
Appendix B – Methods and Assumptions

Methods and Assumptions Document

Date: Monday, February 04, 2019

Project: Meade County Corridor Study

To: Kelly Brennan

From: HDR

Subject: Methods and Assumptions Document

This Methods and Assumptions document was developed in preparation for the Methods and Assumptions Meeting held as part of the project start-up with representatives from Rapid City Metropolitan Planning Organization (MPO), Meade County, South Dakota Department of Transportation (SDDOT), the Federal Highway Administration (FHWA) and HDR. This document is intended to serve as a historical record of the process, dates, and decisions made by the study team representatives for the **Meade County Corridor Study**.

1. Stakeholder Acceptance Page

The undersigned parties concur with the Methods and Assumptions for the **Meade County Corridor Study** as presented in this document.

Rapid City MPO:

Patsy Horton
Signature

Long Range Planning Mgr.
Title

2/11/2019
Date

SDDOT:

[Signature]
Signature

MPO Coordinator
Title

2-5-19
Date

FHWA:

MARK D HOINES
Signature

Digitally signed by MARK
D HOINES
Date: 2019.02.04 10:55:48
-06'00'

Planning/Civil Rights Specialist
Title

02/04/2019
Date

2 Introduction and Project Description

2.1 Project Background and Understanding

The Rapid City Metropolitan Planning Organization (MPO) in conjunction with Meade County, the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA) has contracted with HDR Engineering, Inc. (HDR) to perform a corridor study of a new east-west arterial between Erickson Ranch Road to 143rd Avenue in Meade County, South Dakota.

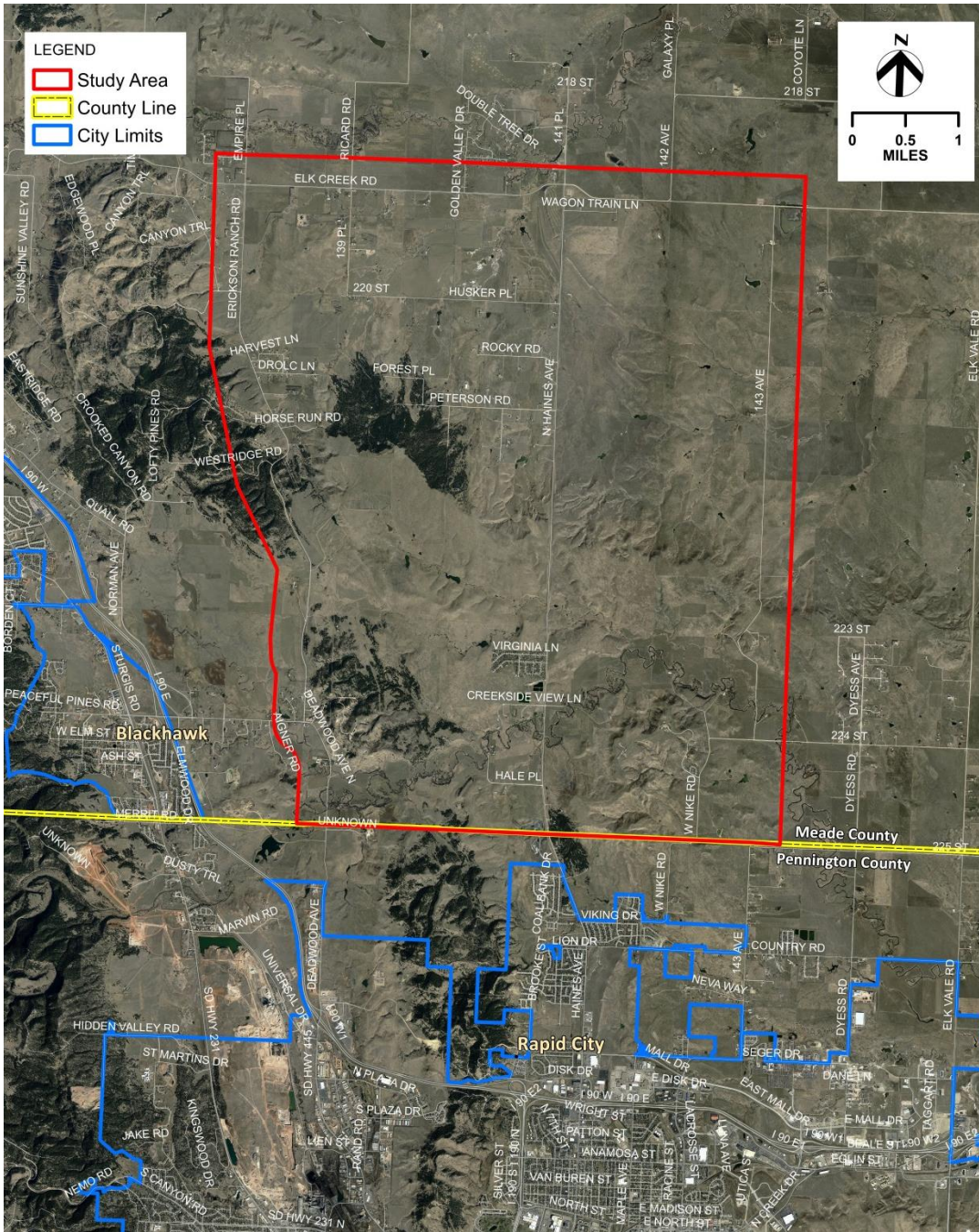
Due to increased development generating additional demands on the county road system, MEADE Moving Forward 2040 Transportation Plan identifies a need for an additional east/west connection between Erickson Ranch Road and 143rd Avenue. Identifying a conceptual alignment will enable Meade County to plan for the potential development in the area.

This study is expected to fulfill the following objectives:

1. Synthesize previous information, reports, and studies applicable to the study area and perform the necessary data collection to aid in the analysis of different alternatives.
2. Forecast and analyze traffic for current and future conditions.
3. Identify up to three alternatives including the no build option. Examine each alternative at the conceptual level to determine the advantages and disadvantages. Provide recommended alternatives to Meade County and the MPO.
4. Perform an environmental scan within a 200 foot buffer surrounding the study corridor and summarize the findings.

2.2 Location

The study area is shown in Map 1 outlined in red and includes the area between the Meade County/Pennington County line to the south, Elk Creek Road to the north, Erickson Ranch Road to the west, and 143rd Avenue to the east. The study will include Elk Creek Road, Erickson Ranch Road, 143rd Avenue, 224th Street, 225th Street, and Nike Road.



Map 1 – Study Area

2.3 Need for Study

Increased development within Meade County, and more specifically the southern portion of the county, has generated additional demands on the county road system. The need for a new east-west connector road is identified within the Meade Moving Forward 2040 Transportation Plan between Erickson Ranch Road and 143rd Avenue. The study will allow Meade County to plan for the potential development in the area.

2.4 Study Schedule

Date	Task/Event
December 21, 2018	Notice to Proceed
February 2019	Kick-off Meeting and Methods and Assumptions Meeting
March 2019	Provide Methods and Assumptions Documentation, Address Comments
January 2019 – March 2019	Data Gathering
March 2019	Public Meeting # 1
June 2019	Public Meeting # 2 & Stakeholder Meetings
November 2019	Draft Report
November 2019	Public Meeting # 3
December 2019	Final Report

2.5 Facilities Affected by the Study

The study corridor is proposed to be between the Meade County/Pennington County line to the south, Elk Creek Road to the north, Erickson Ranch Road to the west, and 143rd Avenue to the east. The following intersections are acknowledged to be affected by the study:

- Elk Creek Rd & Erickson Ranch Rd
- Elk Creek Rd & Haines Ave
- Elk Creek Rd & 143rd Ave
- 143rd Ave & 224th St
- Nike Rd & 224th St
- Peaceful Pines Rd & Erickson Ranch Rd

A future east-west arterial will be included in the Future Build Scenario between Erickson Ranch Road and 143rd Avenue. Up to three alternatives will be analyzed including the no-build scenario. Recommended alternatives will be included in the study report.

2.6 Previous Studies

The following previously conducted studies will be reviewed during the course of this study:

- Meade Moving Forward 2040 Transportation Plan
- Meade County Comprehensive Plan
- Rapid City Major Street Plan
- RapidTRIP 2040 – Rapid City Area Long Range Transportation Plan Update
- Plan Rapid City – Comprehensive Plan Update
- Elk Creek Road Corridor Study

2.7 Study Advisory Team Members

A Study Advisory Team has been formed to guide the study through completion. The Study Advisory Team is comprised of representative parties of the Rapid City MPO, Meade County, SDDOT, and the FHWA. Members of the Study Advisory Team are:

Participant	Agency
Kelly Brennan	Rapid City Area MPO
Kip Harrington	Rapid City Area MPO
Bill Rich	Meade County - Planning/Zoning
Rhea Crane	Meade County - Planning/Zoning
Scott Tegethoff	Meade County Highway
Talbot Wieczorek	Meade County Commission
Doreen Creed	Meade County Commission
Brad Remmich	SDDOT
Stacy Bartlett	SDDOT
Mark Hoines	Federal Highway Administration

Additional team members may be added as the study progresses.

3 Analysis Years/Periods

The study will evaluate traffic operations during the following time periods:

- Existing Conditions (Year 2019)
- Future No-Build Scenario (Year 2045)
- Future Build Scenario (Year 2045)

4 Data Collection

Data collection will occur in two phases: 1) compile existing data inventory items, and 2) collect turning movement and volume counts. The existing data inventory items include:

- Review previous studies
- Aerial photography
- Topography
- Traffic counts
- Existing land use and land use plans
- Known historical properties and areas of environmental significance

4.1 Intersection and Roadway Segment Volumes

The following summarizes intersection turning movement counts to be collected or provided as part of this study.

ID #	Intersection	Count Type	Source
1	Elk Creek Rd & Erickson Ranch Rd	4-hr TMC	HDR
2	Elk Creek Rd & Haines Ave	4-hr TMC	HDR
3	Elk Creek Rd & 143rd Ave	4-hr TMC	HDR
4	143rd Ave & 224th St	4-hr TMC	HDR
5	Peaceful Pines Rd & Erickson Ranch Rd	4-hr TMC	HDR

The following summarizes volume counts for roadway segments to be collected or provided as part of this study.

ID #	Roadway Segment	Count Type	Source
1	Erickson Ranch Rd (near Westridge Rd) – 2 lanes	24-hr Volume/Class	HDR
2	Haines Rd (south of Elk Creek) – 2 lanes	24-hr Volume/Class	HDR
3	Haines Rd (near Hale Rd) – 2 lanes	24-hr Volume/Class	HDR
4	Elk Vale Rd (south of Elk Creek) – 2 lanes	24-hr Volume/Class	HDR
5	Elk Creek Rd (west of Haines Ave) – 2 lanes	24-hr Volume/Class	HDR
6	Elk Creek Rd (east of Haines Ave) – 2 lanes	24-hr Volume/Class	HDR

Supplemental study counts will reflect a typical weekday and be collected on a Tuesday, Wednesday, or Thursday while school is in session. Counts collected by HDR as part of this study will include vehicle classification. Seasonal factors to convert all counts to a similar planning season will be obtained from the MPO.

Supplemental traffic counts may be obtained, as available, to support the development of existing and future-year traffic volumes from the following sources: City of Rapid City, Rapid City MPO, SDDOT, and Meade County.

4.2 Other Information

Other GIS, topography, and crash data is available from SDDOT and Meade County resources and is being provided for review and use in this study.

5 Traffic Forecasting and Volume Development

HDR will coordinate with the Rapid City MPO to develop year 2045 average daily traffic volumes. The 2040 Rapid City MPO travel demand model will not be updated for 2045 in time for this study. The 2045 volumes will be projected using growth factors between the base model and the 2040 model. The MPO will conduct travel demand modeling and HDR will develop the model outputs to create balanced peak hour networks for analysis.

6 Traffic Operations Analysis

Daily counts and forecasts will be used to provide highway volume to capacity assessment on a corridor segment basis using available daily counts. Capacity thresholds will be based on SDDOT Road Design Manual Exhibit 15-10.

Analysis of existing and proposed intersection and corridor operations will be conducted at the study intersections listed in the table provided in section 4.1 and the following future intersections:

- Study Corridor & Erickson Ranch Rd
- Study Corridor & Haines Ave
- Study Corridor & 143rd Ave

These analyses will use the current version of HCM 6 software current edition. HCS 7 analysis reports will be provided in the study documentation and will serve as the basis for intersection analysis. In situations where HCM methodology does not support the analysis conditions, alternate methodology or tools may be used. Any deviations will be documented.

Guidance provided in the Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways 2009 Edition will be used in the evaluation of traffic signal warrants and multi-way stop applications. This analysis may be supplemented with guidance from the Institute of Transportation Engineers (ITE) and SDDOT.

Specific operational variables are listed in the following:

- Peak Hour Factor (PHF) – use peak hour factors developed from turning movement counts for existing conditions.
 - Use a PHF of .80 for future year conditions.
- Saturation Flow Rate – SDDOT Design Manual (Page 30, Chapter 15) indicates the use of up to 1,700 vph in rural areas.
 - This study will use a saturation flow rate of 1,700 vph.
- Heavy Vehicle Percentage – Based on field collected data.
- Speeds –
 - Erickson Ranch Rd – 55 mph
 - Elk Creek Rd – 55 mph
 - Haines Ave
 - 50 mph from south study area boundary to Virginia Lane
 - 55 mph from Virginia Lane to north study area boundary

- 143rd Ave
 - 35 mph from south study area boundary to north of Bison Point Road
 - 45 mph from north of Bison Point Road to Elk Creek Road
- Terrain – Flat.
- HCM6 Highway Class (county minor arterials and collectors) – Class II if analyzed as Two-Lane Highway.

7 Safety and Access Issues

The SDDOT provided crash data for the complete years of 2014-2018. This data will be used to identify and evaluate crash trends or common crash characteristics for the 5-year timeframe.

Existing access will be inventoried and compared with access standards. Recommendations for new corridor access locations will be presented in the study documentation.

8 Selection of Measures of Effectiveness (MOE)

The effectiveness of traffic operations in the study area will be based on the appropriate HCM6 level of service (LOS) measurement with the following goals:

- Two-Way Stop-Controlled Intersections:
 - Rural area minimum allowable LOS – LOS B (worst-case stop-controlled approach)
- Signalized Intersections:
 - Rural area minimum allowable LOS – LOS B
- County highway corridors will be evaluated in terms of 2-lane highway capacity based on SDDOT Road Design Manual Exhibit 15-10.

Volume to capacity ratios that exceed 1.0 will result in LOS F.

Table 15-9 in SDDOT Road Design Manual will be used as a planning-level guide in determining the future number of lanes on a corridor.

9 Data Provided

The following will be provided by the participating agencies to aid the consultant in performing the study:

- Available GIS data
 - Aerial photography (MPO)
 - Topography (Rapid City MPO/SDDOT)
 - Existing crash data (SDDOT)
- Existing design standards and ordinances (Meade County)
- Existing land use and land use plans (Meade County/Rapid City MPO)
- SDDOT Road Design Manual
- Previous applicable planning studies (Meade County/Rapid City MPO)

10 Deviations/Justifications

No deviations from standards are currently known. If it is determined during the study that deviations are required, the methods and assumptions document will be amended prior to proceeding.

11 Conclusion

All sections contained in this document will guide the collection of data and traffic assessment for this study.

12 Appendices

The appendix includes the following:

- Methods and Assumptions Study Team Meeting Minutes

APPENDIX



Meeting Minutes

Project:	RC MPO Meade County Corridor Study		
Subject:	SAT Meeting #1 – Kickoff and Methods & Assumptions		
Date:	Monday, January 28, 2019	(3:00-4:30 PM)	
Location:	Meade County Commission Conference Room – Sturgis, SD		
Attendees:	Kelly Brennan / Rapid City Area MPO Kip Harrington / Rapid City Area MPO Bill Rich / Meade County - Planning/Zoning Rhea Crane / Meade County - Planning/Zoning Scott Tegethoff / Meade County Highway Talbot Wieczorek / Meade County – Commission Doreen Creed / Meade County – Commission Ted Seaman / Meade County – Commission Brad Remmich / SDDOT – Project Development Stacy Bartlett/ SDDOT – Rapid City Region Mark Hoines / Federal Highway Administration Stacia Slowey / HDR - Project Manager Dustin Hamilton / HDR - Public Outreach Rachel Caesar / HDR - Alternative Development Jill Rust / HDR – Environmental (Conference Call) Jon Wiegand / HDR – Traffic (Conference Call)		

Introductions

- Location of SAT Meetings – Rapid City or Sturgis?
[Sturgis was selected as the location for future meetings.](#)

Scope Overview

- Environmental scope clarifications
[The environmental scan should be performed for all three feasible alternatives and not just the recommended alternatives.](#)
- SAT questions/concerns
 - [There was discussion surrounding what a corridor study entails. It was clarified that the study’s purpose is intended for corridor preservation. Once development does begin, it can be done in a meaningful way that allows for connectivity and adequate levels of mobility for roadway users.](#)
 - [With regards to alternative selection, it was suggested that the SAT brainstorms a list of all possible alternatives. These alternatives can then be weeded down to 1-3 alternatives that are feasible. One alternative will be the “no build” option, but the other alternatives can include a “no build” component.](#)
 - [Questions were posed as to how corridor development would be funded, and it was clarified that a corridor study does not fully design the corridor or identify](#)



funding for the development, but rather provide information to guide the process of selecting recommended alternatives. Potential funding sources could be listed in the body of the study's findings.

Tentative Schedule Overview

• Notice to Proceed	December 21, 2018
• Project Initiation	
○ SAT Meeting 1 (Project Kick Off, Draft M&A)	Late January/Early February 2019 January 28, 2019
○ SAT Meeting 2 (Pre-Public Meeting, Final Draft M&A)	Late February 2019 (1 week prior to public meeting)
○ Initiate Website	Late February 2019 (10 days before first public meeting)
○ Public Meeting 1	1 st week of March 2019
○ Finalize Methods & Assumptions	2nd week of March 2019 2 nd week of February 2019
• Data Review and Collection	
○ Traffic Data Collection	3 rd or 4 th week of March 2019
• Analysis and Alternatives Development	
○ Traffic Forecasting and Operations Analysis	April - June 2019
○ SAT Meeting 3 (Development of Alternatives Discussion)	April/May 2019
○ Findings of Traffic Analysis and Development of Alternatives Draft Tech Memo	Late June 2019
○ SAT Meeting 4 (Pre-Public Meeting)	July 2019 (1 week prior to public meeting)
○ Public Meeting 2 and Stakeholder Meetings – Development of Alternatives	July 2019
○ Findings of Traffic Analysis and Development of Alternatives Final Tech Memo	July 2019
○ Environmental Scan	June - August 2019
○ Selection of Preferred Recommended Alternatives by MPO and County	September 2019
• Recommendations	
○ Draft Report	Late October 2019
○ SAT Meeting 5 (Pre-Public Meeting/Draft Report)	November 2019 (1 week prior to public meeting)
○ Public Meeting 3	November 2019
○ Presentation to 3 MPO Committees (Draft Report)	November 2019 Note that these committees do not meet in November
○ Final Report	December 2019
○ SAT Meeting 6 (Final Report)	December 2019



Issues / Discussion

- Website
 - Utilize separate website rather than the MPO website
 - Determine URL
<http://southernmeadecountycorridorstudy.com>
A suggested name for the study was “Southern Meade County East-West Connector.” The website URL might include “Southern” but the website itself needs to clarify that the study is in the southern portion of Meade County.
 - Example Websites
<http://bensoinroadproject.com/>
<http://www.sheridanlakeroadstudy.com/>

- List of Stakeholders
 - Map of Land Owners (See next page)
It was expressed that a map should show more land to the south and include some of Rapid City. See revised map provided in the M&A document.
 - Protocol of dealing with stakeholders
Landowners will have opportunities to provide input at public meetings.
Potential sites for public meetings:
 - North Haines Fire Department
 - Summerset City Hall
 - Stagestop Receptions
 - Black Hawk Fire Department
 - Piedmont Fire Department

Concerns were posed about the style of presentation at the public meetings; whether it would be a formal presentation or a more informal, conversational-style presentation. It was stated that the presentation style could be suited to the audience and specific information being presented, and will be a combination of a formal presentation (10-15 minutes) followed an informal conversation between presenters and the public. The pre-public SAT meetings are intended to function as an opportunity for feedback on the public presentation.

Methods and Assumptions

See separate attachment

- Traffic analysis software – HCS or Synchro? Either could be used for the purposes of this study. The software to be used will be identified in the M&A document.
- Add signature blocks for SDDOT and FHWA.
- Clarify throughout the document that there could be multiple recommended alternatives.
- Add Elk Creek Road Study to the list of previous studies to be reviewed during the course of the study.



- In the traffic forecasting and volume development section, describe the MPO's 2040 model and how it will be projected to 2045 for the use in this study.
- Discussion was held around the use of a PHF of 0.8 or something higher/lower. It was concluded that a PHF of 0.8 was adequate.
- The saturation flow rate is found on page 30 and not page 28 of the road design manual chapter 15.
- The speed of 143rd Avenue changes to 45 mph after the big hill (just north of Bison Point Rd)
- Aerial photography and topography will be provided by the Rapid City MPO.

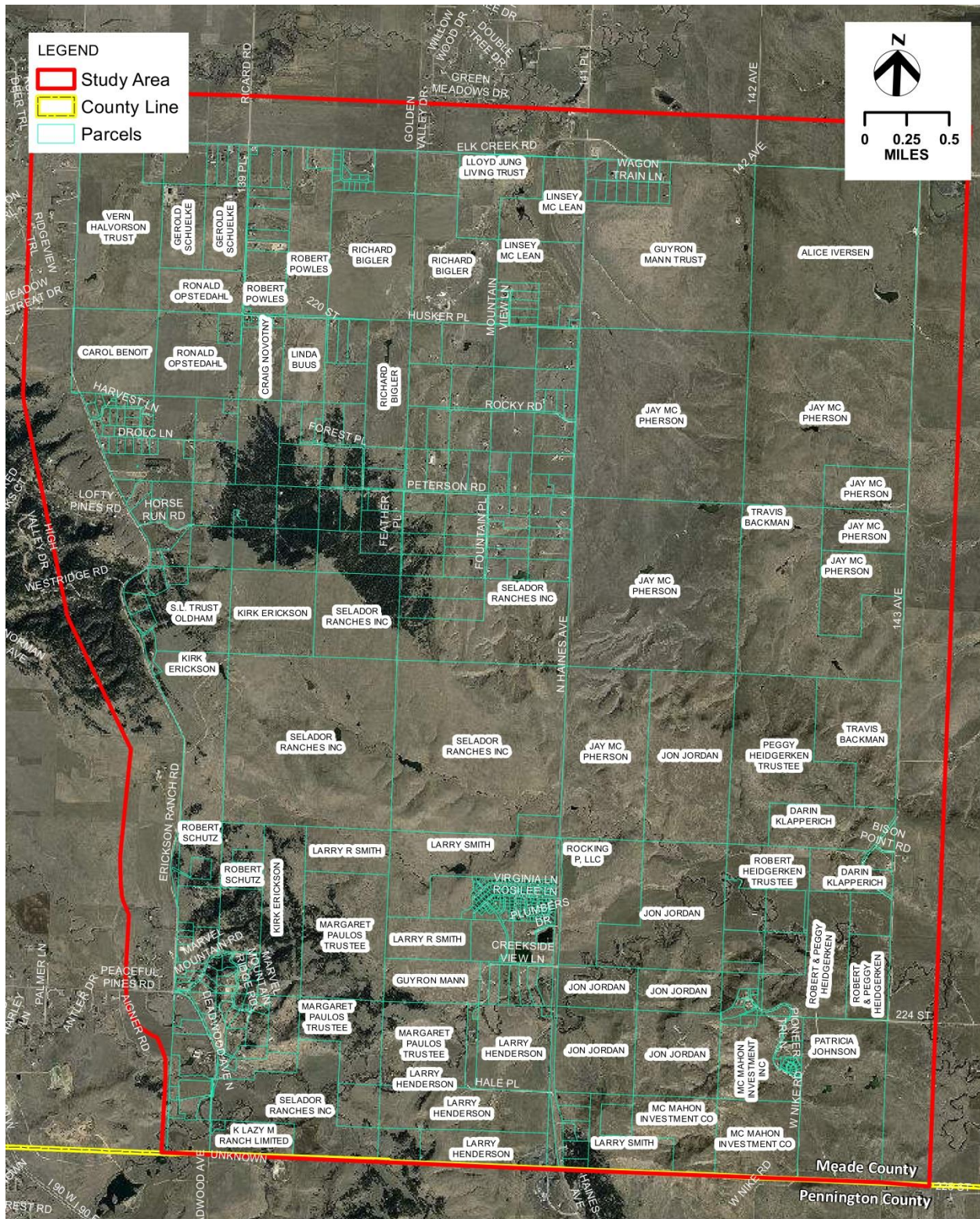


FIGURE 1 - LANDOWNER MAP

