



RAPID CITY AREA
Metropolitan Planning Organization



Major Street Plan Analysis and Update

July 2024





Major Street Plan Analysis and Update

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Executive Summary

Project Introduction and Background

The Rapid City Area Metropolitan Planning Organization (RCAMPO) is comprised of six (6) jurisdictions including the Cities of Rapid City, Box Elder, Summerset, Piedmont, and the unincorporated communities of Black Hawk and Rapid Valley as well as portions of two (2) counties that include the urbanizing areas of Pennington County and Meade County.

Rapid City was the first jurisdiction to adopt a Major Street Plan (MSP) in 1990 and has performed several revisions to the MSP over the last few decades. However, many proposed future road alignments have not been analyzed since the initial creation of the MSP. Many of the future road segments have become dated due to changes in land use, development patterns, and construction projects over the years. Additionally, most of the other RCAMPO member agencies have adopted Major Street Plans or Transportation Plans leading to incongruities among future road alignments and classifications.

As the Rapid City area continues to grow and see increased levels of development, the need for revisiting the MSP became apparent. Issues with slope, constructability, and alignment surfaced on several segments as interested parties began pursuing development of the corridors. As part of the RapidTRIP 2045 Metropolitan Transportation Plan adopted in August of 2020, the RCAMPO completed preliminary work in identifying alignment and constructability issues with the MSP. This MSP analysis expands on that prior planning process and will develop conceptual roadway alignments and profiles for key arterial and collector roadways anticipated to be developed and/or constructed within the 20-year planning horizon to be used as a tool for developers and the City.

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A planning-level prioritization of the existing MSP was completed to identify the key roadway segments recommended for advancement to the conceptual alignment phase. A series of planning-level data was used to screen the MSP roadway segments and assign each a score based on how well the segment aligns with the MPO's and local jurisdiction's goals for the planned network. This effort resulted in the identification of 40 different proposed segments from the existing MSP that were recommended for advancement to the conceptual alignment and plan and profile development phase.

Data used in the planning-level prioritization analysis was sourced from the MPO and was developed as part of RapidTRIP 2045 Metropolitan Transportation Plan (MTP). This data includes the MPO's Travel Demand Model (TDM) outputs, including forecasted household and employment growth and forecasted daily traffic volumes; all TDM output forecasts were for future year 2045. Additional data used in the prioritization analysis included existing daily traffic volumes, topographic and alignment constraints identified in the RapidTRIP 2045 MTP, public comments received from the first public meeting, and runway protection zone (RPZ) areas for Ellsworth Air Force Base and Rapid City Regional Airport.

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The staff of the MPO and local jurisdictions provided a list of 26 key MSP roadway segments based upon known issues, current development plans, and future development. The staff also provided a list of segments which were excluded from the analysis for a variety of reasons, including already having an established profile, the need for a segment likely being beyond the current planning horizon, an existing development precluding a route being built, and other entities being responsible for building the segment. An additional 14 segments were then identified using the scoring rubric to reach the total of 40 segments to have a conceptual plan and profile developed. The full prioritization analysis is available in **Appendix B**. The MSP segments for which plan and profiles were developed are included in **Table ES-1** and displayed in **Figure ES-1**.

Table ES-1: MSP Prioritized Street Segments for Conceptual Plan and Profile Development

Roadway Segment and ID	Extent
E. Anamosa Street (1)	Elk Vale Road to Reservoir Road
Black Hills Boulevard (2)	Caton Boulevard to Upper Spring Creek Road
Bunker Drive (3)	Alma Street to Country Road
Creek Drive (4)	Marlin Drive to Old Folsom Road
Degeest Drive (5)	Anamosa Street to Cheyenne Boulevard
E-W Arterial S of Addison Avenue (6)	Hwy 16 to Black Hills Boulevard
Fairmont Boulevard (7)	Cambell Street to Elk Vale Road
Krebs Drive (8)	Deadwood Avenue to Commerce Road
LaCrosse Street Extension (9)	Seger Drive to Country Road
Les Hollers Way (10)	Sheridan Lake Road to Catron Boulevard
Minnesota Street (11)	Cambell Street to S. Valley Drive
N-S Collector (12)	East of Tartan Court
Neel Street (13)	Anamosa Street to Philadelphia Street
Neva Way (14)	Haines Avenue to LaCrosse Street
Nugget Gulch Road (15)	Moon Meadows Drive to Motherlode Drive
E. Philadelphia Street (16)	N. Valley Drive to Reservoir Road
Turbine Drive (17)	Anamosa Street to N. Turbine Drive
Falling Rock Road (18)	Southern Terminus to Victoria Lake Road
Nameless Cave Road (19)	Northern Terminus to Schroeder Road
Hidden Valley Road (20)	Western Terminus to Bittersweet Road
Sun Ridge Road (21)	Western Terminus to Bittersweet Road
E. Anamosa Street (22)	I-190 to Commerce Road
Twilight Drive (23)	Eastern Terminus to Radar Hill Road



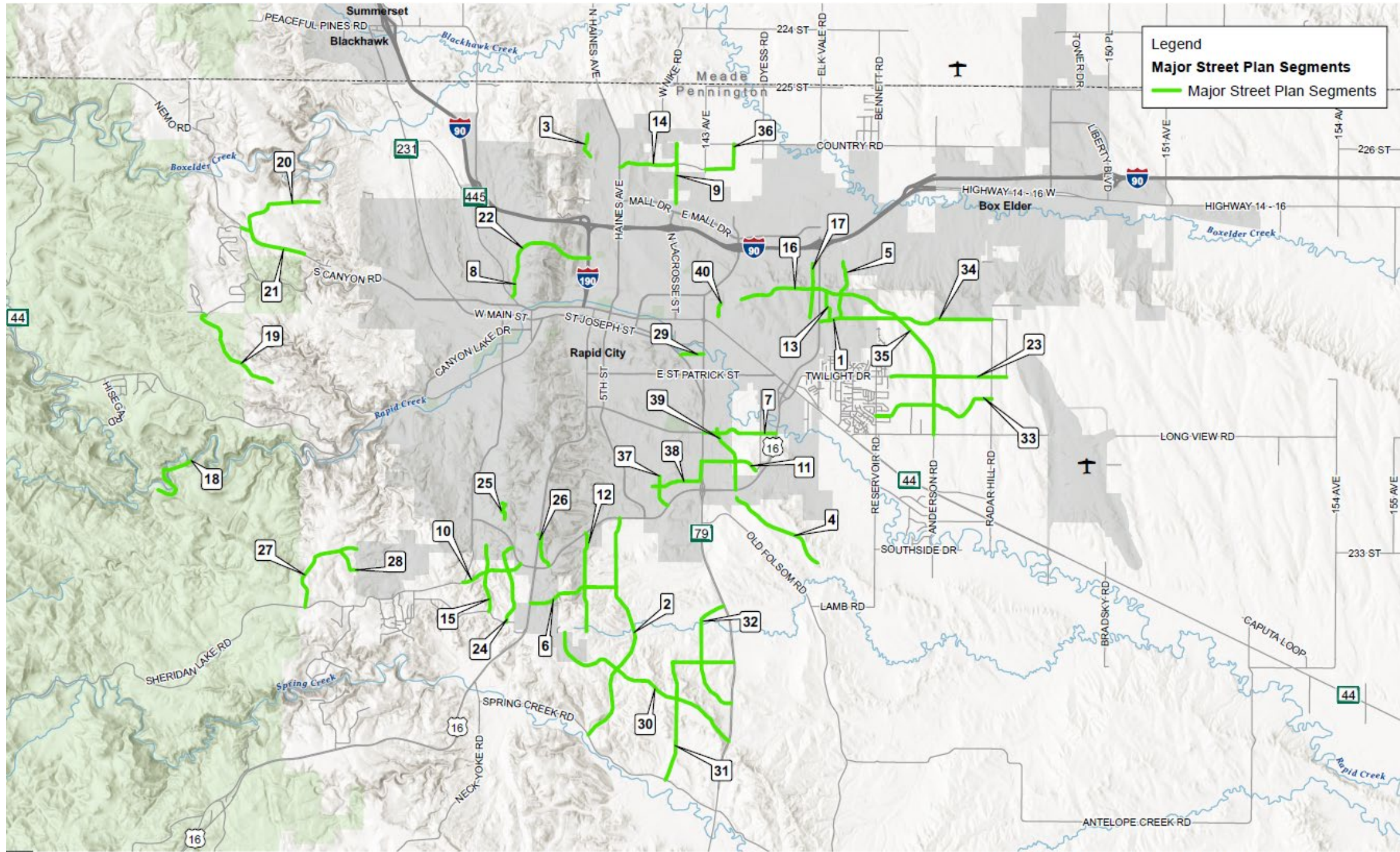
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Roadway Segment and ID	Extent
Haugo Drive (24)	Catron Boulevard to Moon Meadow Drive
Villaggio Lane (25)	Southern Terminus to Horsecreek Road
Healing Way (26)	Hwy 16 to Catron Boulevard
Bethpage Drive (27)	Western Terminus to Sheridan Lake Road
Muirfield Drive (28)	Western Terminus to Prestwick Road
E. Saint James Street (29)	Saint Joseph Street to Western Terminus
Dreamscape Road (30)	Sammis Trail to SD Hwy 79
Southern Collector (31)	SD Hwy 79 to Upper Spring Creek Road
Southern Collector Loop (32)	SD Hwy 79 to North of Black Gap
Mercury Drive (33)	Stellar Drive to Quarter Horse Drive
E. Anamosa Street (34)	Reservoir Road to Radar Hill Road
Anderson Road (35)	Longview Road to Anamosa Street
Neva Way (36)	143 rd Avenue to Country Road
Elm Avenue (37)	Catron Boulevard to Field View Drive
Enchanted Pines Drive (38)	Gemstone Drive to Minnesota Street
Creek Drive (39)	Southern Terminus to Elk Vale Road
Creek Drive (40)	Viewfield Avenue to Philadelphia Street



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Figure ES-1: Major Streets Prioritization Results



MAJOR STREETS PLAN PRIORITIZATION RESULTS

HR 0 2 Miles

RAPID CITY, SOUTH DAKOTA



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After the 40 segments were identified, conceptual plan and profiles were developed for each respective segment using design criteria outlined by the City of Rapid City Infrastructure Design Criteria Manual (ICDM) and American Association of State Highway and Transportation Officials (AASHTO) where applicable. Highlights of specific design criteria are as follows:

- **Design Speed**
 - Principal arterials - 50 MPH
 - Minor arterials - 45 MPH
 - Collectors - 35 MPH
 - Special considerations as necessary where existing constraints may impact proposed corridor
- **Grades**
 - Arterials - AASHTO design criteria
 - Collectors - minimum 0.5% and maximum 10%
- **Curvature (Vertical/Horizontal)**
 - AASHTO design criteria
 - No superelevation
- **Typical Sections and Right-of-Way (ROW) Widths**
 - Arterial
 - Three-lane - 36' pavement width and 100' ROW width (less than 10,000 ADT)
 - Five-lane - 58' pavement width and 110' ROW width (greater than 10,000 ADT)
 - Collector
 - Three-lane - 36' pavement width and 68' ROW width
- **Other Criteria/Assumptions**
 - Used RCAMPO LiDAR data from Fall 2023 for topography/surfaces
 - Assumed a 25% shrink for fill/embankment in conceptual earthwork estimates

Proposed segment alignments also considered topography, existing developments, and environmental constraints; identified where drainage facilities/crossings may be needed; and noted special considerations associated with specific corridor conceptual alignments. Special considerations included but were not limited to potential retaining walls/structures, bridges, FEMA/floodway/flood plain impacts, rail crossings and permits, existing road modifications, and parkland impacts.

Estimated roadway length, surfacing, and earthwork was provided for each conceptual corridor segment. The proposed roadway alignment centerline was then used to update the MSP for corridors which were identified to be constructable based upon the conceptual alignment being able to meet the identified design criteria. Multiple corridors were identified

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which could not reasonably meet the design criteria and are recommended to be removed from the MSP.

The conceptual corridor plan and profile layouts are presented in **Appendix A**.

Public Involvement

There were two public meetings held as part of the study. The first public meeting was held on July 13, 2023 in Rapid City at City Hall. All meeting materials were also posted on-line at the project website www.RCmajorstreets.com so that those interested in the project and unable to attend in person could review meeting materials and provide comments and feedback. The first public meeting introduced the project to the community and requested input on the corridor selection and screening process to identify the corridors for which conceptual alignments would be developed. A total of 25 attendees was present at the first public meeting with additional comments being provided on the comment forms and through the study website.

A second public meeting was held on May 28, 2024 in Rapid City at City Hall to present the results of the corridor screening process, the conceptual alignment plan and profiles for the prioritized corridors, and the preliminary recommendations.

A summary of the public meetings can be found in **Appendix C**.

Recommendations

The suggested MSP recommendations and alignments for reasonably constructable corridors are as shown in **Figure ES-2**.

The following corridor is recommended to be added to the MSP:

- **Healing Way (26)** – from Hwy 16 to Catron Boulevard

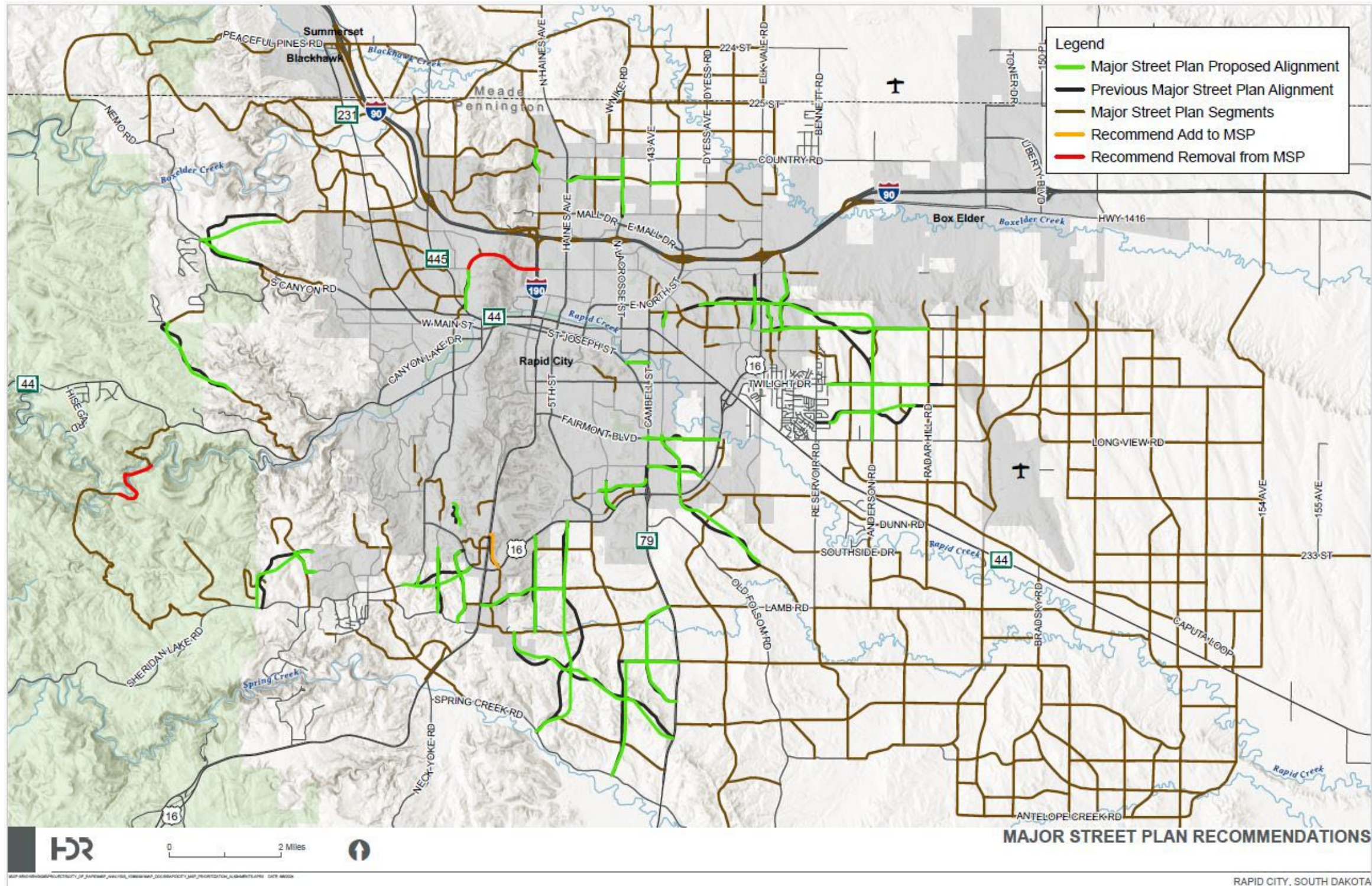
Multiple corridors were identified which may not reasonably meet design criteria associated with grades and/or curvature, would require earthwork which may not be feasible, or may be cost prohibitive. The following corridors are recommended to be removed from the MSP:

- **Falling Rock Road (18)** – from Southern Terminus to Victoria Lake Road
- **Anamosa Street (22)** – from I-190 to Commerce Road
 - It is further recommended that an alternative east-west connection be examined south of I-90 (north of Anamosa Street) to achieve a desired east-west connection to the Deadwood Avenue Corridor.

It is recommended that the centerline alignments of the reasonably constructable corridors be updated in the MSP and the corridors identified for removal be removed from the MSP by the formal process identified in the City of Rapid City Comprehensive Plan for amendments.

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Figure ES-2: Major Street Plan Recommendations



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I. Project Background

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As the Rapid City area continues to grow and see increased levels of development, the need for revisiting the MSP became apparent. Issues with slope, constructability, and alignment surfaced on several segments as interested parties began pursuing development of the corridors. As part of the RapidTRIP 2045 Metropolitan Transportation Plan adopted in August of 2020, the RCAMPO completed preliminary work in identifying alignment and constructability issues with the MSP. This MSP analysis expands on that prior planning process and will develop conceptual roadway profiles and updated alignments to be used as a tool for developers and the City for key arterial and collector roadways anticipated to be developed and/or constructed within the 20-year planning horizon.

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II. Roadway Segment Prioritization

Introduction

The RCAMPO is conducting an analysis of its existing MSP with the intent of updating this Plan to remove proposed roadway segments that demonstrate slope, constructability, and alignment issues while developing conceptual alignments for key proposed segments. This effort builds off the preliminary review of alignment and constructability issues completed with the development of the MPO’s RapidTRIP 2045 Metropolitan Transportation Plan.

This analysis summarizes a planning-level prioritization of the existing MSP that was completed to identify the key roadway segments recommended for advancement to the conceptual alignment phase. The prioritization analysis used a series of planning-level data to screen the MSP roadway segments and assign each a score based on how well the segment aligns with the MPO’s and local jurisdiction’s goals for the planned network. This effort resulted in the identification of 40 different proposed segments from the existing MSP that were recommended for advancement to the conceptual alignment and plan and profile development phase.

Data and Methodology

Data Sources

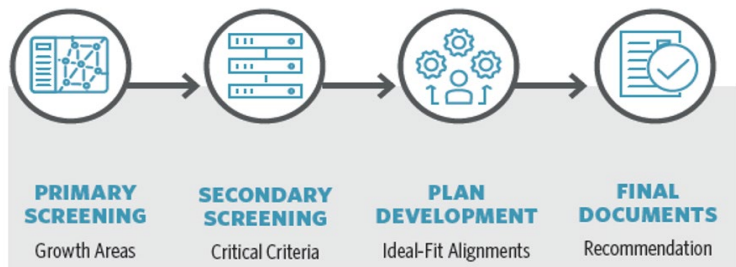
Data used in the planning-level prioritization analysis was sourced from the MPO and was developed as part of RapidTRIP 2045 Metropolitan Transportation Plan (MTP). This data includes primary screening elements from the MPO’s Travel Demand Model (TDM) outputs, including forecasted household and employment growth and forecasted daily traffic volumes; all TDM output forecasts are for future year 2045. Additional data used in the secondary screening prioritization analysis included existing daily traffic volumes, topographic and alignment constraints identified in the RapidTRIP 2045 MTP, and runway protection zone (RPZ) areas for Ellsworth Air Force Base and Rapid City Regional Airport.

Methodology

The methodology used for the planning-level prioritization analysis, which is summarized in **Figure 1**, was based on a desktop GIS review of the existing MSP roadway alignments. Roadway segments were evaluated against the data discussed above and assigned scores based on their performance in serving future high-growth areas.

Once the 40 roadway segments were scored, they were then ranked by score to see how each compared to the other 39 segments.

Figure 1: Prioritization Approach



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Higher prioritization scores indicate that a road segment is in a high household and/or employment growth area and provides a connection between two or more segments demonstrating high existing daily traffic volumes or are forecasted to have high daily traffic volumes by 2045. Segments that demonstrate topographic or alignment constraints received a negative score, as did any segment located within a RPZ of the Ellsworth Air Force Base or the Rapid City Regional Airport. **Table 1** summarizes the prioritization scoring approach.

Table 1: Prioritization Scoring Approach

Range	Tier	Range	Tier		
Household Growth		Job Growth			
Increase of 25 HH's or Fewer	Low	0	Increase of 50 Jobs or Fewer	Low	0
Increase of 26 - 50	Medium-Low	1	Increase of 51 - 100	Medium-Low	1
Increase of 51 - 100	Medium	2	Increase of 101 - 500	Medium	2
Increase of 101 - 150	Medium-High	3	Increase of 501 - 1,000	Medium-High	3
Increase of 151 or More	High	4	Increase of 1,000 or More	High	4
Existing Volume		Future Volume			
Less than 1,000 ADT	Low	0	Less than 1,000 ADT	Low	0
1,000 - 5,000 ADT	Medium-Low	1	1,000 - 5,000 ADT	Medium-Low	1
5,000 - 10,000 ADT	Medium	2	5,000 - 10,000 ADT	Medium	2
10,000 - 20,000 ADT	Medium-High	3	10,000 - 20,000 ADT	Medium-High	3
20,000 or More ADT	High	4	20,000 or More ADT	High	4
Topography Constraint		Alignment Constraint			
Yes	Low	1	Yes	Low	1
No	High	0	No	High	0

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Primary and Secondary Screening

Staff of the MPO and local jurisdictions provided a list of key MSP roadway segments to be prioritized. This list comprised 26 segments within the MPO Area; **Table 2** summarizes the MPO- and local jurisdiction-identified segments that formed the basis of the prioritization analysis.

Table 2: MPO- and Local Jurisdiction- Identified MSP Segments

Roadway Segment and ID	Extent
E. Anamosa Street (1)	Elk Vale Road to Reservoir Road
Black Hills Boulevard (2)	Catron Boulevard to Upper Spring Creek Road
Bunker Drive (3)	Alma Street to Country Road
Creek Drive (4)	Marlin Drive to Old Folsom Road
Degeest Drive (5)	Anamosa Street to Cheyenne Boulevard
E-W Arterial S of Addison Avenue (6)	Hwy 16 to Black Hills Boulevard
Fairmont Boulevard (7)	Cambell Street to Elk Vale Road
Krebs Drive (8)	Deadwood Avenue to Commerce Road
Lacrosse Street Extension (9)	Seger Drive to Country Road
Les Hollers Way (10)	Sheridan Lake Road to Catron Boulevard
Minnesota Street (11)	Cambell Street to S Valley Drive
N-S Collector (12)	East of Tartan Court
Neel Street (13)	Anamosa Street to Philadelphia Street
Neva Way (14)	Haines Avenue to LaCrosse Street
Nugget Gulch Road (15)	Moon Meadows Drive to Motherlode Drive
E. Philadelphia Street (16)	N. Valley Drive to Reservoir Road
Turbine Drive (17)	Anamosa Street to N. Turbine Drive
Falling Rock Road (18)	Southern Terminus to Victoria Lake Road
Nameless Cave Road (19)	Northern Terminus to Schroeder Road
Hidden Valley Road (20)	Western Terminus to Bittersweet Road
Sun Ridge Road (21)	Western Terminus to Bittersweet Road
E. Anamosa Street (22)	I-190 to Commerce Road
Twilight Drive (23)	Eastern Terminus to Radar Hill Road
Haugo Drive (24)	Catron Boulevard to Moon Meadows Drive
Villaggio Lane (25)	Southern Terminus to Horsecreek Road
Healing Way (26) (New/Added Segment)	Hwy 16 to Catron Boulevard

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In addition to the segments identified for prioritization by MPO and local jurisdiction staff, several segments were identified for exclusion. These segments and the reasoning behind their exclusion are presented in **Table 3**.

Table 3: MSP Segments Excluded from the Prioritization Analysis

Roadway	Extent	Reason
Healing Way	Moon Meadows Drive to Addison Avenue	Road profile already established
Plaza Boulevard	North of E. Anamosa Street	Connects to Anamosa and is highly dependent on development
Sheridan Lake Road	W. Main Street to Deadwood Avenue N	Existing development precludes route
Proposed streets through Lien quarry	Various locations	Beyond planning horizon
N. Saint Onge Street	W. Chicago Street to Deadwood Avenue N	Road profile already established
Jackson Boulevard	W. Main Street to W. Omaha Street	Existing development precludes route
E. Anamosa Street	North Street to Elk Vale Road	Road profile already established
N. Neel Street	Sweetbriar Street to E Anamosa Street	Developer-led
Reservoir Road	Homestead Street to E Anamosa Street	In area development plans
E. Minnesota Street	Vinecliff Drive to Jolly Lane	Road profile already established
E. Enchanted Pines Drive	5 th Street to Parkview Drive	City to establish road profile
N. Valley Drive	Homestead Street to E North Street	Developer-led
N. Degeest Drive / Hotel Way	North of Cheyenne Boulevard	Box Elder is building this segment
Century Road	E. North Street to E. Anamosa Street	Road profile already established



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An additional 14 segments were identified for prioritization by evaluating those that are located within high household and employment growth areas. These segments were then prioritized based on the methodology described above. **Table 4** presents these additional segments.

Table 4: Additional Prioritized MSP Segments

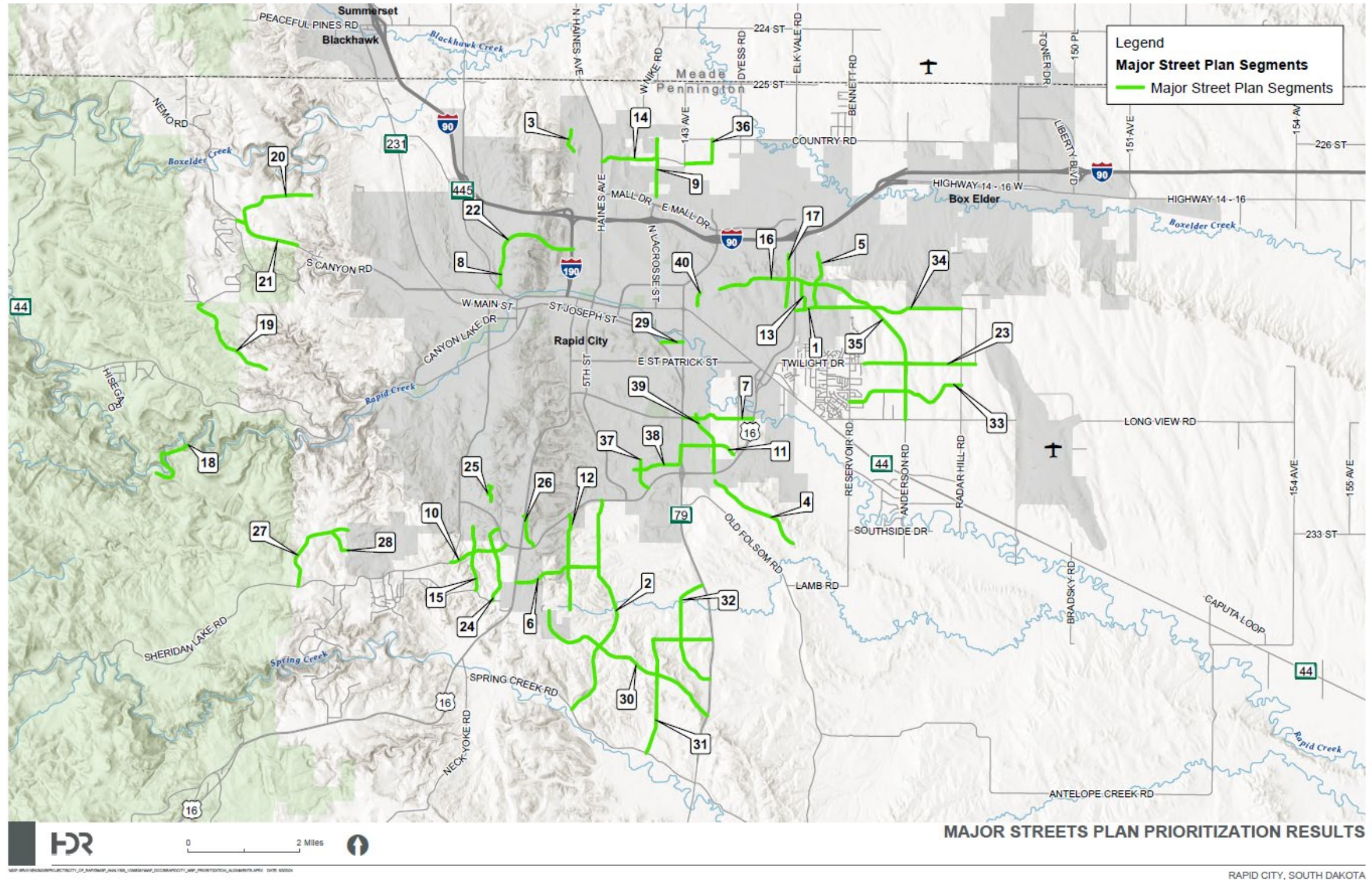
Roadway Segment and ID	Extent
Bethpage Drive (27)	Western Terminus to Sheridan Lake Road
Muirfield Drive (28)	Western Terminus to Prestwick Road
E. Saint James Street (29)	Saint Joseph Street to Western Terminus
Dreamscape Road (30)	Sammis Trail to SD Hwy 79
Southern Collector (31)	SD Hwy 79 to Upper Spring Creek Road
Southern Collector Loop (32)	SD Hwy 79 to North of Black Gap
Mercury Drive (33)	Stellar Drive to Quarter Horse Drive
E. Anamosa Street (34)	Reservoir Road to Radar Hill Road
Anderson Road (35)	Long View Road to Anamosa Street
Neva Way (36)	143rd Avenue to Country Road
Elm Avenue (37)	Catron Boulevard to Field View Drive
Enchanted Pines Drive (38)	Gemstone Drive to Minnesota Street
Creek Drive (39)	Southern Terminus to Elk Vale Road
Creek Drive (40)	Viewfield Avenue to Philadelphia Street

Figure 2 illustrates the current MSP, along with the segments that were identified for the development of conceptual plan and profiles.



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Figure 2: Major Streets Plan Prioritization Results



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Prioritization Summary

The following provides an overview of the prioritization analysis results for the 40 MSP segments listed in **Table 2** and **Table 4**. The full prioritization process is outlined in the Rapid City Area MPO Major Street Plan Prioritization Memo contained in **Appendix B**. The discussion of the results will focus on quadrants of the RCAMPO, defined as:

- **Northern Growth Area:** MPO Area north of I-90
- **Southern Growth Area:** MPO Area south of E. Fairmont Boulevard, between Sheridan Lake Road and Highway 44
- **Western Growth Area:** MPO Area south of I-90 and west of Mount Rushmore Road
- **Eastern Growth Area:** MPO Area north of Highway 44 and east of Campbell Street

Northern Growth Area

The Northern Growth Area, defined as the MPO Area north of I-90, had four MSP segments included in the prioritization analysis. The four MSP segments prioritized were:

- **Bunker Drive**, from Alma Street to Country Road (ID 3)
- **N. Lacrosse Street**, from Seger Drive to Country Road (ID 9)
- **Neva Way**, from N Haines Avenue to N Lacrosse Street (ID 14)
- **Neva Way**, from 143rd Avenue to Country Road (ID 36)

Figure 3 depicts the Northern Area Growth segments identified for plan and profile development.

The main factors influencing the prioritization scores in this area relate to the forecasted household and employment growth anticipated for this part of the MPO Area. While the Bunker Drive, Lacrosse Street, and eastern Neva Way segments are located in high household growth areas, the forecasted employment growth is relatively low. Similarly, the western Neva Way segment is located in an area expected to have both moderate household and employment growth.

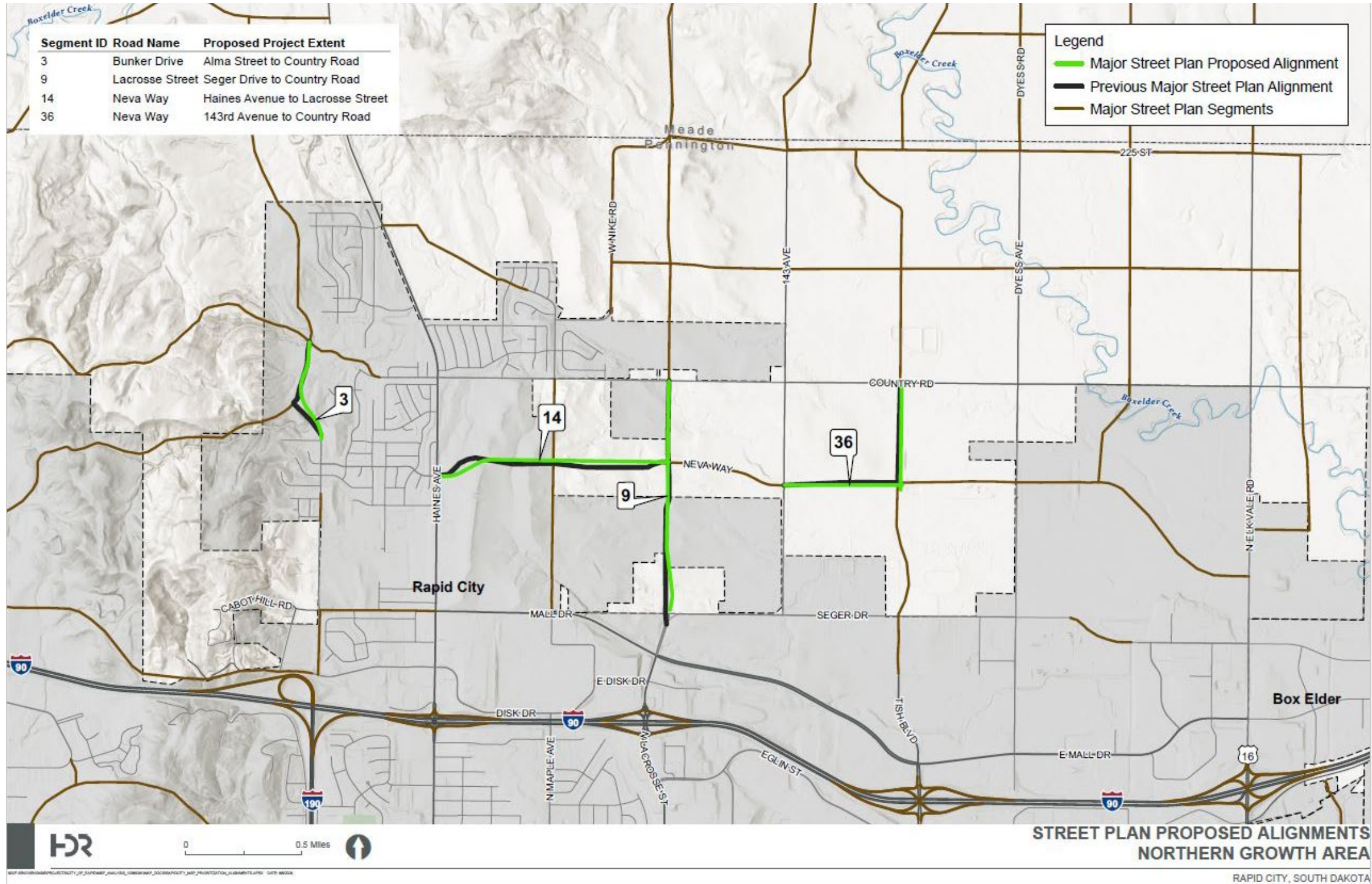
Existing traffic volumes in this area are also relatively low, which influenced low scores for all four segments. Traffic volume forecasts for this area anticipate a relatively low increase by 2045, which also resulted in relatively low scores for this prioritization metric. Several of the segments - namely Bunker Hill Drive and the western Neva Way segment - were identified as demonstrating topography and alignment constraints, which further reduced the prioritization scores for these segments.

While there is a need to address the high levels of future household and employment growth anticipated for this area, the relatively low growth in traffic volumes paired with the topographical constraints found in this part of the MPO Area resulted in these segments scoring lower when compared to segments in other growth areas.



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Figure 3: North Area Segments



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Southern Growth Area

The Southern Growth Area, defined as the MPO Area south of E Fairmont Boulevard between Sheridan Lake Road and Highway 44, had the highest number of MSP segments included in the prioritization analysis with 17. The MSP segments prioritized in this area were:

- Black Hills Boulevard, from Catron Boulevard to Upper Spring Creek Road (ID 2)
- Creek Drive, from Marlin Drive to Old Folsom Road (ID 4)
- E-W Arterial south of Addison Avenue, from Highway 16 to Black Hills Boulevard Extension (ID 6)
- E. Fairmont Boulevard, from Campbell Street to Elk Vale Road (ID 7)
- Les Hollers Way, from Sheridan Lake Road to Catron Boulevard (ID 10)
- E. Minnesota Street, from Cambell Street to S. Valley Drive (ID 11)
- North-South Collector, east of Tartan Court (ID 12)
- Nugget Gulch Road, from Moon Meadows Drive to Motherlode Drive (ID 15)
- Haugo Drive, from Catron Boulevard to Moon Meadows Drive (ID 24)
- Villaggio Lane, from Southern Terminus to Horsecreek Road (ID 25)
- Healing Way Extension, from Highway 16 to Catron Boulevard (ID 26)
- Dreamscape Road, from Sammis Trail to SD Highway 79 (ID 30)
- Southern Collector, from SD Highway 79 to Upper Spring Creek Road (ID 31)
- Southern Collector Loop, from SD Hwy 79 to north of Black Gap (ID 32)
- Elm Avenue, from Catron Boulevard to Field View Drive (ID 37)
- Enchanted Pines Drive, from Gemstone Drive to Minnesota Street (ID 38)
- Creek Drive, from Elk Vale Road to Southern Terminus (ID 39)

Figure 4 depicts the Southern Growth Area segments identified for plan and profile development.

The resulting priority scores for the segments found in the Southern Growth Area are mainly due to the high household and employment growth anticipated to occur in this part of the MPO Area. It is noted that the main Transportation Analysis Zone (TAZ) used to forecast household and employment growth in the Southern Growth Area covers a relatively large area, which can lead to inaccuracy when estimating exact locations of where future growth is anticipated to occur. Future study of this area could benefit from the disaggregation of the TAZ into several sub-areas to allow for more detailed growth analysis. In addition to the high household and employment growth, many of these segments connect corridors that demonstrate high daily traffic levels today or are forecasted to carry relatively high levels of daily traffic by 2045.



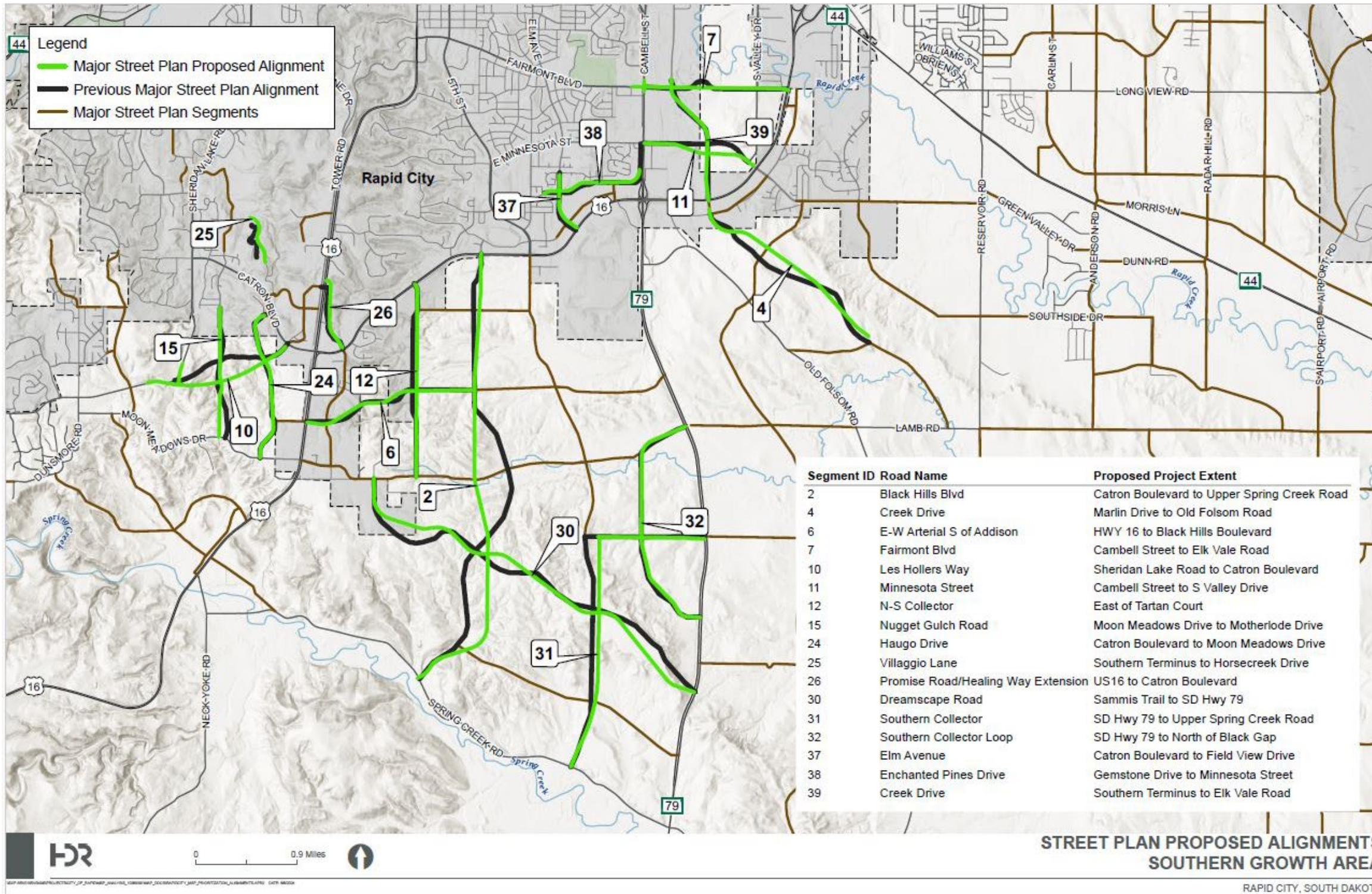
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A couple of segments received lower scores compared to others due to topographical and/or alignment constraints identified along them. Three segments were also seen to connect corridors with low existing and forecasted future daily traffic volumes.

The two segments receiving the lowest priority scores when compared to the other segments were Villaggio Lane and E Fairmont Boulevard; both are found in areas with lower household and employment growth forecasts as well as lower existing and forecasted future daily traffic volumes. The E Fairmont Boulevard segment was also identified as having a multi-line rail crossing constraint impacting its development.

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Figure 4: South Area Segments



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Western Growth Area

The Western Growth Area, defined as the MPO Area south of I-90 and west of Mount Rushmore Road, had eight MSP segments included in the prioritization analysis. The eight MSP segments prioritized were:

- Krebs Drive, from Deadwood Avenue to Commerce Road (ID 8)
- Falling Rock Road, from Southern Terminus to Victoria Lake Road (ID 18)
- Nameless Cave Road, from Northern Terminus to Schroeder Road (ID 19)
- Hidden Valley Road, from Western Terminus to Bittersweet Road (ID 20)
- Sun Ridge Road, from Western Terminus to Bittersweet Road (ID 21)
- Anamosa Street, from I-190 to Commerce Road (ID 22)
- Bethpage Drive, from Western Terminus to Sheridan Lake Road (ID 27)
- Muirfield Drive, from Western Terminus to Prestwick Road (ID 28)

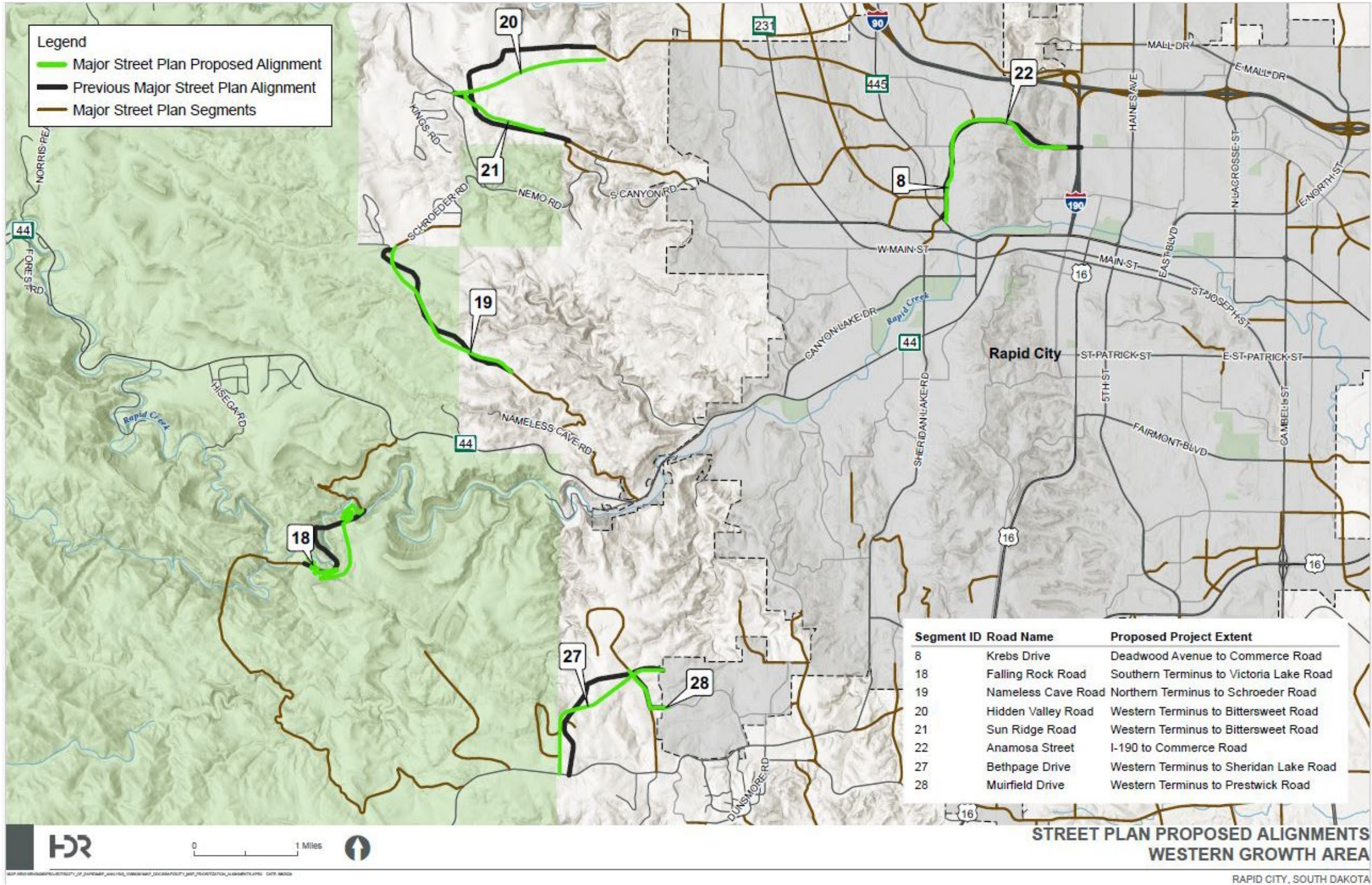
Figure 5 depicts the Western Growth Area segments identified for plan and profile development.

All MSP segments found within the Western Growth Area received lower priority scores compared to the other quadrants analyzed mainly due to the limited forecasted growth in households and employment through 2045. As household and employment growth is closely related to travel demand, it was seen that existing traffic volumes are expected to see limited growth through the year 2045, thus resulting in lower scores for this prioritization element. Adding to the lower priority score results is the presence of topographical and alignment constraints impacting several of the segments, including Falling Rock Road, Hidden Valley Road, and Anamosa Street.



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Figure 5: West Area Segments



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Eastern Growth Area

The Eastern Growth Area, defined as the MPO Area north of Highway 44 and east of E Saint Joseph Street, had 11 MSP segments included in the prioritization analysis. The 11 MSP segments prioritized were:

- E. Anamosa Street, from Elk Vale Road to Reservoir Road (ID 1)
- Degeest Drive, from Anamosa Street to Cheyenne Boulevard (ID 5)
- Neel Street, from Anamosa Street to Philadelphia Street (ID 13)
- E. Philadelphia Street, from N. Valley Drive to Reservoir Road (ID 16)
- Turbine Drive, from E. Anamosa Street to N. Turbine Drive (ID 17)
- Twilight Drive, from Eastern Terminus to Radar Hill Road (ID 23)
- E. Saint James Street, from Western Terminus to Saint Joseph Street (ID 29)
- Mercury Drive, from Stellar Drive to Quarter Horse Drive (ID 33)
- E. Anamosa Street, from Reservoir Road to Radar Hill Road (ID 34)
- Anderson Road, from Long View Road to Anamosa Street (ID 35)
- Creek Drive, from Viewfield Avenue to Philadelphia Street (ID 40)

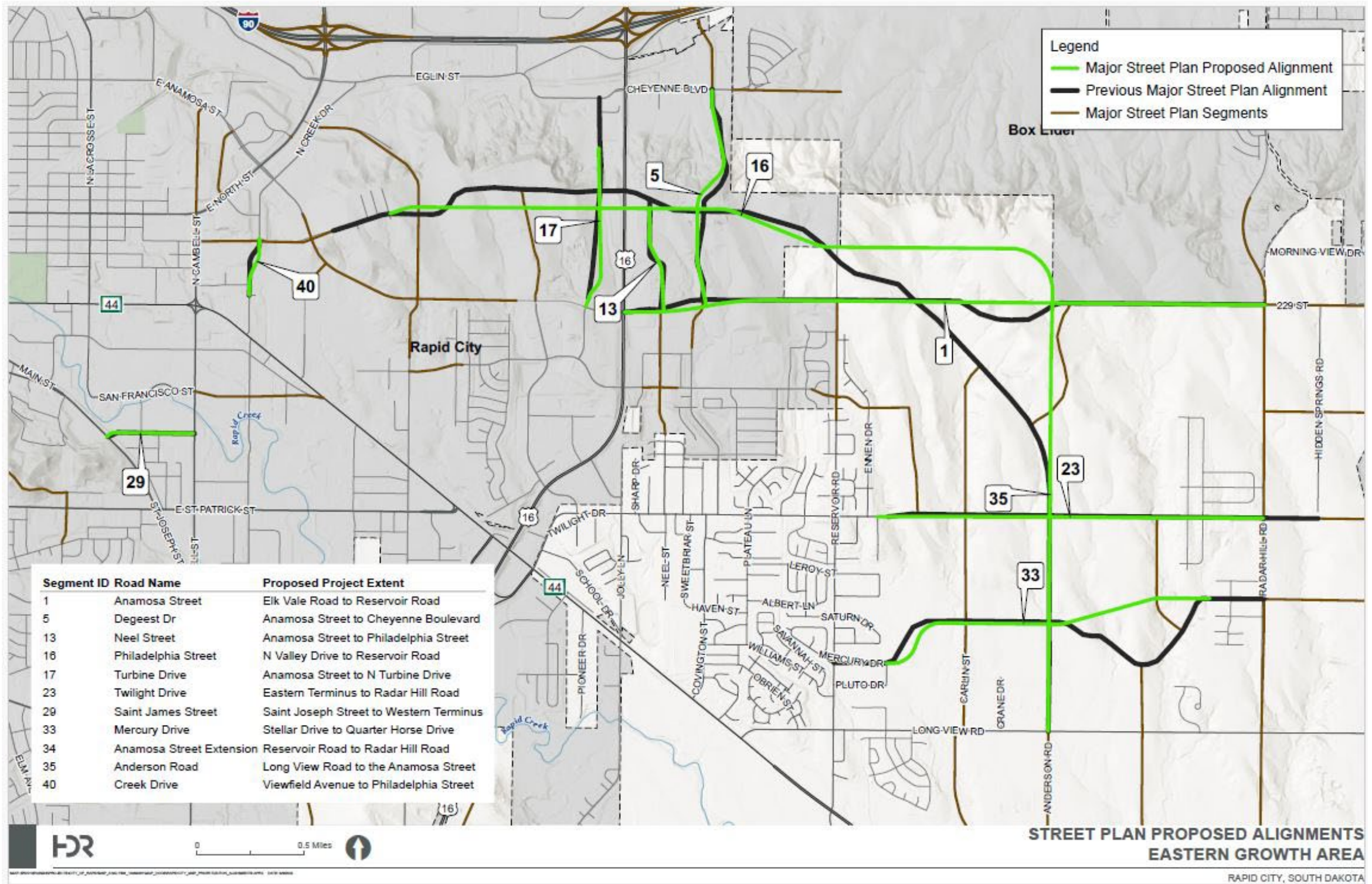
Figure 6 depicts the segments for the Eastern Growth Area identified for plan and profile development.

The Eastern Growth Area is expected to see substantial household and employment growth through 2045, which resulted in the segments located here receiving relatively high prioritization scores for those two metrics. However, low existing daily traffic volumes and moderate growth in traffic forecasts indicate that these segments are not likely to provide connections between the MPO Areas' highest-traveled future corridors through 2045. In terms of constraints, only the E Philadelphia Street and Turbine Drive segments demonstrated any type of constraint (topography) related to their alignments.



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Figure 6: East Area Segments



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III. Prioritized Roadway Segment Alignment Development Considerations & Design Criteria

Upon completion of the process to identify and prioritize corridors for conceptual design development, each corridor/segment was reviewed to identify a “best-fit” alignment which considered elements impacting the route of the corridor/segment, including but not limited to:

- **Barriers**
 - Mountainous topography
 - Existing development
 - Railroads
 - Creeks/streams/floodway
 - Higher classified roads with limited access (i.e. interstates)
- **Environmental**
 - Parks
 - Historical properties
 - Floodways/plains
- **Other**
 - Section lines
 - Existing right-of-way (ROW) available
 - Limiting impacts to existing structures where possible

The application of roadway design criteria was then used to refine the conceptual alignment to validate if the identified alignment is able to be reasonably be constructed. The design references and criteria used to advance the conceptual alignment and roadway plan and profiles included:

- **Design Guidance References**
 - Rapid City Infrastructure Design Criteria Manual (IDCM)
 - Section 2 – Streets and Right-of-Way
 - AASHTO Geometric Design of Highways and Streets
 - AASHTO Geometric Design of Low-Speed Urban Streets
 - SDDOT Road Design Manual
 - AASHTO Roadside Design Guide (RSDG)
- **Design Criteria**
 - Design Speed (IDCM)
 - Principal arterials – 50 MPH
 - Minor arterials – 45 MPH
 - Collectors – 35 MPH
 - Special considerations as needed due to constraints

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- Street Grades
 - Collectors – minimum 0.5% and maximum 10% (IDCM)
 - Arterials – 0.5% minimum and 7% maximum (AASHTO)
- Roadway Curvature (Horizontal/Vertical)
 - Collector
 - 510' minimum horizontal radius
 - “K” value (minimum) for vertical curves
 - Crest – 29
 - Sag – 49
 - Minor Arterial
 - 1,039' minimum horizontal radius (with no superelevation)
 - “K” value (minimum) for vertical curves
 - Crest – 61
 - Sag – 79
 - Principal Arterial
 - 7,870' minimum horizontal radius (with no superelevation)
 - “K” value (minimum) for vertical curves
 - Crest – 84
 - Sag – 96
- Roadway Vertical Clearances
 - SDDOT Bridge Design Manual - Section 4
 - Union Pacific Railroad/BNSF Railway Guidelines for Railroad Grade Separation Projects
 - 23' minimum from finished pavement to lowest chord of structure
 - It was assumed multi-line rail crossings would be required to be grade separated.
- Roadside Design
 - Clearzone (AASHTO RSDG)
- Roadway Typical Sections and ROW Widths
 - Collector (ICDM)
 - Three-lane – 32' pavement width, c/g, 68' ROW
 - Arterial (ICDM)
 - Three-lane – 36' pavement width, c/g, 100' ROW (less than 10,000 ADT)
 - Five-lane – 58' pavement width, c/g, 110' ROW (greater than 10,000 ADT)
- Intersection Spacing/Access Criteria
 - Signalized spacing – 1200' minimum

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RCAMPO LiDAR data (2023) was used for existing topographic data (a traditional field survey was not conducted). There was no geotechnical analysis completed as part of the study/conceptual design. However, a shrink factor of 25% was assumed for roadway embankment to assist with estimating conceptual earthwork quantities.

Conceptual Roadway Plans

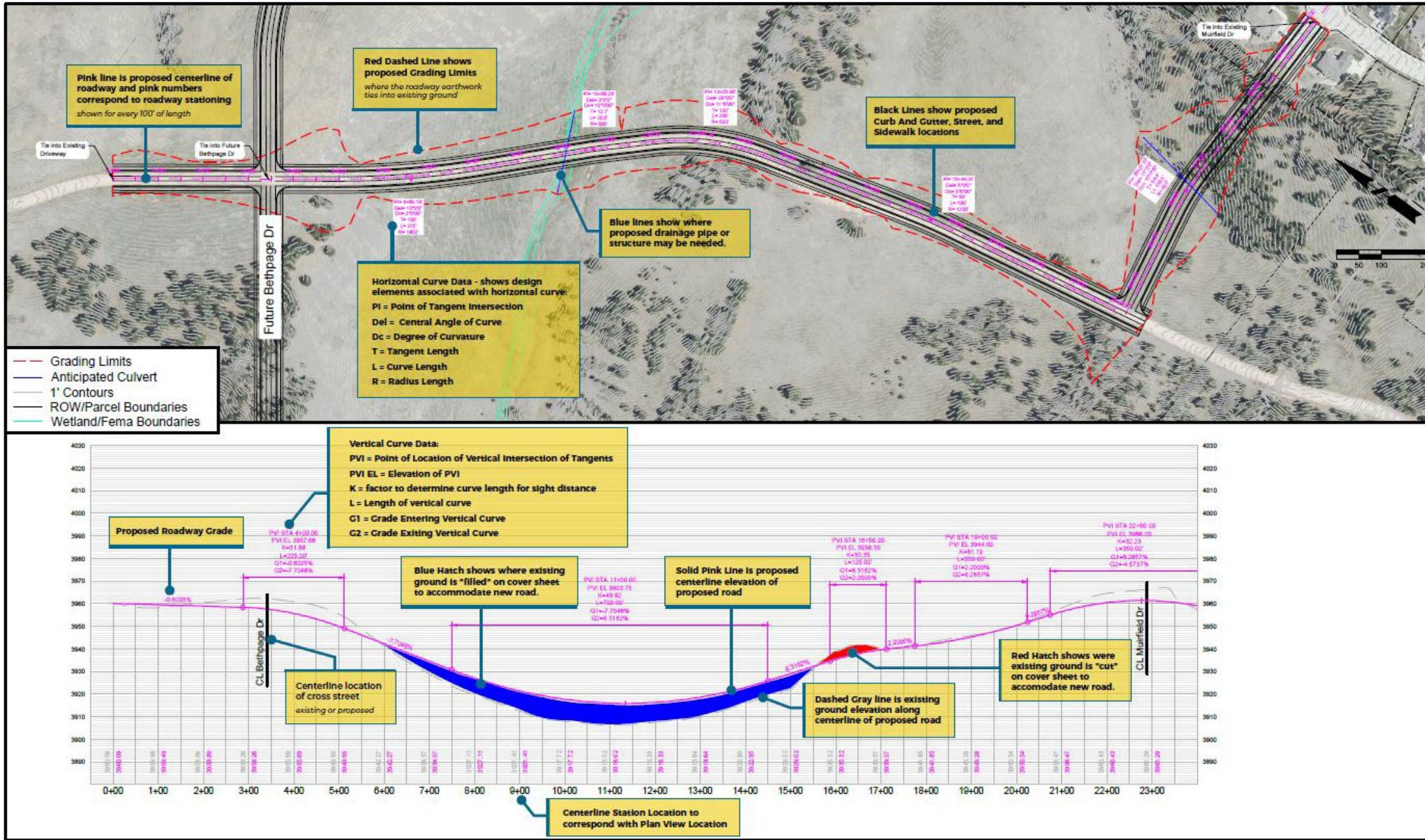
Conceptual roadway plan and profile elements were generated for the 40 segments using the design criteria previously noted. In general, the roadway profiles achieve the respective minimum/maximum design criteria for the identified roadway classification. Deviations to design criteria (e.g. design speed, grades, curvature, etc.) where required due to specific constraints/limitations were identified as special considerations for the corridor/segment. The conceptual roadway profiles were developed to follow existing grades/topography as close as practical. Special attention was given to connecting into existing roads or crossing existing roadway alignments at existing elevations. Special considerations were noted where connections to existing roads required modifications to the existing facility due to limited sight distance, railroad crossing proximity, or other topography issues. Additionally, where grading limits were identified to impact existing structures, a special consideration was noted to investigate possible retaining walls or other slope stability mitigation measures during roadway design.

The proposed conceptual roadway plan and profiles are presented for each of the identified corridors/segments in **Appendix A**. An example viewing guide is provided in **Figure 7** to assist readers in interpreting the design information contained in the conceptual roadway plan and profile figures.

The 40 conceptual roadway alignments and designs have been prepared to assist in taking the very high planning level existing MSP alignment to the next step and applying horizontal and vertical design criteria to assist in providing a higher level of accuracy and validate if the roadway is feasible for future construction. These conceptual alignments can be used as a tool for the City, landowners, and developers to aide in the expansion of the roadway network within the RCAMPO boundary.



Figure 7: Plan and Profile Viewing Guide



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IV. Jurisdictional Major Street Plan Discrepancies

As each jurisdiction within the RCAMPO has prepared Major Street or Major Roads plans independently through the years, discrepancies among proposed alignments have resulted. As part of this project, a review of the discrepancies among proposed alignments was conducted. Several proposed roadway alignments in the northern/eastern portion of the RCAMPO were noted to have inconsistent alignments between the City of Rapid City Major Street Plan and the Pennington County Major Roads Plan.

As part of this review there were multiple street segments which have recently been constructed and the as-built alignment has yet to be updated in the Major Street Plan. These alignments include:

- **E. Mall Drive** – from Elk Vale Road to Seger Drive
- **Seger Drive** – from Elk Vale Road to E. Mall Drive

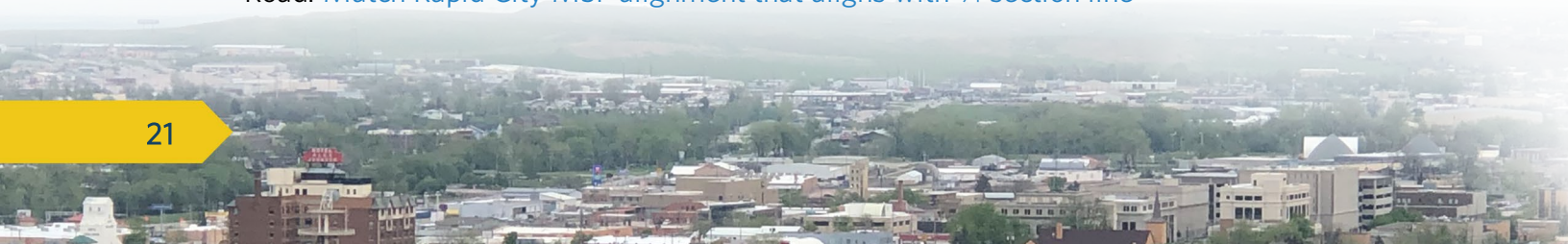
Alignment discrepancies for notable segments were identified as follows:

- **Anamosa Street Extension** – from Elk Vale Road to Anderson Road
- **Anderson Road Extension** – from Twilight Road to Anamosa Street
- **N-S Collector (East of Hidden Springs Road)** – from Quarter Horse extension to Anamosa Extension
- **E-W Collector (North of RC Regional Airport RPZ)** – from 149th Avenue to Radar Hill Road

Additional discrepancies were also identified for multiple segments north and east of the Rapid City Regional Airport which are likely not to develop within the current planning horizon. The street/roadway discrepancies which have been identified and recommendations for the priority alignment are noted in **Figure 8**.

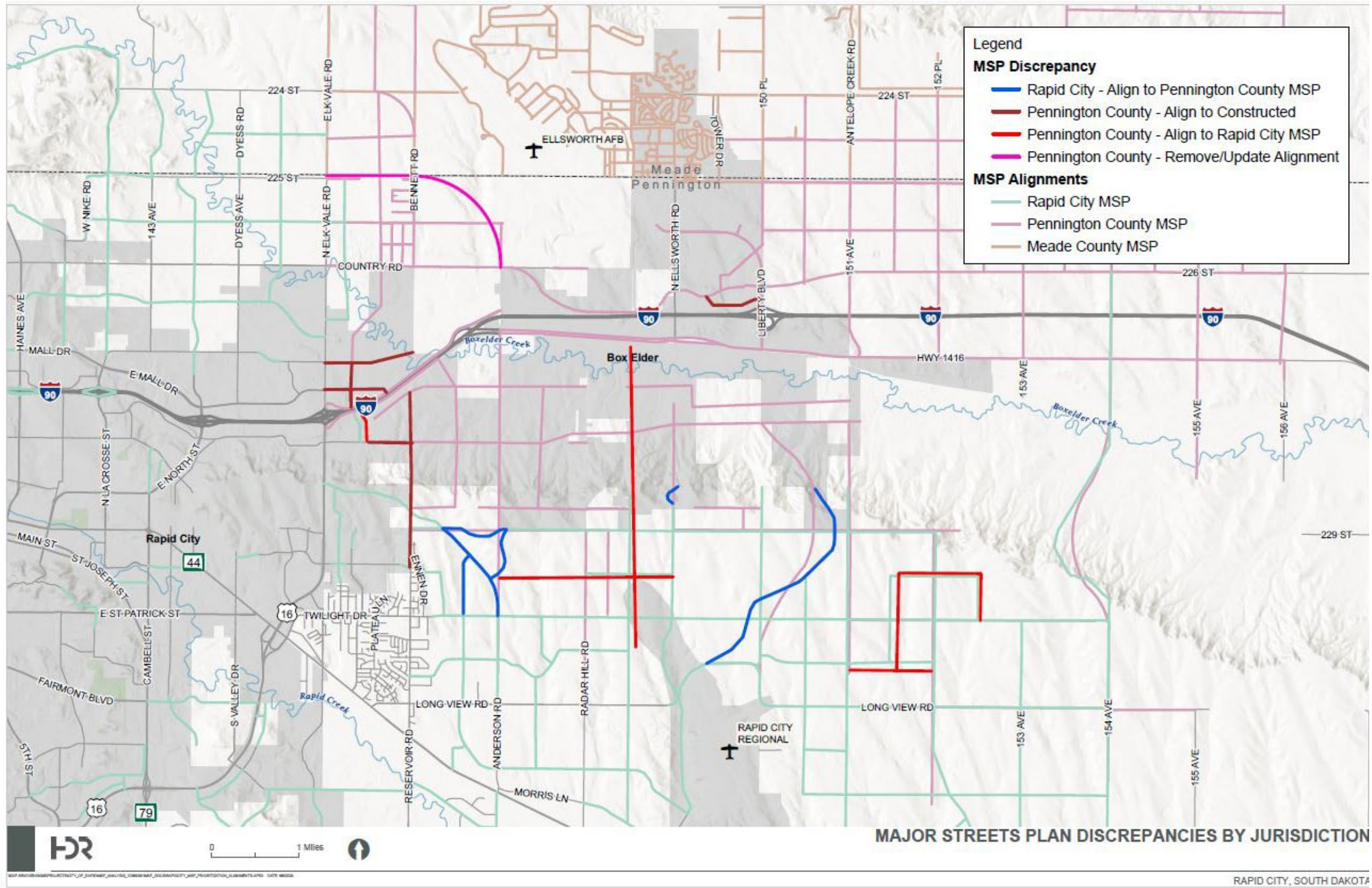
Recommendations to address the identified discrepancies are as follows:

- **E. Mall Drive** – from Elk Vale Road to Seger Drive: [Update to as-built alignment](#)
- **Seger Drive** – from Elk Vale Road to E. Mall Drive: [Update to as-built alignment](#)
- **Anamosa Street Extension** – from Elk Vale Road to Anderson Road: [Match Pennington County/alignment developed as part of this study \(follows section line\)](#)
- **Anderson Road Extension** – from Twilight Road to Anamosa Street: [Match Pennington County/alignment developed as part of this study \(follows section line\)](#)
- **N-S Collector (East of Hidden Springs Road)** – from Quarter Horse extension to Anamosa Extension: [Match Rapid City MSP alignment which minimizes encroachment to Rapid City Regional Airport RPZ and follows ¼ section line](#)
- **E-W Collector (North of RC Regional Airport RPZ)** – from 149th Avenue to Radar Hill Road: [Match Rapid City MSP alignment that aligns with ¼ section line](#)



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Figure 8: Jurisdictional Major Street Plan Discrepancies



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V. Public Involvement

There were two public meetings held as part of the study. The first public meeting was held on July 13, 2023 in Rapid City at City Hall. All meeting materials were also posted online at the project website www.RCmajorstreets.com so that those interested in the project and unable to attend in person could review meeting materials and provide comments and feedback. The first public meeting introduced the project to the community and requested input on the corridor selection and screening process to identify the corridors for which conceptual alignments would be developed. A total of 25 attendees was present at the first public meeting with additional comments being provided on comment forms and through the study website.

A second public meeting was held on May 28, 2024 in Rapid City at City Hall to present the results of the corridor screening process and the conceptual alignment plan and profiles for the prioritized corridors. All meeting materials were posted online on the project website including a presentation on the completed analysis, the proposed segment plan and profiles which were developed, and an interactive map which allowed participants to view the proposed corridor alignment with available MPO data in the background including the original MSP alignment, topography, parcel data, drainage/flood information, etc. There was a total of 16 attendees present at the second public meeting and several comments submitted through the project website.

A summary of the public meetings can be found in **Appendix C**.

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VI. Findings and Recommendations

Findings

The suggested MSP alignments for reasonably constructable corridors are shown in **Figure 9**. Multiple corridors were identified which may not reasonably meet horizontal or vertical design criteria or would require an impractical amount of earthwork. The following corridors were found to exhibit characteristics which could not reasonably meet design criteria or have constructability constraints:

- **Falling Rock Road (18)** – from Southern Terminus to Victoria Lake Road
 - Steep topography requires “switch-back” design which does not satisfy horizontal curve design requirements for required design speed
- **Anamosa Street (22)** – from I-190 to Commerce Road
 - Requires in excess of 120 feet of cut and over four million yards of earthwork and impacts to existing recreation area

All remaining segments selected for conceptual plan and profile development are anticipated to be feasible and/or constructable by applying current design criteria as noted in Section IV of this report. It should be noted that several of the corridors have constraints or other special considerations that should be further examined on a case-by-case basis as the segments move from concept to design and then construction. Segments identified with special considerations are as follows:

Table 5: Northern Growth Area – Special Considerations

ID	Segment Name	Special Considerations
3	Bunker Drive	Possible retaining walls required to limit existing development/structure impacts at current northern terminus.
9	N. LaCrosse Street	Proposed segment is shown as five lane section as an extension of the existing five-lane section.
36	Neva Way	The north-south portion of this segment will likely be identified as “Tish Boulevard”.



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Table 6: Southern Growth Area – Special Considerations

ID	Segment Name	Special Considerations
7	Fairmont Boulevard	Impacts to 100-year floodplain. Rail grade-separated and at-grade options for west end were developed. Current multi-rail line exists at crossing location. K value for grade-separated crossing vertical curve does not meet minor arterial requirement.
10	Les Hollers Way	Re-alignment of Sheridan Lake Road required on west end for proposed configuration. Conceptual alternative intersection at Catron Boulevard provided should traffic volumes on Les Hollers exceed Catron Boulevard volumes west of US Hwy 16.
11	Minnesota Street	Impacts to floodway and 100-year floodplain. Rail grade-separated and at-grade options for single track rail crossing developed. K value for grade-separated crossing vertical curve does not meet minor arterial requirement.
12	N-S Collector (East of Tartan)	Overhead utility line impacts likely.
25	Villagio Lane	May need design exception for maximum grade on collector.
26	Healing Way	SDDOT has designed and is planning to construct northern portion of segment (north of Tucker Street).
37	Elm Avenue	Impacts to 100-year floodplain.
38	Enchanted Pines Drive	Impacts to 100-year floodplain.
39	Creek Drive	Impacts to 100-year floodplain.



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Table 7: Western Growth Area - Special Considerations

ID	Segment Name	Special Considerations
19	Nameless Cave Road	Will require realignment of existing Schroeder Road at proposed new intersection/connection point.
20	Hidden Valley Road	The sight distance at existing Bittersweet Road/Nemo Road intersection meets a 50 MPH design speed; however, backslope and vertical curve grading may be necessary to meet a 55 MPH design speed on Nemo Road. Consider steeper slopes to reduce property impacts near Station 22+00.
27	Bethpage Drive	Proposed profile at Sheridan Lake Road connection is shown to match existing road grade to minimize existing property impacts. Grade exceeds maximum criteria by 1% (11%). Proposed north-south portion follows section line (with USFS property on west) and could be shifted east to allow development on either side of proposed collector.

Table 8: Eastern Growth Area - Special Considerations

ID	Segment Name	Special Considerations
5	Degeest Drive	Connection south of Anamosa Street will require further review to connect into existing segment alignment.
13	Neel Street	Connection south of Anamosa Street will need further review to connect into existing segment alignment.
16	Philadelphia Street	Collector west of Elk Vale Road and minor arterial east of Elk Vale Road. A proposed grade-separation was provided over Elk Vale Road. This location could be studied/considered for an interchange pending future traffic demands.
23	Twilight Drive	Design speed reduced to 35 MPH through existing residential areas with platted right-of-way. Retaining walls will be necessary to limit impacts to existing properties in these areas.



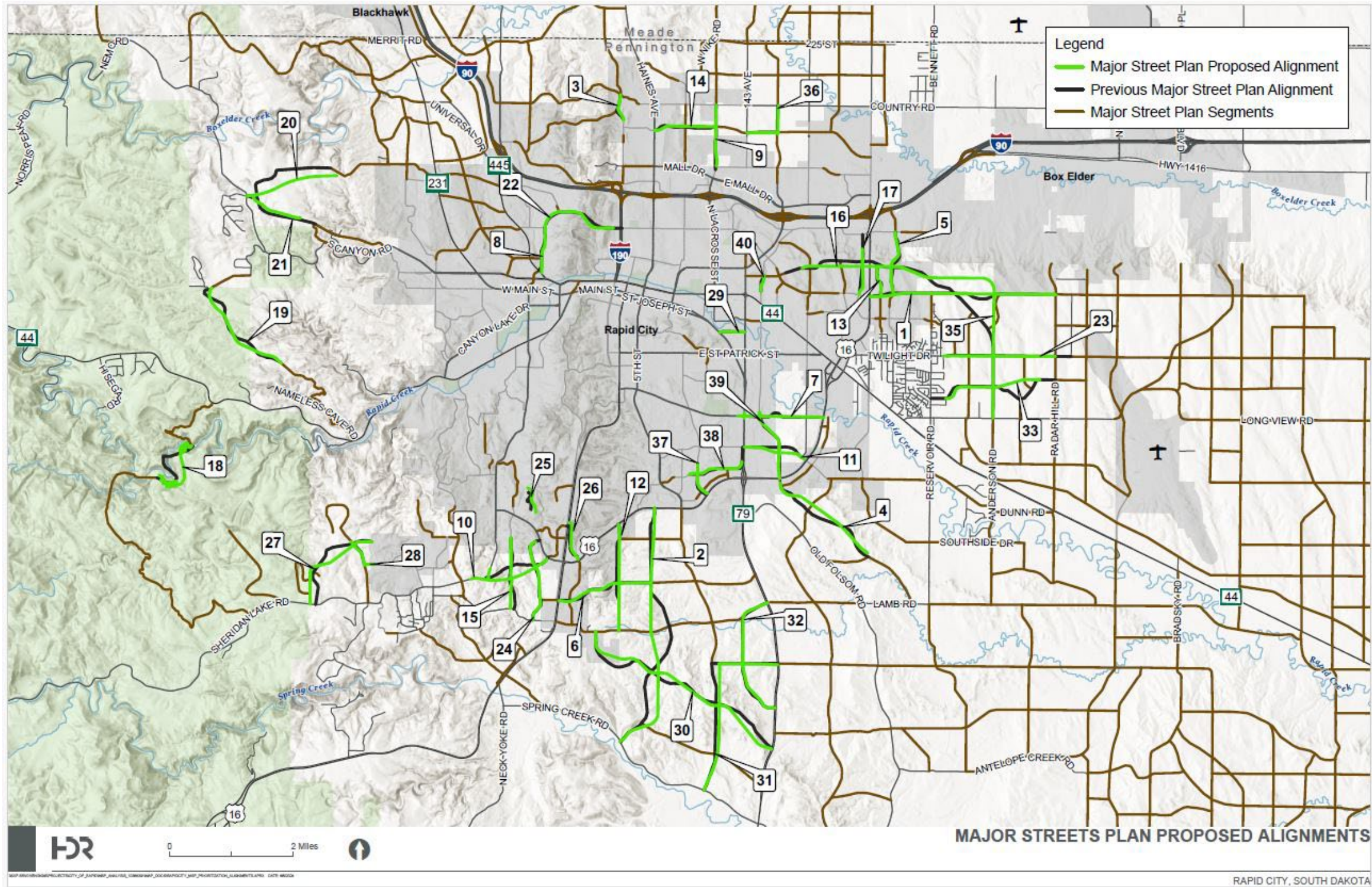
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ID	Segment Name	Special Considerations
29	Saint James Street	A grade-raise on St. Joseph Street of approximately seven feet and retaining wall along SDSMT parking lot will be required to make connection. Proposed grading impacts the floodway/plain. At-grade rail crossing and permit required. Space for single vehicle queue is available between railroad tracks and STOP bar. Reduced design speed (25 MPH) for horizontal curve entering STOP condition at E. St. Joseph Street.



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Figure 9: Suggested Major Street Plan Alignments



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Recommendations

The recommended conceptual centerline alignments and profiles can generally achieve current design criteria and are anticipated to be reasonably constructable in the identified location. The proposed conceptual alignments and profiles are not based upon survey quality topographical data and have not been reviewed for geotechnical considerations or impacts to existing utilities. The proposed alignments/profiles can be modified to accommodate adjacent proposed development grading plans, changes in anticipated development patterns, updated design criteria, and acquisition of additional and/or more accurate data. Further, there may be segments which exhibit traffic volumes on the lower end of the collector threshold and be designed to meet local street criteria while still providing the desired connectivity for the street network.

It is recommended the centerline alignments of the reasonably constructable corridors be updated in the MSP and the corridors identified for removal be removed from the MSP by the formal process identified in the City of Rapid City Comprehensive Plan for amendments.

The following corridor is recommended to be added to the MSP:

- **Healing Way (26)** – from Hwy 16 to Catron Boulevard

The following corridors are recommended to be removed from the MSP:

- **Falling Rock Road (18)** – from Southern Terminus to Victoria Lake Road
- **Anamosa Street (22)** – from I-190 to Commerce Road
 - It is further recommended an alternative east-west connection be examined south of I-90 (north of Anamosa Street) to achieve a desired east-west connection to the Deadwood Avenue Corridor.

The recommended MSP is presented in **Figure 10**.

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Figure 10: Major Street Plan Recommendations

