Appendix D

Methods and Assumptions Document

METHODS & ASSUMPTIONS

FOR THE
RAPID CITY AREA MPO
MAJOR STREET PLAN ANALYSIS & UPDATE

PREPARED BY HDR ENGINEERING

FOR THE

RAPID CITY AREA METROPOLITAN PLANNING ORGANIZATION

AND

THE SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

IN CONJUNCTION WITH

THE FEDERAL HIGHWAY ADMINISTRATION

April 28, 2023

This Methods and Assumptions Document was developed in preparation for the Methods and Assumptions Meeting held as part of the project kick-off meeting with representatives from the Rapid City Area Metropolitan Planning Organization (MPO), the South Dakota Department of Transportation (SDDOT), and the Federal Highway Administration (FHWA). This document is intended to serve as a historical record of the study process and methodologies, dates, and decisions made by the study team representatives for the Rapid City Area MPO Major Street Plan Analysis and Update.

Stakeholder Acceptance Page

The undersigned parties concur with the Methods and Assumptions for the Rapid City Area MPO Major Street Plan Analysis and Update as presented in this document.

MPO:

Kip Harrington
Signature

Long Range Planning Manager
Title

5/15/2023
Date

SDDOT:

Signature

Sarah M. Gilkerson

Title

Date

FHWA:

GREGORY L HEITMANN
Signature

Digitally signed by GREGORY L HEITMANN
Date: 2023.05.22 15:39:15 -05'00'

Title

Date

Notes:

(1) Participation on the Study Advisory Team and/or signing of this document does not constitute approval of the Rapid City Area MPO Major Street Plan Update and Analysis Final Report or conclusions.

(2) All members of the Study Advisory Team will accept this document as a guide and reference as the study progresses through the various stages of development. If there are any agreed upon changes to the assumptions in this document a revision will be created, endorsed and signed by all the signatories.

1. Introduction and Project Description

Background Information

Rapid City was the first jurisdiction in the Rapid City Area Metropolitan Planning Organization (RCAMPO) to adopt a Major Street Plan in 1990, and has performed numerous revisions to the Major Street Plan to date. However, many of the proposed future road alignments have not been analyzed since the initial creation of the plan. Many of the proposed segments have become dated due to changes in land use, development, and construction projects through the years. Additionally, most of the other RCAMPO member agencies have adopted Major Street Plans or Transportation Plans, leading to incongruities among road alignments and classifications. As Rapid City and the surrounding communities continue to develop and grow, the need for analyzing and reviewing the current plans has become apparent. Issues with slope, constructability, and alignment have surfaced on numerous proposed roadway segments. A preliminary look at identifying alignment and constructability issues was completed in the RapidTRIP 2045 Metropolitan Transportation Plan. This study is intended to expand on that process and update the Major Street Plan and develop conceptual alignments for selected corridors.

Location and Study Area

The Rapid City Area MPO is located in western South Dakota and area of study includes the City of Rapid City, the City of Summerset, the City of Box Elder, the City of Piedmont, unincorporated areas of Black Hawk and Rapid Valley, and the developing portions of Pennington and Meade Counties as depicted in **Figure 1**.

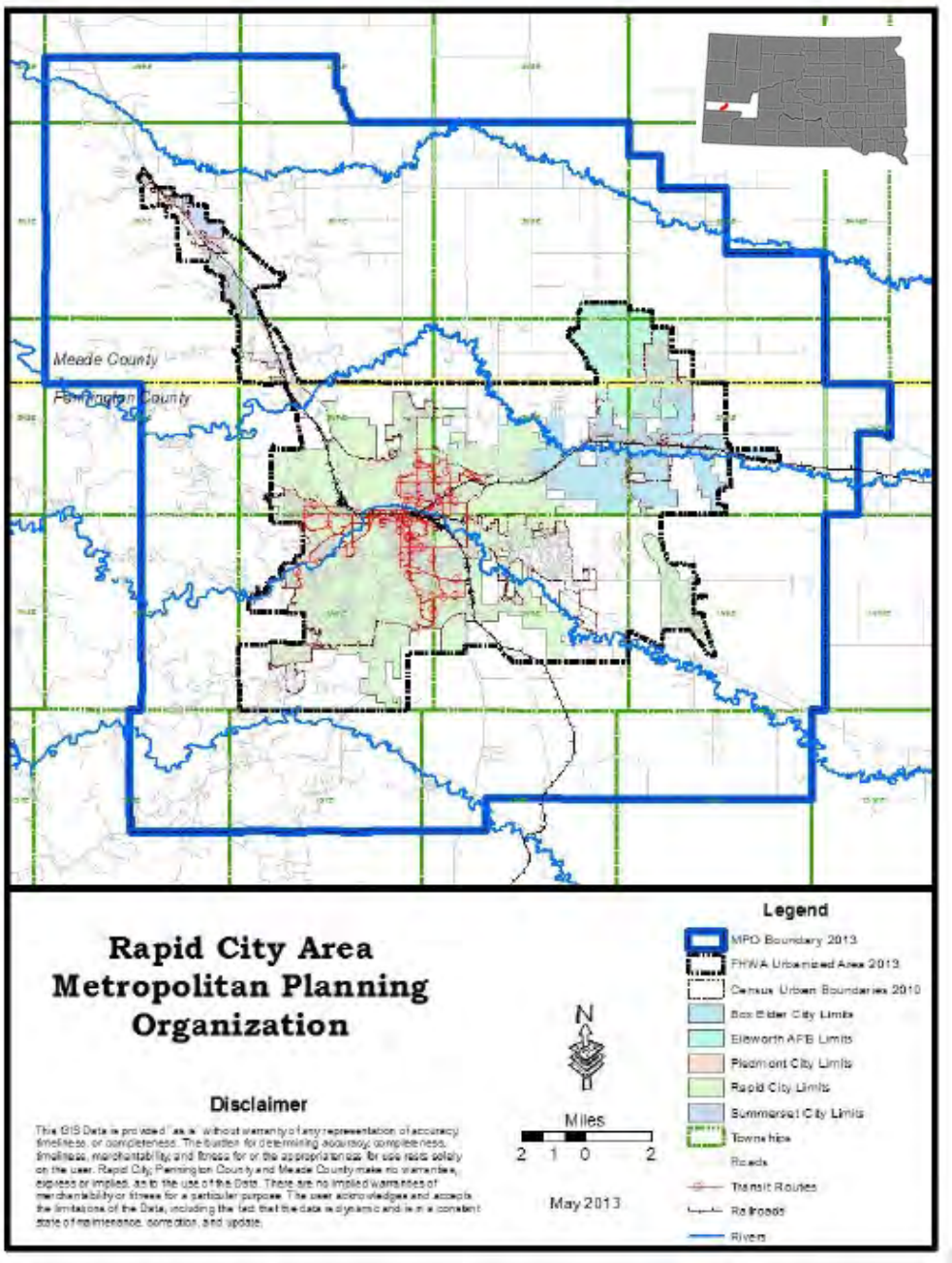

Figure 1: Study Area
(Obtained from RFP)

Need for Study

Many of the proposed future road alignments in the Rapid City Major Street Plan have not been analyzed since the initial creation of the plan. A large portion of the proposed segments have become dated due to changes in land use, development, and construction projects through the years. Most of the other RCAMPO member agencies have adopted

Major Street Plans or Transportation Plans, leading to incongruities among road alignments and classifications. As Rapid City and the surrounding communities continue to develop and grow, the need for analyzing and reviewing the current plans has become apparent. Issues with slope, constructability, and alignment have surfaced on numerous proposed roadway segments.

This study includes the following tasks to aid in the analysis and updating the Major Street plan:

- Review and Analysis of the existing Major Street Plans for all of the MPO member agencies to identify issues with alignment or classification.
- Review of constructability, slope, and alignment for roads in developing areas and identification of up to 40 corridors to further refine and develop conceptual layouts.
- Updating Major Street Plan and developing alignments and profiles for up to 40 corridors identified in the Major Street Plan analysis.
- Consistency with federal and state guidelines with respect to public participation.

Study Schedule

Date	Task/Event
March 24, 2023	Notice to Proceed
April 2023	Kick Off Meeting (SAT – 1)
May 2023	Pre-Public Meeting No. 1 (SAT – 2)
June 2023	Public Meeting No. 1
December 2023	SAT - 3
March 2024	Pre-Public Meeting No. 2 (SAT – 4)
March 2024	Public Meeting No. 2
April 2024	Report Presentations and Study Completion

Facilities Affected by Study

The facilities affected by this project include the Major Streets identified in the Major Street Plans for the Rapid City Area MPO and its respective member agencies.

Previous Studies

The agency partners for this study have identified a few previous studies that would appear to benefit or provide background for this study:

- Rapid Trip 2045 (existing MTP for MPO)
    - https://rapidcityareampo.org/application/files/5115/9665/7703/20TP028_-_Metropolitan_Transportation_Plan_-_Final_Report.pdf

- Rapid City Major Street Plan

  - https://www.rapidcityareampo.org/application/files/9215/3918/8445/Major_Street_Plan_11X17_signed.pdf
- Plan Rapid City (Rapid City Comprehensive Plan)
  - https://www.rcgov.org/index.php?option=com_docman&view=download&alias=23936-rapid-city-comprehensive-plan-adopted-april-2014-with-maps-no-appendices&category_slug=transportation-planning&Itemid=149
- Pennington County Master Transportation Plan
  - https://dot.sd.gov/media/documents/11-096PennFinalReport.pdf
- Meade County Master Transportation Plan
  - https://dot.sd.gov/media/documents/Meade%20County%20MTP%20Final%20Report2_Final_PDF_20220715.pdf
- Box Elder Strategic Transportation Plan
  - https://www.boxelder.us/documents/view/box-elder-strategic-transportation-plan-final-12-01-2014
- Summerset Comprehensive Plan
  - https://nebula.wsimg.com/516dd7a82412c6052aed647395ce4ef5?AccessKeyId=1827892A2DC3F5DD9B4B&disposition=0&alloworigin=1
- Sheridan Lake Corridor Study
  - https://www.rapidcityareampo.org/application/files/2715/9181/7556/PROJECT_2373_Sheridan_Lake_Road_Traffic_Study_FINAL_COMPLETE_REPORT_reduced.pdf
- East Rapid City Corridor Study
  - https://mail.rapidcityareampo.org/application/files/4515/5433/1393/19TP013_-_East_Rapid_City_Traffic_and_Corridor_Analysis_Study_-_Draft_Report.pdf
- Cambell Street Corridor Study
  - https://mail.rapidcityareampo.org/application/files/8416/6015/7902/22TP018_-_Cambell_Street_Structure_Study_-_Final_Report.pdf
- US16 Corridor Study
  - https://dot.sd.gov/media/rep_US16_Corridor_Study_2021-0714.pdf
- Additional studies may be added at the discretion of the SAT

Study Advisory Team Members

Participant	Agency
Kelly Brennan	RCAMPO
Kip Harrington	RCAMPO
Roger Hall	Rapid City Public Works
Todd Peckosh	Rapid City Engineering
Sara Odden	Rapid City Engineering
Greg Heitmann	FHWA
Sarah Gilkerson	SDDOT

2. Data Collection

Data collection needs for the study will be provided by the MPO and / or member jurisdictions, and are identified as follows:

- GIS Data including:

  - major street plan
  - existing functional classifications
  - street inventory including existing lanes and posted speeds
  - existing and future land uses
  - parcel data
  - structure data
  - barriers
    - streams/creeks/ponds
    - railroads
    - parks
    - historical properties
    - flood plains
- Recent and on-going studies at the City/Regional/State Level
- Current Lidar data and Aerial Photography
- Travel Demand Model 2045 - traffic volumes

3. Traffic Operations Analysis

There will be no traffic operations analysis associated with the study.

4. Travel Forecasting

There will be no travel forecasting associated with the study. However, 2045 traffic volumes from the RCAMPO Travel Demand model may be used to assist with roadway typical section development.

5. Safety

There will be no safety analysis associated with the study.

6. Multimodal Analysis

There will be no multimodal analysis associated with the study.

7. Major Street Plan Design Criteria

The following standards/criteria will be used to develop roadway typical cross-sections, conceptual geometrics and roadway profiles:

Outline of 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
- Street Grades
  - Collectors – Min. 0.5% and Max. 10% (IDCM)
  - Arterials – AASHTO design criteria
- Roadway Curvature (vertical/horizontal)
  - AASHTO design criteria
  - No Superelevation
- 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
    - It is assumed all conceptual alignments crossing rail facilities will be grade separated.
- Roadside Design
  - Clear zone (AASHTO RSDG)
- Roadway Typical Sections and ROW Widths
  - Collector (IDCM)
    - Three lane – 32’ pavement width, c/g, 68’ ROW
  - Arterial (IDCM)
    - Three lane – 36’ pavement width, c/g, 100’ ROW (less than 10,000 ADT)
    - Five lane – 58’ pavement width, c/g, 110’ ROW – tangent sections (greater than 10,000 ADT)
- Intersection Spacing/Access Criteria
  - Signalized Intersection Spacing – 1200’ minimum

8. Deviations/Justifications

There are no known deviations/justifications at this time. Any modifications to study methodologies or assumptions will be addressed through an amendment to this document.

9. Conclusion

All sections contained in this document will guide the development of the Major Street Plan Analysis and Update.

10. Appendices

The appendix includes the following:

A. Methods and Assumptions Meeting Minutes

Meeting Minutes

Project:	RCAMPO – Major Street Plan Analysis and Update
Subject:	M&A Meeting Minutes
Date:	Friday, April 28, 2023
Location:	Rapid City City Hall and Virtual Option
Attendees:	Kip Harrington – RCAMPO Kelly Brennan – RCAMPO Roger Hall – RC Public Works Todd Peckosh – RC Engineering Sara Odden – RC Engineering Sarah Gilkerson – SDDOT Greg Heitmann - FHWA Dustin Hamilton – HDR Stacia Slowey – HDR Ally Carson – HDR Gunnar Ensz – HDR Jeremy Williams - HDR

The Methods and Assumptions Document for the Rapid City Area MPO Major Streets Plan Analysis and Update was held immediately following the project Kick-off Meeting on Friday, April 28, 2023 held at City Hall in Rapid City with a virtual meeting attendance option. The Draft Methods and Assumptions Document was presented by HDR and the following items were specifically discussed with regard to each referenced section:

1. Section 1 - Previous Studies (Page 7) – The SAT noted additional previous studies which may benefit the project included:
    a. Sheridan Lake Road Corridor Study
    b. East Rapid City Corridor Study
    c. Cambell Street Corridor Study
    d. US16 Corridor Study
2. Section 7 – Outline of References (Page 8) – It was noted the 2023 Rapid City Infrastructure Design Criteria Manual should be used.
3. Section 7 – Roadway Curvature (Page 9) – The City requested adding in that superelevation should not be used in the conceptual designs and typical roadway crown should be used.
4. Section 7 – Roadway Vertical Clearances (Page 9) – It will is assumed that all alignments crossing rail facilities will be grade separated.
5. Section 7 – Roadway Typical Sections and ROW Widths (Page 9) – ROW for Major Arterial tangent sections to be 110’.
6. Section 7 – Intersection Spacing/Access Criteria (Page 9) – Added “Access Criteria” to section heading and noted signalized intersection/access spacing of 1200’ minimum.