within the Study Area.

1.5.3. West Main Street

W. Main Street is an east/west route beginning at Park Drive intersecting with Sturgis Road between Park Drive and Sheridan Lake Road. W. Main Street continues to travel east into downtown where the eastbound and westbound traffic splits between St. Joseph Street (westbound) and W. Main Street (eastbound). The directional streets join again east of downtown and W. Main Street continues east terminating at South Dakota Highway 79. Within the Study Area, W. Main Street consists of a five-lane section.

W. Main Street is classified as a Principal Arterial within the study area.

1.5.4. West Chicago Street (Business Loop 90/SD Route 23)

W. Chicago Street is an east/west route that carries commuters from west of the city via Nemo Road changing to South Canyon Road within the city limits. South Canyon Road intersects with W. Chicago Street approximately 1.5 miles west of Sheridan Lake Road and continues east through downtown and eventually east of Rapid City. W. Chicago Street becomes SD Highway 44/Omaha Street at the

intersection with Mountain View Road. W. Chicago Street is a 5-lane section within the study area, however the SDDOT does have included in their Long Range Transportation Plan to improve W. Chicago Street to a 6-lane roadway from Deadwood Avenue east.

According to the City of Rapid City Major Street Plan, W. Chicago Street is classified as a Principal Arterial within the study area.

1.5.5. Deadwood Avenue (State Highway 445)

Deadwood Avenue begins at Interstate 90 (I-90) Exit 55 in northwestern Rapid City. Deadwood Avenue does continue to the north of I-90 and exists as an unpaved county road to the Pennington County line. From the interchange, Deadwood Avenue travels south until intersecting with W. Chicago Street to the east of Sheridan Lake Road extended and consists of a 5-lane section within the study area.

According to the City of Rapid City Major Street Plan, Deadwood Avenue is classified as a Principal Arterial within the study area.

1.5.6. Canyon Lake Drive

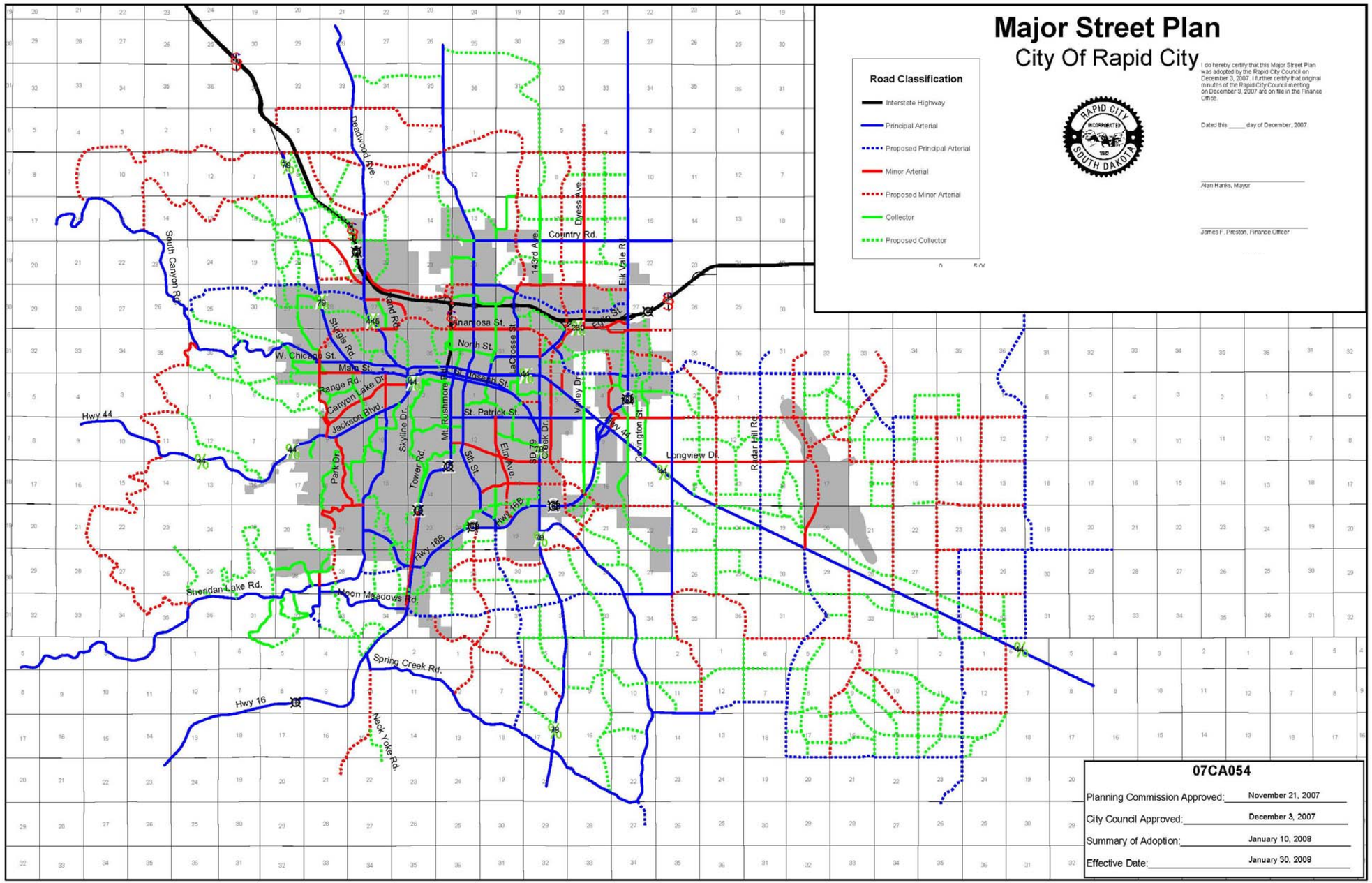
Canyon Lake Drive is classified as a Minor Arterial within the Study Area and begins at Jackson Boulevard (SD 44) west of Sheridan Lake Road, intersecting with Sheridan Lake Road approximately 1/4-mile south of W. Main Street, and continuing east to Mountain View Road approximately 1/2–mile east of Sheridan Lake Road. Development along Canyon Lake Road consists primarily of residential west of Sheridan Lake Road and commercial between Sheridan Lake Road and Mountain View Road. Canyon Lake Drive is a 2-lane section for a majority of the roadway with widening at intersections to accommodate a left turn lane.

According to the City of Rapid City Major Street Plan, Canyon Lake Drive is classified as a Minor Arterial within the study area.

1.5.7. Sturgis Road (State Highway 231)

Sturgis Road is classified as an arterial road and carries traffic from the west side of Rapid City to several neighboring communities to the north and west of the city such as Blackhawk and Sommerset. Sturgis Road is a five-lane roadway through the W. Chicago signalized intersection and then tapers down to a two-lane rural section between W. Chicago and Interstate 90 at Exit 51. Heavy industrial land use and mining is prevalent on the west side of Rapid City with scattered commercial development further west near Blackhawk.

Figure 1.2 – Major Street Plan



1.6. Transit Service

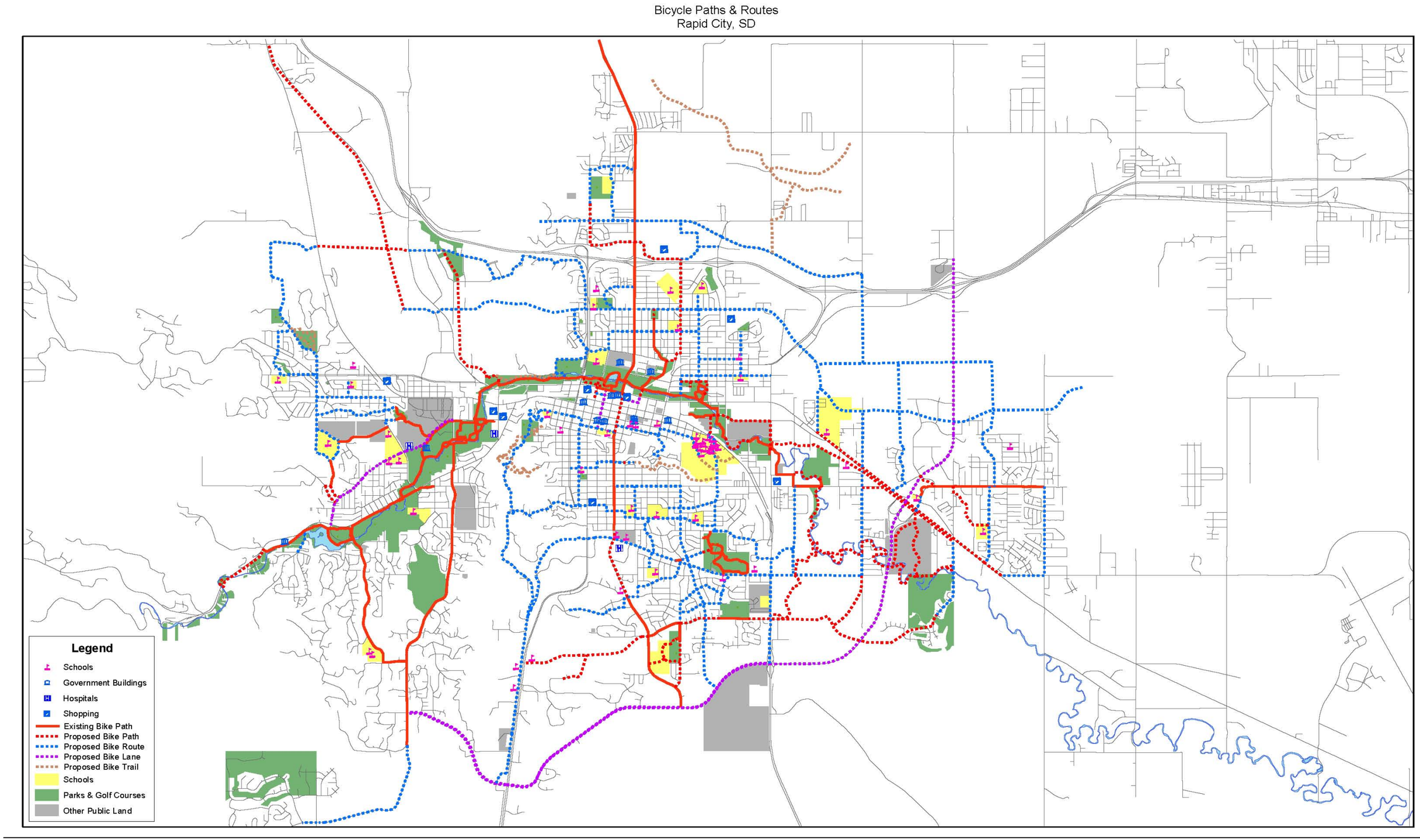
Transit service is provided along portions of the roadways within the study area. Route 4A serves this area of the City running along Jackson Blvd. from W. Main Street to Canyon Lake Drive. Route 4A runs from the west along W. Main Street, turns south on Sheridan Lake Road, turns east on Canyon Lake Drive, turns north on Mountain View Drive, then east again on W. Main Street. There are currently no signed bus stops along the route within the study area.

1.7. Pedestrian Travel

Pedestrian travelers along Sheridan Lake Road use primarily sidewalks along the corridor. The sidewalks are located adjacent to the roadway with the exception of the area along Story Book Island where the sidewalk is located between the parking lot and Story Book Island. Sidewalks exist along both sides of Sheridan Lake Road from Jackson Boulevard to Canyon Lake Drive and along the west side of Sheridan Lake Road from Canyon Lake Drive north to W. Main Street. Marked crosswalks along Sheridan Lake Road exist at Jackson Boulevard, south and north side of Rapid Creek, entrance to the ball fields, Canyon Lake Drive, and W. Main Street. The crosswalk located just north of Rapid Creek is used as pedestrian recreation for walkers and joggers, as well as a link between the parks located on either side of Sheridan Lake Road.

Sheridan Lake Road is on the City's bike route extending from south of the study area along Sheridan Lake Road to a bike path paralleling Rapid Creek. The bike route then travels east and west along Rapid Creek. (See Figure 1.3)

Figure 1.3 – Rapid City Recreational Path Map



1.8. Safety/Crash History

As a supplement to the traffic study, a review of the crash history within the Study Area was performed. The goal of the crash study was to identify areas of concern and determine if there is a correlation between poorly operating intersections and a higher-than-normal crash history.

The City of Rapid City uses Crash Magic software which is a database of crash history and is continuously updated by the City. When conducting a query at an intersection, a screen shot of the intersection will be displayed showing the crashes with easy access to the incident report.

For this study, four intersections and up to 100' in each direction from the intersection were queried. The intersections reviewed include:

- Sheridan Lake Road/ W. Main Street
- Sheridan Lake Road/Jackson Boulevard
- Sheridan Lake Road/Canyon Lake Road
- W. Chicago Street/Deadwood Avenue

The query covered the years of 2004, 2005, and a portion of 2006 (through May, 2006). Appendix D contains a list of the crashes at the above referenced intersections for the identified years along with a summarized incident report for approximately half the crashes that occurred.

When reviewing the incident reports, key areas stand out and include:

- U-Haul entrance along Deadwood Avenue: vehicles entering Deadwood Avenue are struck by vehicles traveling along Deadwood Avenue;
- Vehicles traveling on W. Chicago Street losing control due to excessive speeds; and
- Crashes at business driveways along W. Main Street east of Sheridan Lake Road: These crashes can be attributed to the close proximity of the driveways to intersections, steep grade of W. Main Street, and slippery pavement.

Following is a brief summary of the intersections reviewed:

Sheridan Lake Road/W. Main Street – The crashes queried reveal two potential concerns at this intersection: 1) east- and westbound rear-end crashes, and 2) driveway access crashes. Both of these types of crashes may be linked. A possible cause of the crashes can be attributed to drivers focusing their attention on vehicles darting out from driveways then suddenly encountering the back of the queue when they return their attention to the roadway. Likewise, entering drivers accelerating hard to fit into a small gap in the traffic may unexpectedly encounter the back of the queue.

There are a few indications (more recently) in the crash reports for the intersection that westbound drivers turning north are having difficulty seeing oncoming traffic. This might indicate that the grades on either side of the intersection are contributing to the crash rate.

At the time this report is written, the intersection is under construction to address some of the safety concerns.

Sheridan Lake Road/Jackson Boulevard – The primary trend for crashes at this intersection are rear-end crashes. This indicates that many of the drivers are distracted by a variety of things as they approach the intersection. Observation of the intersection reveals that longer than normal queuing is occurring at the intersection. These long queues can be unexpected for drivers not familiar with the area resulting in crashes.

Sheridan Lake Road/Canyon Lake Drive – There were too few crashes to establish trends, but collision reports reveal a potential concern of rear-end crashes. This intersection is adjacent to parks and may be attributed to younger, less experienced drivers leaving the park following baseball games and/or practice. Attention should be paid to this intersection in future reviews of crash statistics.

W. Chicago Street/Deadwood Avenue – Of the four intersections analyzed, this intersection produced the most crashes. Although a trend is difficult to determine, the primary crash at this intersection is again rear-end crashes in the eastbound and westbound directions. Reasons for the rear-end crashes can be most likely attributed to longer than expected queues and it appears that a number of the rear-end crashes can be attributed to a combination of weather and high speeds since the speed limit is higher to the west of this intersection as compared to intersections to the east. Considering the number of vehicles utilizing this road, current speeds may not give drivers adequate time to react to queues and potential conflicts in the roadway.

1.8.1. Recommendations

The following actions are recommended, based on examination of the crash data and site conditions:

Sheridan Lake Road/W. Main Street – An access management study should be conducted in the area with a goal of combining/removing driveways especially those closer to the intersection. Also, a project should be considered that would improve the sight distance along W. Main Street.

Sheridan Lake Road/Jackson Boulevard – An intersection improvement project should be planned at this intersection in order to improve intersection capacity in order to relieve existing and future peak hour congestion and queues.

Sheridan Lake Road/Canyon Lake Drive – An intersection improvement project should be planned at this intersection in order to improve intersection capacity in order to relieve existing and future peak hour congestion and queues.

W. Chicago Street/Deadwood Avenue – A design for the future reconstruction of W. Chicago Street/Omaha Street should include adequate intersection capacity to relieve peak hour congestion and queues.

2.0 Traffic Analysis

2.1. Introduction

In order to adequately identify impacts of an extension of Sheridan Lake Road, a traffic study along with traffic analysis was performed for the purpose of identifying existing and future traffic operational concerns and identifying the benefits an extension will provide. Traffic analysis plays an important role in the traffic planning process. The analysis is a tool that helps to identify intersections that allows for decision makers to predict the benefits of an extension of Sheridan Lake Road from W. Main Street to Deadwood Avenue. During the traffic study process, HDR prepared several memos in order to update the progress of the study and to document findings at key milestones of the project. The process followed for the traffic study was as follows:

1. Document existing conditions (Appendix A);
2. Document traffic operations under No-Build, extend to W. Chicago Street, and extend to Deadwood Avenue for years 2007 and 2030 (Appendix B); and

Observations of traffic volumes provide an understanding of the general nature of traffic, but are insufficient to indicate either the ability of the street network to carry additional traffic or the quality of service provided by the street system. For this reason the concept of *level of service* (LOS) was developed to correlate numerical traffic operational data to subjective descriptions of traffic performance.

Roadway LOS is a level of travelers' perceptions of the quality of service provided by a facility. Much like a student's report card, LOS is represented by the letters "A" through "F", with "A" generally representing the most favorable driving conditions and "F" representing the least favorable. LOS "C" has generally been established as the standard for planning of transportation facilities for peak hour traffic conditions. However, LOS "D" is often accepted in urbanized areas where the cost or impacts to provide LOS "C" are prohibitive.

During review and discussion of the 2030 conditions under all scenarios, concerns arose as to the results that were being documented. Upon further review, it was determined that several of the roadways within the Study Area were showing improvements that were not necessarily going to be made. Revisions were then made to the original traffic model and updated results were developed and documented. A memo was then prepared updating 2030 conditions for No-Build, extend to W. Chicago Street, and extend to Deadwood Avenue (Appendix C).

Due to tourism, the City of Rapid City has two traffic seasons that must be considered in addition to AM and PM peak periods. For this study, AM and PM peak hour volumes were developed for Peak Tourism Season and Off-Peak tourism season for the base year of 2007 and the designated projected year of 2003. Along with the roadway network analysis, 14 intersections were analyzed for existing and future conditions. The intersections included in the study are shown in Table 2.1.

Table 2.1. Study Intersections

Sheridan Lake Road/Jackson Boulevard
Sheridan Lake Road/Canyon Lake Road
Sheridan Lake Road/W. Main Street
Sheridan Lake Road/Deadwood Avenue
Mountain View Road/Jackson Boulevard
Mountain View Road/Canyon Lake Road
Mountain View Road/W. Main Street
Mountain View Road/Omaha Street
Jackson Boulevard/W. Main Street
W. Main Street/Sturgis Road
W. Chicago Street/Sturgis Road
W. Chicago Street/St. Onge Street
Omaha Street/Deadwood Avenue

The analysis for AM and PM peak hours under Peak and Off-Peak season volumes for 2007 and 2030 were performed under No-Build; extend Sheridan Lake Road to W. Chicago Street; and extend Sheridan Lake Road to Deadwood Avenue. The following sections provide an overview of what was discovered under each of the scenarios. During the study process, it was determined that the tourism season for the Rapid City area is considered to occur through most of the year less a few of the winter months. Due to this, the study concentrated on the effects/benefits of the extension options with the Peak Season volumes.

2.2. Operational Analysis

2.2.1. 2007 No-Build Conditions

For 2007 existing conditions, a few of the intersections do have operational concerns occurring under AM and PM conditions during both the Peak and Off-Peak tourism seasons. All of the signalized intersections within the Study Area do operate at LOS "C" or better, however a few of the un-signalized intersections operate at worse than LOS "C":

- W. Chicago Street/St. Onge
  - NB Approach – LOS 'F' and 'D' during the AM and PM peak hours, respectively; and
  - SB Approach – LOS 'F' during both peak hours.
- W. Main Street/Sheffer Road
  - SB Approach – LOS 'D' and 'F' during the AM and PM peak hours, respectively.

Unlike the intersections within the Study Area, the roadway network generally operates at unacceptable LOS. Following are roadway segments operating at LOS "D" or lower:

- Jackson Boulevard: Sheridan Lake Road to W. Main Street;
- W. Main Street: St. Onge east;
- W. Chicago Street: Deadwood Avenue east;
- Canyon Lake Drive: Sheridan Lake Road to Mountain View Road;
- Sheridan Lake Road: Canyon Lake Drive to W. Main Street; and
- Mountain View Road: W. Main Street to W. Chicago Street.

2.2.2. 2030 No-Build Conditions (Peak Season)

For 2030 No-Build conditions, all of the signalized intersections within the Study Area do operate at LOS "C" or better, however a few of the un-signalized intersections operate at worse than LOS "C":

- W. Chicago Street/St. Onge
  - NB Approach – LOS 'F' during both peak hours; and
  - SB Approach – LOS 'F' during both peak hours.
- W. Main Street/Sheffer Road
  - SB Approach – LOS 'E' during both the AM and PM peak hours.

Several roadway segments within the Study Area operate at LOS "D" or lower:

- Jackson Boulevard: all segments within the Study Area;
- W. Main Street: Sturgis Road east;
- W. Chicago Street: Deadwood Avenue east;
- Canyon Lake Drive: Sheridan Lake Road to Mountain View Road;
- Sheridan Lake Road: Canyon Lake Drive to W. Main Street;
- Mountain View Road: W. Main Street to W. Chicago Street; and
- Deadwood Avenue.

2.2.3. 2030 Extend to W. Chicago Street (Peak Season)

For 2030 extend Sheridan Lake Road to W. Chicago Street, all of the signalized intersections within the Study Area do operate at LOS "C" or better, however a few of the un-signalized intersections operate at worse than LOS "C":

- W. Chicago Street/St. Onge
  - NB Approach – LOS 'F' during both peak hours; and
  - SB Approach – LOS 'F' during both peak hours.
- W. Chicago Street/Sheffer Road
  - NB Approach – LOS 'D' during both peak hours.
- W. Main Street/Sheffer Road
  - SB Approach – LOS 'D' during the PM peak hour.

Several roadway segments within the Study Area operate at LOS "D" or lower[2]:

- Jackson Boulevard: all segments within the Study Area;
- W. Main Street: Sturgis Road east;
- W. Chicago Street: Sheridan Lake Road east;
- Deadwood Avenue;
- Mountain View Road: W. Main Street to W. Chicago Street; and
- Canyon Lake Drive: Sheridan Lake Road to Mountain View Road.

[2] Sheridan Lake Road LOS is based on a five-lane section from Jackson Boulevard to W. Chicago Street.

2.2.4. 2030 Extend to Deadwood Avenue (Peak Season)

For 2030 extend Sheridan Lake Road to Deadwood Avenue, all of the signalized intersections within the Study Area do operate at LOS "C" or better, however a few of the un-signalized intersections operate at worse than LOS "C":

- W. Chicago Street/St. Onge
  - NB Approach – LOS 'F' during both peak hours; and
  - SB Approach – LOS 'F' during both peak hours.
- W. Main Street/Sheffer Road
  - SB Approach – LOS 'D' during the PM peak hour.
- Sheridan Lake Road/Jackson Boulevard
  - LOS 'D' during the PM peak hour
- Sheridan Lake Road/Canyon Lake Drive
  - LOS 'D' during the PM peak hour

Several roadway segments within the Study Area operate at LOS "D" or lower[3]:

- Jackson Boulevard: all segments within the Study Area;
- W. Main Street: Sturgis Road east;
- W. Chicago Street: Sheridan Lake Road east; and
- Mountain View Road: W. Main Street to W. Chicago Street.

2.2.5. Signal Warrant Analyses

Traffic signal warrant analyses were performed utilizing Warrant 3 (Peak Hour Vehicular Volume Warrant) from the *2003 Manual on Uniform Traffic Control Devices (MUTCD)*. The analyses were performed for three intersections:

- W. Chicago Street/St. Onge (Currently un-signalized)
- W. Chicago Street/Sheridan Lake Road (New intersection under build conditions)
- Sheridan Lake Road/Deadwood Avenue (New intersection under build conditions)

The signal warrant analyses show that signals would be warranted at all three intersections in the Year 2030. Under the Year 2007 build conditions Sheridan Lake Road/Deadwood Avenue would warrant a signal. The signal warrant analyses are shown in Figures 3.1, 3.2, and 3.3 for W. Chicago Street/St. Onge, W. Chicago Street/Sheridan Lake Road, and Sheridan Lake Road/Deadwood Avenue, respectively.

2.3. Summary and Recommendations

Based on the traffic analysis in this project, an extension of Sheridan Lake Road from W. Main Street to Deadwood Avenue along with the widening of Sheridan Lake Road to a five-lane section between Jackson Boulevard to W. Main Street, would not significantly improve the traffic operation within the Study Area. Although the traffic volumes would decrease on several roadway segments, the amount of those decreases are not at a level that would considerably improve the overall traffic flow. Also, the volume reductions seen on the specific roadway segments were shown to simply transfer to other roadway segments in the study area that were already operating poorly.

Although the traffic modeling indicated the extension of Sheridan Lake Road would not significantly improve the existing and future operational concerns, discussions should continue as to how to alleviate

[3] Sheridan Lake Road LOS is based on a five-lane section from Jackson Boulevard to W. Chicago Street.

the traffic issues in "The Gap". The role that an extended Sheridan Lake Road would play is to balance the higher than capacity traffic volumes between the three routes of Jackson Boulevard, W. Main Street, and W. Chicago Street. A key problem is that each of these roadways are already experiencing traffic congestion, and thus the extension results did not indicate an acceptable future level of service. Based on a review of the traffic study results for this project, an additional east-west corridor would be needed in order to seriously alleviate the traffic congestion concerns on Jackson Boulevard, W. Main Street, and W. Chicago Street in the study area.

Improvements to the existing road network that should be considered include:

- Jackson Boulevard/Sheridan Lake Road Intersection
  - Provide dual left turn for the westbound to southbound movement;
- Jackson Boulevard/W. Main Street Intersection
  - Provide a free right-turn lane for the east/northbound to eastbound;
- Develop an Access Control Plan for Jackson Boulevard
- Develop an Access Control Plan for W. Main Street
- Widen Catron Boulevard
  - Although Catron Boulevard was not included in the Traffic Study conducted for this project, it is important that any plans to widen Catron Boulevard in the future should not be delayed. As traffic congestion increases in the "Gap", traffic will look for alternate routes and an improved Catron Boulevard corridor may become that route.

In addition to the identified recommended improvements, the City should also consider revisiting the traffic analysis of Sheridan Lake Road as redevelopment along Deadwood Avenue occurs. As the redevelopment occurs and Deadwood Avenue becomes more of a commuter destination, traffic pressures could increase within the "Gap" and an extension of Sheridan Lake Road would help to relieve the Deadwood Avenue destination pressures.

3.0 Roadway Analysis

3.1. Description of Existing Conditions

3.1.1. Sheridan Lake Road: Jackson Boulevard to W. Main Street

The section of Sheridan Lake Road between Jackson Boulevard to W. Main Street is an existing 2-lane road with widening at park entrances and the intersections to accommodate turning lanes. The existing ROW from Jackson Blvd north to Canyon Lake Drive is wide enough to accommodate additional lane recommendations that may result from this study. Sheridan Lake Road from Canyon Lake Drive north to W. Main Street consists of narrower ROW and key physical features (stone wall west side and office parking east side) that limit options available without impacting the existing features.

3.1.2. Sheridan Lake Road: W. Main Street to W. Chicago Street

Currently Sheridan Lake Road exists as a residential street from W. Main Street north for two blocks where the street dead-ends due to steep terrain as it drops off significantly to the north. Another physical feature that must be addressed in any extension option is the DM&E railroad line which bisects this segment. Also, there are businesses located along both W. Main Street and W. Chicago Street that must be considered as extension options are developed and discussed.

The typical section considered for this segment will consist of a 5-lane urban section both north and south of the railroad overpass with the road narrowing to 4-lanes across the overpass to save construction costs. Sidewalk will be installed along both sides of the roadway and will include a grass boulevard north and south of the overpass. The boulevard will be eliminated as the sidewalks cross the overpass, again to save on construction costs.

3.1.3. Sheridan Lake Road: W. Chicago Street to Deadwood Avenue

As depicted in Figure 9, the primary obstruction north of W. Chicago Street is the Black Hills Power property which consists of multiple above ground power lines along with a sub-station and above ground storage tanks. The land to the east of the Black Hills Power property consists of relatively flat terrain and is currently undeveloped.

The typical section for this segment will consist of a 5-lane urban section and depending on ROW costs and future development plans, a four-lane section may be considered through the middle portion of this segment. Sidewalk will be installed along both sides of the roadway with a grass boulevard between the street and sidewalk.

3.2. Extension Option Discussion

In order to determine if an extension of Sheridan Lake Road can be constructed and to verify that all possibilities were considered, multiple extension alignments/options were developed, analyzed, discussed, and presented. For this study, eight options were developed. Each option evaluated was included in a Relative Rankings Matrix (Table 4.1) and brought to the public for review and comment. Based on the comparison matrix findings along with consideration of public, City of Rapid City, SDDOT, and FHWA comments, the eight options were reduced to two along with the No-Build option. The two options (Options 3A, and 4) were evaluated further and a recommendation will be presented to the MPO committees for approval. In addition to Options 3A and 4, Option 3 is also carried forward since the alignment from W. Main Street to W. Chicago Street is the same and can be considered as a first phase of a widening project. The layouts for the three options can be found in Appendix E and have been renamed as Options A (old Option 3), B (old Option 3A), and C (Old Option 4).

Table 4.1 – Extension Options Relative Rankings										
Factor	Relative Weight	No-Build Opt.	Opt. 1	Opt. 1A	Opt. 2	Opt. 3	Opt. 3A	Opt. 4	Opt. 5	Opt. 6
Meets Project Goals	4	9	6	3	5	4	2	1	7	8
Project Costs	1	1	5	8	4	6	9	7	2	3
Environmental Impacts	3	1	2	9	3	4	5	6	7	8
Property Impacts	3	1	2	9	6	3	4	5	7	8
Traffic Flow/Connectivity	3	9	5	3	6	4	2	1	7	8
Safety	4	5	8	6	9	3	2	1	7	4
Weighted Average Ranking		5.00	4.89	5.94	5.83	3.72	3.22	2.83	6.72	6.83
Relative Rank		**5**	**4**	**7**	**6**	**3**	**2**	**1**	**8**	**9**

3.3. Identification of Preliminary Alignments

In determining potentially needed ROW to construct an extension of Sheridan Lake Road, eight build alternatives and a no-build alternative were evaluated. Following are descriptions for each of the extension options:

3.3.1. No-Build Option

A no-build alternative would maintain the current roadway network along Sheridan Lake Road with the existing links between W. Main Street, W. Chicago Street, and on to Deadwood Avenue at Sheffer Road or Mountain View Road. According to the MPO Long Range Transportation Plan, Jackson Boulevard is scheduled to be widened to a six- or seven-lane section from W. Main Street to Sheridan Lake Road to accommodate future traffic demands, thus requiring additional ROW. This long range plan will prove to be very difficult and expensive as there is currently very little room to widen Jackson Boulevard without severely impacting businesses along the roadway. The results of the traffic analysis indicate that there will be multiple locations within the existing roadway network that will operate at a substandard Level of Service (LOS) by year 2030.

3.3.2. Preliminary Build Alternatives

Each of the options itemized below were presented to City of Rapid City, FHWA and SDDOT in a "Brainstorming" meeting on July 26, 2007. The general design criteria used to develop the eight options were as follows:

- Provide reasonable extension of Sheridan Lake Road.
- Minimize impacts to businesses, residences, and land.
- Limit impacts to the railroad.
- Utilize acceptable design speeds for all roadways.

Embankment options for each of the extension options consist of using either 4:1 or 3:1 fill slopes or Large Panel MSE Retaining Walls. Another option consisting of 2:1 embankment slopes have not been

considered as the steeper slopes are difficult to maintain. The determination of what type of embankment to use with a preferred option will depend on the property impacted by the slopes. Undeveloped land will most likely be cheaper to acquire and thus 3:1 or even 4:1 slopes can be economically feasible. However, fills slopes require a large quantity of fill material which, in the case of this project may become very expensive. The use of large panel retaining walls will reduce the amount of fill material needed and reduce the amount of ROW needed to be acquired including impacts to buildings.

Based on the land use of the area between W. Main Street and W. Chicago Street, a combination of 3:1 embankment slopes and large panel retaining walls may be the best option. Although the embankment slopes should be evaluated in greater detail during final design, embankment recommendations for the Sheridan Lake Road extension are as follows:

- South of the railroad tracks:
    - 3:1 embankment slopes paralleling the roadway: Currently there are no businesses or residences between Rapid Street and the railroad tracks and therefore, the use of 3:1 embankment slopes will not require any buy-outs and/or relocations.
    - Large Panel MSE Retaining Walls parallel to the railroad tracks: Due to the expense of the overpass, use of retaining walls paralleling the railroad tracks will significantly shorten the overpass and as a result reduce the cost. The cost savings of the shorter bridge more than pays for the retaining walls.
- North of the railroad tracks
    - Large Panel MSE Retaining Walls along the roadway: Property north of the railroad tracks is developed and consists of small businesses and the use of fill slopes would require the acquisition and/or relocation of these businesses.
    - Large Panel MSE Retaining Walls parallel to the railroad tracks: Due to the expense of the overpass, use of retaining walls paralleling the railroad tracks will significantly shorten the overpass and as a result reduce the cost. The cost savings of the shorter bridge more than pays for the retaining walls.

3.3.2.1. Option 1

This option consists of extending Sheridan Lake Road straight north from the existing road north of W. Main Street. The extended Sheridan Lake Road ties into W. Chicago Street just east of the existing railroad overpass on W. Chicago Street. This option was developed to create the shortest route between W. Main Street and W. Chicago Street.

Benefits of this option include:

- Shortest alignment option resulting in least cost of options with an overpass.
- Least ROW impacts.

Drawbacks of this option include:

- Does not meet project goals. (Goal of project is to extend Sheridan Lake Road to Deadwood Avenue)
- Impacts existing power poles. (Existing utility line will be expensive to relocate.)
- Negatively impacts a business and would require business relocation with building acquisition.
- Creates an additional intersection along W. Chicago Street. (Less than desirable spacing between Sheffer and Sheridan Lake Road.
- Skew angle at overpass requires a longer and more expensive bridge.

3.3.2.2. Option 1A

Option 1A is the same as Option 1 between W. Main Street and W. Chicago Street. The difference with Option 1A is north of W. Chicago Street where Sheridan Lake Road is extended north through Black Hills Power property and intersects Deadwood Avenue. This alignment will travel through a substation, power lines, and underground utilities.

Benefits of this option include:

- Meets the goals of the study by extending Sheridan Lake Road through to Deadwood Avenue.
- Shortest alignment between W. Main Street and W. Chicago Street.
- Least amount of ROW acquisition required.

Drawbacks of this option include:

- Extensive costs due to major impacts to Black Hills Power property.
- Impacts to private utilities south of W. Chicago Street.
- Negatively impacts a business and would require business relocation with building acquisition.
- Creates an additional intersection along W. Chicago Street. (Less than desirable spacing between Sheffer and Sheridan Lake Road
- Skew angle at overpass requires a longer and more expensive bridge.

3.3.2.3. Option 2

Option 2 begins at the existing intersection of Sheridan Lake Road-north and W. Main Street and travels north to just south of Rapid Street where the alignment curves slightly east in order to avoid the private utility poles located between Rapid Street and the railroad tracks. The slight shift of the alignment to the east allows for a better separation between the intersection at W. Chicago Street and the overpass on W. Chicago Street which allows for a designated right turn lane for eastbound W. Chicago Street to southbound Sheridan Lake Road.

Benefits of this option include:

- No impacts to the power poles south of the railroad tracks.
- Alignment is only slightly longer than Option 1.
- Alignment shift allows for right turn lane for eastbound to southbound movement.
- Shorter bridge length than Option 1.

Drawbacks of this option include:

- Does not meet project goals of extending Sheridan Lake Road to Deadwood Avenue.
- Negatively impacts two businesses (1 north and 1 south of railroad tracks) and would require businesses to be relocated with the buildings to be acquired.
- Creates an additional intersection along W. Chicago Street which will slow traffic progression along W. Chicago Street.
- Severe skew angle of Sheridan Lake Road alignment with railroad requires a longer bridge.

3.3.2.4. Option 3 (Option A)

Option 3 begins at W. Main Street with an alignment shift of Sheridan Lake Road to the east in order for Sheridan Lake Road to be directly north of Sheridan Lake Road south of W. Main Street. This shift of Sheridan Lake Road negatively impacts the businesses located north of W. Main Street and east of Sheridan Lake Road. Just north of W. Main Street, the Sheridan Lake Road alignment curves to a northeasterly direction in order to cross the railroad tracks at nearly perpendicular angle. Sheridan Lake Road then curves north and intersects with W. Chicago Street at the existing location of Sheffer Street.

Note that with the tight constraints of the extension area, a few of the horizontal curves do not meet the 45 mile per hour (mph) standard for Rapid City Principal Arterial Streets. However, due to those constraints and the short distance between W. Main Street and W. Chicago Street, the slightly lower design speed of 35 mph for minor arterials was considered acceptable.

Benefits of this option include:

- Relocating the intersection of Sheridan Lake Road with W. Chicago Street to Sheffer Street, there will be no additional intersection along W. Chicago Street.
- Allows for a constructible and less expensive extension of Sheridan Lake Road to Deadwood Avenue.
- No impacts to existing power poles.
- Minimal ROW impacts
- Maximizes intersection (turn lane) options along W. Main Street.

Drawbacks of this option include:

- Increased business impacts. Requires purchase/relocation of businesses.
- Increased bridge length to allow for access road to business.
- Difficult access options for businesses adjacent to W. Chicago Street.

3.3.2.5. Option 3A (Option B)

Option 3A has the same alignment as Option 3 from W. Main Street north to W. Chicago Street. This option continues the Sheridan Lake Road extension north to Deadwood Avenue creating a "T" intersection approximately 1,000' from the Deadwood Avenue/W. Chicago Street intersection. The alignment of Sheridan Lake Road north of W. Chicago Street curves to the northeast and intersects Deadwood Avenue at a nearly perpendicular angle. With projected traffic volumes, the Sheridan Lake Road/Deadwood Avenue intersection will be signalized.

A concern with this option is the ability to develop the open land that is bordered by Sheridan Lake Road to the west and north, Deadwood Avenue to the north and east, and W. Chicago Street to the south. Goals of access management strive to maintain intersection spacing as close as possible to one-quarter mile. Due the locations of the proposed (Sheridan Lake Road/W. Chicago Street and Sheridan Lake Road/Deadwood Avenue) and existing (Deadwood Avenue/W. Chicago Street) intersections that are spaced at approximately 1000', it will be difficult to access any development without affecting traffic flow. This may place a limit on the type of development that can occur. An Access Control Plan will be vital in order to control the amount and type of traffic accessing the development.

Benefits of this option include:

- Meets goals of project – Sheridan Lake Road extension to Deadwood Avenue.
- Desirable Sheridan Lake Road extension location north of W. Chicago Street as the land is undeveloped.
- By placing the Sheridan Lake Road extension intersection at Sheffer Street, the need for an additional intersection on W. Chicago Street is eliminated.

- Reduces building/business impacts between the railroad tracks and W. Chicago Street.
- No impacts to existing power poles south of W. Chicago Street.
- Improved intersection configuration at W. Main Street.
- Cut-through traffic is eliminated on Sheffer Street.

Drawbacks of this option include:

- Difficult for development to occur in undeveloped land due to access spacing.
- Impacts to businesses/buildings directly north of W. Main Street.
- Increased bridge length to provide access to existing businesses.
- Increased ROW impacts.
- Difficult to provide access to businesses directly south of W. Chicago Street at Sheridan Lake Road.
- An additional signal installed along Deadwood Avenue (Sheridan Lake Road/Deadwood Avenue).

3.3.2.6. Option 4 (Option C)

Option 4 is similar to Option 3A. The alignment of Sheridan Lake Road from W. Main Street to W. Chicago Street is identical to Option 3A. The alignment north of W. Chicago Street is where the difference exists. The alignment of Sheridan Lake Road curves to the north and becomes tangent to Deadwood Avenue making Deadwood Avenue to Sheridan Lake Road a continuous movement. This option would eliminate the need for an additional intersection along Deadwood Avenue as is the case in Option 3A and possibly eliminate the need of a signal at the Deadwood Avenue/W. Chicago Street intersection. (A signal warrant study would have to be performed following construction to verify the ability to remove the signal.)

Another benefit of this option would be the ability to develop the open land with access to the property either from Deadwood Avenue/Sheridan Lake Road or W. Chicago Street. A concern, however with this alignment is the design speed of the horizontal curve where Sheridan Lake Road ties into Deadwood Avenue. This curve does not meet Rapid City design standards for a Principal Arterial requiring further discussions regarding minimum speeds that can be allowed for this curve.

Benefits of this Option include:

- Meets goals of project – Sheridan Lake Road extension to Deadwood Avenue.
- Desirable Sheridan Lake Road extension location north of W. Chicago Street as the land is undeveloped.
- By placing the Sheridan Lake Road extension intersection at Sheffer Street, the need for an additional intersection on W. Chicago Street is eliminated.
- Continuous movement for Deadwood Avenue to Sheridan Lake Road.
- Eliminates need for an additional signalized intersection on Deadwood Avenue.
- Ability to develop open land without sacrificing Control of Access goals.
- Reduces building/business impacts between the railroad tracks and W. Chicago Street.
- No impacts to existing power poles south of W. Chicago Street.
- Improved intersection configuration at W. Main Street.
- Cut-through traffic is eliminated on Sheffer Street.

Drawbacks of this option include:

- Impacts to businesses/buildings directly north of W. Main Street.
- Increased bridge length to provide access to existing businesses.
- Increased ROW impacts.

- Difficult to provide access to businesses directly south of W. Chicago Street at Sheridan Lake Road.
- Depending on development access location, an additional signal may be installed along Deadwood Avenue.
- Major intersection moved from W. Chicago Street/Deadwood Avenue to W. Chicago Street/Sheridan Lake Road.

3.3.2.7. Option 5

Option 5 extends Sheridan Lake Road to W. Chicago Street; however the alignment curves to the west to avoid crossing the DM&E and thereby eliminating the need for an expensive bridge and retaining walls. The extension follows the existing Sheridan Lake Road to Rapid Street and then curves to the northwest almost paralleling the tracks to Omaha Street where the alignment curves to the west following Omaha Street. Sheridan Lake Road then curves to the north just west of existing Sturgis Road and intersects with W. Chicago Street just west of the bridge carrying W. Chicago Street over the DM&E railroad. The alignment of this option does minimize impacts to existing businesses however the impacts are shifted to a residential area and would require the buy-out and relocation of residences in the neighborhood.

Sheridan Lake Road intersects with W. Chicago Street just west of the overpass carrying W. Chicago Street over the DM&E which creates sight distance concerns and a less than desirable intersection configuration. Due to the minimal distance between the intersection and the overpass, a deceleration/left turn lane would not be possible. This would create traffic slowing down in a through lane to make the left-hand turn. Also traffic on Sheridan Lake Road wishing to make a left turn onto W. Chicago Street will have limited sight distance due to the barriers along the bridge. Another concern with the location of the intersection is during the winter months and snow removal. Snow removal vehicles will be pushing the snow across the bridge as there is no room to place the snow along the barrier. The pushed snow will pile up across the Sheridan Lake Road intersection for along westbound W. Chicago Street.

Benefits of this option include:

- Cost savings by eliminating the bridge and associated retaining walls.
- Vertical alignment follows terrain, eliminating large embankment quantities.
- Improved intersection spacing along W. Chicago Street.
- Minimal business impacts.
- Portion of alignment travels through undeveloped land.

Drawbacks of this option include:

- Impacts to residential area requiring buy-out/relocation of homeowners.
- Increased environmental issues related to residential impacts.
- Extension of Sheridan Lake Road north from W. Chicago Street to Deadwood Avenue is not feasible due that it connects west of the tracks and there are significant barriers north of W. Chicago.
- Poor intersection location on W. Chicago Street with relation to the existing overpass.
- The shift of the alignment to the west may limit the number of users.
- Omaha Street dead-ends at Sheridan Lake Road and no longer has connection to Sturgis Street.

3.3.2.8. Option 6

Option 6 is very similar to Option 5; the only difference is the intersection of Sheridan Lake Road with W. Chicago Street shifted further west. The shift allows for a better separation between the intersection and the overpass to allow for a more preferred intersection configuration. The alignment of Sheridan Lake Road is the same until the point where Option 5 curves to the north to intersect with W. Chicago Street. At this location the Option 6 alignment continues west along Omaha Street and curves north to tie into W. Chicago Street at the approximate location of Whitewood Street extended.

The location of this intersection allows for a more preferred intersection configuration with deceleration/turn lanes for westbound to southbound traffic.

Benefits of this option include:

- Cost savings by eliminating the bridge and associated retaining walls.
- Vertical alignment follows terrain, eliminating large embankment quantities.
- Improved intersection spacing along W. Chicago Street.
- Minimal business impacts.
- Portion of alignment travels through undeveloped land.

Drawbacks of this option include:

- Impacts to residential area requiring buy-out/relocation of homeowners.
- Increased environmental issues related to residential impacts.
- Extension of Sheridan Lake Road north from W. Chicago Street to Deadwood Avenue is not feasible due that it connects west of the tracks and there are significant barriers north of W. Chicago.
- The shift of the alignment to the west may limit the number of users.

3.4. Determination of Options to Carry Forward

Each of the Preliminary Build Alternatives along with the No-Build Alternative was presented at a Public Open House on September 18, 2007. Comments from the Open House were evaluated and as a result options were eliminated from further review. The following sections describe recommendations for the options to carry forward for further evaluation.

3.4.1. No-Build Alternative

As pointed out in the previous section, traffic projections indicate that the current roadway network will have operational implications with a No-Build alternative. However, the No-Build option will provide a baseline for comparison of the Build Alternatives carried forward. **Therefore, this alternative is carried forward for further analysis.**

3.4.2. Build Alternatives

Following is discussion on the selection process of Sheridan Lake Road extension options to be carried forward for further analysis:

Eight original build alternatives were developed and evaluated with this project. Based on criteria developed, the extension options have been reduced to two. Options 3A & 4 have been chosen for further review and will be labeled as Options B and C on future layouts. As compared to the other alternatives in Table 4.1, these three options best meet the goals of this project by extending Sheridan Lake Road, minimize the impacts to adjacent land, and improve intersection spacing along W. Chicago Street.

Key features of Option B (Old Option 3A) include:

1. Meets project goals;
2. Extension of Sheridan Lake Road from W. Chicago Street to Deadwood Avenue through undeveloped land; and
3. Minimal impacts to businesses.

Key features of Option C (Old Option 4) include:

1. Geometrics provide desired functionality by making Deadwood to Sheridan Lake Road a continuous movement;
2. Meets project goals; and
3. Improves traffic flow by limiting the number of major intersections.

Therefore, Options B and C (Options 3A and 4) were carried forward for analysis.

While each alternative was specifically designed in an attempt to meet the project goals, usually only one or two drawbacks made them prohibitive to construct. While Options 1, 1A, & 2 met a portion of the project goals, extending these options north to Deadwood would not be feasible. Option 3 (Option A) follows the same alignment as the preferred options and could be considered a first phase of construction if funding does not allow for the entire project to be constructed at once. Options 5 & 6 poses environmental concerns by traveling through a residential neighborhood and the shift west would limit the number of users. **Therefore, Options 1, 1A, 5, & 6 were eliminated from further analysis.**

The final two options will be evaluated further with a recommendation to be presented to the Metropolitan Planning Organization (MPO) committees for approval. As stated above, a comparison matrix evaluating the Sheridan Lake Road extension options is shown on Table 4.1. A cost estimate for each of the options is included in Appendix F.

3.4.3. Conclusion and Recommendation

Based on the traffic study performed as a phase for this project, an extension of Sheridan Lake Road does not address the immediate concerns of the City. However, Rapid City should consider preserving the right-of-way needed to build the extension. An extension of Sheridan Lake Road does improve the north-south connectivity for the City and although the current traffic model does not identify any north-south traffic concerns at this time, this may not be the case in the future. Along Deadwood Avenue, the traffic model used in this study is based on the existing development however the potential for redevelopment of Deadwood Avenue is high which would completely alter the traffic patterns as presently predicted. The current mining operation occurring at Deadwood Avenue and I-90 is expected to end within 15 years and redevelopment/rezoning of this land along with rezoning of additional property along Deadwood Avenue could significantly alter the traffic patterns creating a need for a north-south connector in the future. Preserving the land now for a future extension of Sheridan Lake Road would give the City the opportunity to address future north-south connectivity needs.

An additional reason for preserving the Sheridan Lake Road extension right-of-way is public perception. A reoccurring theme heard during the public open houses was that an extension of Sheridan Lake Road is a great idea. Although justification for building the extension or even preserving the right-of-way cannot be based on this, public perception along with the potential redevelopment along Deadwood Avenue does help in making a decision whether to preserve the right-of-way.

3.5. Widening Option Discussion

To accommodate the additional traffic volumes that would utilize Sheridan Lake Road due to the extension, widening Sheridan Lake Road from Jackson Boulevard to W. Main Street was determined to be necessary. Options were developed, analyzed, and refined until three widening options along with the No-Build option were selected as “Feasibly Preferred”.

In addition to the widening options between Canyon Lake Drive and W. Main Street, a five-lane option and a three-lane option were developed for Sheridan Lake Road from Jackson Boulevard to Canyon Lake Drive. The purpose of the three-lane option was to identify minimum improvements needed to maintain a safe corridor with current lane capacity. The reason this option was developed is that the Technical Committee understood that the traffic volumes on Sheridan Lake Road following an extension would not immediately require a five lane section and the widening could occur when the traffic volumes increase to the level that five lanes are needed.

3.5.1. Preliminary Build Alternatives

Each of the options described below were presented to the Technical Committee in a "Brainstorming" meeting on November 20, 2007. The general design criteria used to develop the two options are as follows:

- Provide increased capacity of Sheridan Lake Road;
- Minimize impacts to parks, business, residences; and
- Provide improved pedestrian access.

3.5.1.1. Five-Lane Corridor – Option 1

This option consists of widening Sheridan Lake Road to a five-lane section from Jackson Boulevard north to W. Main Street. In addition to the additional lanes, raised medians are proposed at strategic locations between Jackson Boulevard and Canyon Lake Drive to aid in pedestrian crossings and aid in directing traffic wishing to make left turns. Due to width constraints at the existing bridge over Rapid Creek, the center two-way-left-turn-lane is removed for a short segment across the bridge with a taper length off each end **of the bridge.**

The alignment of Sheridan Lake Road from Canyon Lake drive to West Main Street is shifted slightly east for the purpose of avoiding the stone wall at Camp Rapid. The alignment shift does severely affect properties along the east side of Sheridan Lake Road with the most sever impacts occurring to Clock Tower property.

3.5.1.2. Five-Lane Corridor – Option 2

This option is similar to Optin 1 with the only difference occurring between Canyon Lake Drive and W. Main Street. This option maintains the existing alignment from Canyon Lake Drive to just north of the Clock Tower property. At this point, Sheridan Lake Road is shifted west to align with Sheridan Lake Road north of W. Main Street. The Camp Rapid rock wall will be affected from the alignment shift to W. Main Street.

3.5.1.3. Five-Lane Corridor – Option 3

This option consists of a combination of Options 1 and 2 between W. Main Street and Canyon Lake Drive. Sheridan Lake Road is shifted east to avoid the Camp Rapid stone wall from Canyon Lake Drive to half-way between Clower Lane (Camp Rapid access) and W. Main Street. From just south of the Clock Tower office complex to W. Main Street, the Sheridan Lake Road alignment is shifted west to align with Sheridan Lake Road to the north of W. Main Street.

3.5.1.4. No-Build Option

A no-build alternative would maintain the current roadway section along Sheridan Lake Road thus maintaining the existing capacity of Sheridan Lake Road as a two or three-lane section. Based on traffic projections, the long-range plan of widening Jackson Boulevard to a six- or seven lane section to accommodate future traffic demands would be needed. This long range plan will prove to be very difficult and expensive as there is currently very little room to widen Jackson Boulevard without severely impacting businesses along the roadway. The results of the traffic analysis indicate that there will be multiple locations within the existing roadway network

that will result in a substandard LOS by year 2030 without increasing the capacity of Sheridan Lake Road.

3.5.2. Bike Path Access Improvements

During the development and refinement of the widening options, concerns regarding the safety of pedestrians and bicyclists became a big concern. As a result of the concerns and through discussions with the City and public, review of options to improve safety was conducted and became focused at improving the safety of the recreation path that runs parallel to Rapid Creek as it crosses Sheridan Lake Road. Following review, the feasibly preferred alternative is to raise the elevation of the existing bridge to allow the bike path to go underneath the bridge. The work limits if the bridge was raised are shown in the five-lane widening option between Jackson Boulevard and Canyon Lake Drive.

The replacement of the bridge would most likely occur when the structure becomes structurally inadequate.

3.5.3. Conclusions and Recommendations

As stated above, the purpose of developing widening options for Sheridan Lake Road between W. Main Street and Jackson Boulevard was to accommodate the additional traffic that would utilize Sheridan Lake Road due to the extension. Although the extension of Sheridan Lake Road is not going to occur in the immediate future, HDR is recommending that Rapid City preserve the right-of-way needed for the extension. Due to the possibility of a future extension of Sheridan Lake Road, the City should also pursue an ultimate five-lane section between W. Main Street and Jackson Boulevard. The feasibly preferred option for widening between W. Main Street and Canyon Lake Drive is Option 3. Between Canyon Lake Drive and Jackson Boulevard, the City should consider improving the three-lane section as shown on the 3-Lane Corridor layout and widen to the five-lane corridor option when traffic warrants the need. Also, when the existing bridge over Rapid Creek becomes structurally deficient, the city should consider replacing the bridge with one that will be raised to accommodate a realigned and grade separated pedestrian/bicycle path under the new bridge structure.

3.6. American with Disabilities Act (ADA)

In accordance with Federal Regulations, bicycle and pedestrian traffic have been considered during the planning process for the Sheridan Lake Road extension project.

Sidewalk will be installed along both sides of Sheridan Lake Road for the entire length of the project. The exact location of the sidewalk will vary depending on adjacent land-use along the project. Adjacent to the parks and where there is available ROW, a landscaped boulevard will separate the sidewalk from the street and in areas where there is an attempt to minimize ROW acquisition, the sidewalk will be located directly behind the curb. Also, all sidewalks will meet the guidelines set forth in the American with Disabilities Act (ADA).

Pedestrian traffic will also be accommodated at each of the intersections within the project. All intersections within the study area will have striped crosswalks and signals enabling the pedestrians to cross the street safely in either direction. In addition to the cross walks, ADA approved curb ramps with a "Detectable Warning Panel" will be incorporated at all crossings.

Additional discussion regarding pedestrian travel and safety of the pedestrians utilizing the adjacent parks and the bike path can be found in Section 6.4 Public Lands.

4.0 Bridge Analysis

4.1. Description of Design Criteria and Options

Design criteria for the proposed bridge were defined by the City of Rapid City standards. Design speeds of 30 mph to 40 mph were developed for the horizontal curves at either end of the bridge. The design speed works well with the future classification of the road once constructed.

The goal of establishing an alignment for the bridge crossing of the DM&E railroad was to obtain as close to a perpendicular crossing as possible in order to minimize the length of the bridge. Also, a more perpendicular alignment of the bridge allowed for increased distance between the intersection at W. Main Street and the existing W. Main Street Bridge over the DM&E railroad.

4.2. Structural Considerations

4.2.1. Girders

Typically, there are two options for the type of bridge that is considered for an overpass and are either a steel plate or pre-stressed concrete girder bridge. Anticipated span lengths and the corresponding depth of girders required are typically the determining factor for the type of girder that is selected. In the case of this overpass, steel or concrete will work well and therefore the selection most likely will come down to costs. Historically, the price difference of steel versus concrete has been minimal. However, recently, the gap between costs has begun to grow. In recent years, the cost of a steel girder bridge has been approximately $90 per square foot versus approximately $75 per square foot for a pre-stressed concrete girder bridge.

Table 5.1: Girder Costs

Girder Type	Bridge Area (SQFT)	Cost per Sq. Ft. ($)	Total Cost ($)	Cost Savings ($)
Steel Plate Girder	8,260	$ 90	$ 743,400	-
Pre-stressed Concrete	8,260	$ 75	$ 619,500	$ 123,900

The primary factor in the girder selection will be the determination of an approved vertical alignment at the overpass. There becomes a balance of additional embankment and the associated costs with additional hauling in of material versus a lower profile meaning less embankment and reduced hauling costs. A concrete girder will require additional structure depth and thereby require additional embankment and retaining walls.

4.2.2. Conclusion and Recommendation

Based on the above information, HDR recommends that Pre-stressed Concrete Girders be used for the structure over the DM&E Railroad.

5.0 Phasing of Sheridan Lake Road Improvements

5.1. Introduction

As the development of options for improving the traffic operations of the study area and the costs of construction are introduced, the tendency is to believe that the entire project must be constructed at once in order to realize the project improvements to the transportation network. The problem with this is that the traffic analysis is based on a single year traffic projections that is twenty plus years away. The reality of this is that as the city grows, the traffic will gradually increase and a phased approach for the Sheridan Lake Road improvements can be accomplished as traffic increases.

5.2. Project Phasing

The final result of the improvements will be to have a continuous five-lane roadway from Jackson Boulevard north to the connection with Deadwood Avenue. The steps to reach the final result will include:

- Extend Sheridan Lake Road from W. Main Street to W. Chicago Street.
- Extend Sheridan Lake Road from W. Chicago Street to Deadwood Avenue.
- Widen Sheridan Lake Road from Canyon Lake Drive to W. Main Street.
- Widen Sheridan Lake Road from Jackson Boulevard to Canyon Lake Drive including replacing the bridge over Rapid Creek.

5.2.1. W. Main Street to W. Chicago Street

This segment will be the most expensive segment of the Sheridan Lake Road improvements and should be the first to be accomplished. The number one goal of this project is to help to relieve traffic pressures on Jackson Boulevard and Mountain View Road and, based on the traffic study, pushing Sheridan Lake Road north to W. Chicago Street will start in accomplishing this goal.

The final recommendation for the initial section to construct will depend greatly on the available funds. However, the segment costs will be controlled by the bridge which should be constructed to full width. Therefore the recommendation is to construct the ultimate section for the length of this segment and utilize striping to reduce the section at W. Main Street.

5.2.2. W. Chicago Street to Deadwood Avenue

This phase of the improvements will complete the extension. Following completion of this segment, additional improvements between W. Main Street and Jackson Boulevard can be based on traffic volumes. Since this segment ties directly into Deadwood Avenue, the recommendation is to construct the segment to full width.

5.2.3. W. Main Street to Canyon Lake Drive

This segment will be the most difficult with respect to property impacts. Depending on the preferred option selected, the widening will impact either the Camp Rapid rock wall to the west or the parking for Clock Tower offices. As stated previously, the widening of the road will not be needed immediately and can occur as the traffic volumes increase to a level that the LOS is below acceptable levels. One portion of this segment that will need to be reconstructed early and possibly along with the segment to the north is near the W. Main Street intersection. The existing poor alignment between Sheridan Lake Road to the south and north would require special signal timing and would in turn severely impact the intersection LOS. The poor operations of the intersection would affect traffic both on W. Main Street and Sheridan Lake Road.

5.2.4. Canyon Lake Drive to Jackson Boulevard

As was the case with the segment to the north, this segment through the park can be delayed until the traffic volumes have increased to a level that is below acceptable levels. When this segment is widened, it would be advantageous to consider replacing the bridge over Rapid Creek to allow for a grade separated crossing for the recreational bike path. The additional width of the roadway along with higher traffic volumes would reduce the safety of the at-grade crossing and would severely impact the use of the bike path for recreational purposes.

6.0 Environmental Considerations

6.1. Land Use

6.1.1. Main Street to W. Chicago Street

The majority of the land adjacent to the railroad is open space owned by the DM&E and private landowners. Land on either side of the railroad and closer to the intersecting roads (Main Street and W. Chicago Street) consist of small businesses. The portion of the land directly adjacent to and south of the railroad is open and the topography rises steeply away from the tracks toward Main Street. The remaining area south of the railroad tracks consists of small business (Dominoes Pizza, Credit Collections Bureau, Pizza Hut, and a storage facility). In addition to the small businesses, residential properties lie to the west and south of the tracks (north of the business area). Topography to the north of the railroad is relatively flat for a few hundred feet and then rises steeply toward W. Chicago Street. Land use to the north of the tracks consists of small businesses.

6.1.2. W. Chicago Street to Deadwood Avenue

Land use between W. Chicago Street and Deadwood Avenue consists of light industrial on the west half of the study area and open undeveloped land on the east half of the study area. The undeveloped land is currently for sale.

6.2. Vegetation

Vegetation in the area includes mixed grasses and scattered trees, with larger trees and denser vegetation concentrated along the railroad.

6.3. Threatened and Endangered Species

Agencies were not contacted specifically regarding Threatened and Endangered (T&E) Species for this project but a list of the Federal and State Threatened and Endangered species was prepared below with a discussion of their anticipated presence within the Study Area. Future environmental documentation will require coordination with the South Dakota Game Fish and Parks (SDDFP) and United States Fish and Wildlife Service (USFWS) to determine the exact impacts of the Project on T&E species.

Threatened and Endangered Species

Species	Status	Comments
Whooping Crane (*Grus americana*)	Federal Endangered, State Endangered	Species is a known resident of Pennington County, but not specifically within the Project Area.
Interior Least Tern (*Sterna antillarum athalassos)*	Federal Endangered, State Endangered	Species is a known resident of the northeastern portion of Pennington County, but not specifically within the Project Area.
Black Footed Ferret (*Mustela nigripes*)	Federal Endangered, State Endangered	The Study Area is urban, therefore does not have the correct habitat for this species. Species is assumed not to be present in the Study Area.
Osprey (*Pandion halianetus)*	State Threatened	The Study Area is within the migratory area of this species, but the required habitat is not within the Study Area.
Bald Eagle	Delisted	This species has been delisted from the T&E status but

(*Haliaeetus leucocephalus*)		will continue to be projected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. The species is known to occur within Pennington County but has not been identified within the Study Area.
Peregrine Falcon *(Falco peregrinus)*	State Endangered	Peregrine Falcon is known to occur on the western portion of Pennington County, but is not known to occur within the Study Area.
Swift Fox (*Vulpes velox)*	State Threatened	This species is noted to exist in the southeastern portion of Pennington County, but is not specifically found within Study Area.

6.4. Public Lands

For purposes of discussion in this report, the proposed improvements for Sheridan Lake Road can be separated into two separate phases. The first phase relates to the extension of Sheridan Lake Road north from W Main Street to either W. Chicago Street or Deadwood Avenue. The second phase of discussion will center on the widening of existing Sheridan Lake Road from Jackson Boulevard north to W. Main Street.

6.4.1. Extension of Sheridan Lake Road (W. Main Street to Deadwood Avenue)

Currently, public or recreational lands have not been identified to exist either adjacent to or in the immediate vicinity of the extension segment of this project.

6.4.2. Widening of Sheridan Lake Road (Jackson Boulevard to W. Main Street)

Adjacent to Sheridan Lake Road through this segment of the project are multiple public parks, Cliffside Park, Halley Park, Jackson Park, and a private park, Storybook Island. In addition to the parks, the City's bike path system crosses Sheridan Lake Road at Canyon Lake Drive and adjacent to Rapid Creek. Although a final recommendation must be received from the FHWA, a Programmatic Section 4(f) Evaluation may be applied to the parks and bike path system. The following criteria must be met to receive a Programmatic Section 4(f) Evaluation:

- The project is designed to improve the operational characteristics, safety, and/or physical condition of an existing highway facility, including construction of additional lanes, on essentially the same alignment.
- Section 4(f) lands are publicly owned parks located adjacent to the existing highway.
- The amount of land to be used shall not impair the use of the remaining Section 4(f) land for its intended purpose. This determination is to be made by the FHWA in concurrence with the officials having jurisdiction over the Section 4(f) lands.
- The proximity impacts of the project on the remaining Section 4(f) land shall not impair the use of such land for its intended purpose.
- The officials having jurisdiction over the Section 4(f) lands must agree, in writing, with the assessment of the impacts.

Although the requirements of Section 4(f) are most likely met based on the previous information, the study would not be complete if concerns of increased traffic and the impacts that this may have on the adjacent land are not addressed. Traffic impacts that may affect the parks include increased noise levels and pedestrian safety.

6.4.2.1. Safety

A major concern with the improvements of any street and the corresponding increased traffic is how adjacent land-use and increased traffic can co-exist. In the case of Sheridan Lake Road, parks along either side of the road and the crossing of Sheridan Lake Road with two separated bike routes raises concerns of the safety of the park and bike path users. Therefore, a study to present options of improving the transportation routes of an area is not complete unless pedestrians and bicyclists are accounted for.

In order for the users of the park to enjoy their day at the park, they must be comfortable. A major contributor to this is being safe and walking needs to be safe and easy. The U.S. Department of Transportation prepared a walk ability checklist to aid in determining the safety of an area. Items that are considered are:

- Was there room to walk?
- Was it easy to cross streets?
- Driver behavior
- Was it easy to follow safety rules?
- Was the experience pleasant?

Meeting the City's growing transportation needs while attempting to maintain a safe environment for pedestrians and those attending the park when creating a compatible environment must be included in any Sheridan Lake Road expansion option. In 2001, most pedestrian fatalities occurred in urban areas (69 percent), at non-intersection locations (79 percent), in normal weather conditions, and at night (64 percent)[4]. By addressing the checklist and having a better understanding of the "how, when, and where" of the crashes, the City can achieve a safer environment. Even without an extension of Sheridan Lake Road, the current capacity of the road allows for the traffic to increase significantly from existing numbers. Therefore, improvements to the corridor should be considered regardless of the outcome of this study.

Following are pedestrian concerns along with implementation options to be included in the widening option layouts.

- Room to walk: Develop sidewalks adjacent to the park with adequate widths to accommodate pedestrian and bicycle traffic. (Proposed 10' sidewalks from Rapid Creek to Canyon Lake Drive.)
- Ease of Crossing Street: As there are two designated crossing locations (just north of Rapid Creek for bike path and at Canyon Lake drive), each crossing must be looked at separately.
    - Canyon Lake Drive: A traffic signal is currently located at the intersection of Sheridan Lake Road and Canyon Lake Drive and is proposed to remain with future improvements. Signal timing must be addressed to assure adequate time is given to pedestrians crossing a wider street section.
    - Bike Path at Rapid Creek: Two options to improve safety that can be considered are signal installation or grade separated crossing. The installation of a traffic signal would be the most economical and simplest option however traffic delays causing driver frustration is a concern. A grade separated option, which would be achieved by replacing the existing bridge with one that will allow the bike

[4] *Traffic Safety Facts 2001, DOT HS 809 478, National Center for Statistics & Analysis*

path to travel underneath would be the safest and should be considered in the long range improvements at this location. (Work limits are shown with the widening layouts.)

- Driver Behavior: Although it is impossible to control all poor driver behavior, the concern can be reduced by implementing traffic calming measures. Incorporating some of these measures can also help address other concerns. Maintaining narrower driving lanes helps reduce the speed of the vehicles and reduces the amount of time to cross the street. Landscaping within the boulevards reminds the traveling public that they are driving through a park/neighborhood setting and aids in reducing the number of pedestrians crossing at a non-designated crossing location.
- Following Safety Rules: The landscaping as discussed previously helps to prevent pedestrians from crossing at non-designated locations; adequate signing directs pedestrians to the crossings.
- Was the experience pleasant: Implementing the improvements discussed above along with adequate lighting could make this a very pleasant area where both can exist.

6.4.2.2. Noise

Although a noise study should be performed, the locations of the areas of congregation are at such a distance from the roadway, that there may not be a concern.

An additional item that must be addressed in an environmental document is the temporary impacts to the bike path during construction as access must be maintained to the path at all times. This will require temporary tie-ins and detours around the construction area.

Initial contact has been made with the Rapid City Parks Division Manager (Lon Van Deusen) regarding the possible improvements to Sheridan Lake Road. Additional improvements to the parks other than maintenance improvements are not planned.

6.5. Public Involvement

The public involvement process consisted of informational presentations to the committees of the MPO and public meetings.

6.5.1. Public Information Meetings

During the course of this project, two public meetings were scheduled for the purpose of discussing the project. The first open house, held on Tuesday, September 18th, 2007 in the Community Room at the Rapid City School/Administration Center, was intended to inform the public of the goals of the project and present/discuss extension options developed for Sheridan Lake Road. The second open house, held on Wednesday, March 19th, 2008 in the Hilton Conference Room at the Rapid City School/Administration Center, was intended to show the public the feasibly preferred options and allow for their comment.

6.5.1.1. Open House #1: September, 18, 2007

The first meeting, held on Tuesday, September 18th, 2007 in the Community Room at the Rapid City School/Administration Center, was intended to inform the public of the goals of the project and present/discuss extension options developed for Sheridan Lake Road. An open house format was used for the meeting to allow the public to meet with the project team and present their ideas of what could be improved with the options developed. In addition to general discussions regarding each of the crossings, the public was encouraged to submit comments in writing. Postcards were distributed at the open house and the public could complete the comment card while attending the open house or take home, complete, and place it in the mail. Comments received following the initial Open House can be found in Appendix G. A total of 42 people attended the open house. See Appendix G to view the attendance list.

The primary goal of the open house was to introduce developed extension and widening options of Sheridan Lake Road to the public and to gather public input. The format of the open house allowed the public to view boards that showed the extension and widening options. The public was encouraged to view the variety of displays that were available, including boards with text and graphics showing the extension and widening options.

The following summarize the informal[5] comments received at the meetings:

- Most comments were generally supportive of the Project.
- A landowner located in the northeast corner of the Jackson/Sheridan intersection expressed concerns about access to the property. (She wants the property rezoned to commercial.) Also stated that she would like the City to purchase her property for safety reasons.
- Representatives of the Clock Tower office building expressed concerns of insufficient parking and options that remove parking would be detrimental to the property. Also concerned with traffic patterns within their parking lot. Currently have an exit very close to the W. Main/Sheridan intersection that will be removed when construction occurs.
- There were several questions regarding a schedule for the extension.
- Several landowners wanted to know how access would be provided to their properties.
- A landowner along Sheffer Street has daily truck traffic and was concerned with truck turning patterns.

The public had an opportunity to provide written comments during and after the first open house. The deadline for submitting written comments was October 12th. A total of 8 written comments were received during the open house (See Appendix G). The comments received were supportive of the Project. Comments and issues identified in the written comments were similar to those expressed informally at the meetings and included:

- Support for the Project and a desire to have Sheridan Lake Road extend to Deadwood.
- Three letters supported Options 3A and 4.
- Two letters in support for widening Option 2A to aid in pedestrian traffic in the vicinity of the ball parks.
- A comment regarding the speed of traffic coming on Sheridan Lake Road from the south.
- One comment regarding a right turn lane and a left turn arrow for southbound traffic turning onto Jackson Boulevard.
- One comment regarding an area for a turn-out for the trolley/mass transit along the ball fields and Story Book Island.
- Two letters (each of the partners) regarding impacts to parking at the Clock Tower Office Plaza and access to the parking lot. (Options show the elimination of the egress just south of Main Street on Sheridan Lake Road.
- Written letter from the property owner located in the northeast corner of Sheridan Lake Road and Jackson Boulevard discussing the value of the property, re-zoning, and buy-out.
- One letter against any widening of Sheridan Lake Road south of Canyon Lake Road due to dangers to pedestrians/bicyclists and children.

6.5.1.2. Open House #2: March 19, 2008

The second meeting, held on Wednesday, March 19, 2008 in the Third Floor West Conference Room at the Rapid City School/Administration Center, was intended to show the public the feasibly preferred options and allow for their comment. An open house format was used for the meeting to allow the public to meet with the project team and discuss the options displayed and concerns they may have had. In

[5] Informal comments are those that were expressed to staff during the open house.

addition to general discussions regarding each of the crossings, the public was encouraged to submit comments in writing. Postcards were distributed at the open house and the public could complete the comment card while attending the open house or take home, complete, and place it in the mail. Comments received following the initial Open House can be found in Appendix H. A total of 28 people attended the open house. See Appendix H to view the attendance list.

The primary goal of the open house was to show the Feasibly Preferred extension and widening options of Sheridan Lake Road to the public and to gather additional public input. The format of the open house allowed the public to view boards that showed the extension and widening options. The public was encouraged to view the variety of displays that were available, including boards with text and graphics showing the extension and widening options.

The following summarize the informal[6] comments received at the meetings:

- There were several concerns regarding the safety of children and pedestrians in general along Sheridan Lake Road between Jackson Boulevard and Canyon Lake Drive.
- There were several questions regarding a schedule for the extension.
- The owner of the undeveloped land north of W. Chicago Street and west of Deadwood Avenue was concerned with access.

The public had an opportunity to provide written comments during and after the second open house. A total of 3 written comments were received during the open house (See Appendix H). Comments and issues identified in the written comments were similar to those expressed informally at the meetings and included:

- Prefers the three-lane option between Jackson Boulevard and Canyon Lake Drive.
- Provide for pedestrian crossings.
- Concerns with a five-lane section adjacent to the parks and Story Book Island.
- Concerns with truck traffic on Sheridan Lake Road and potential increase in truck traffic if the extension is completed.
- Concerns with public safety.

6.5.2. Agency Coordination

To date, there has been no Agency Coordination conducted with this project.

[6] Informal comments are those that were expressed to staff during the open house.

7.0 Cost

7.1. Estimated Construction Costs

Estimated construction costs for the roadway extension and overpass are located in Appendix F.

The overall costs are summarized in Table 7.1 below.

Table 7.1. SLR Extension Option Costs

SLR Extension Option	Roadway Cost	Structure Cost (Bridge/Wall)	ROW And Utilities	Total Cost (2007)
No-Build	$ 0	$ 0	$ 0	$ 0
Option A (Old Option 3)	$ 1,866,000	$ 1,807,000	$ 1,039,800	$ 4,732,800
Option B (Old Option 3A)	$ 2,844,000	$ 1,807,000	$ 1,311,800	$ 5,962,800
Option C (Old Option 4)	$ 3,432,000	$ 1,807,000	$ 1,320,800	$ 6,599,800