



MR. JOHN POELMA

Laramie County Public Works
13797 Prairie Center Circle
Cheyenne, WY 82009

SPEED STUDY
CHRISTENSEN ROAD (CR 130) SPEED LIMIT
EVALUATION REPORT
LARAMIE COUNTY, WYOMING

DRAFT



INBERG-MILLER ENGINEERS

350 Parsley Blvd
Cheyenne, WY 82007
(307) 635-6827
www.inberg-miller.com

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May 28, 2024

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**PDF REPORT EMAILED: JOHN.POELMA@LARAMIECOUNTYWY.GOV
THIS CONSTITUTES THE ORIGINAL**

Mr. John Poelma
Assistant Director
Laramie County Public Works
13797 Prairie Center Circle
Cheyenne, Wyoming 82009

RE: CHRISTENSEN ROAD (CR 130) SPEED LIMIT EVALUATION REPORT
LARAMIE COUNTY, WYOMING

Dear Mr. Poelma:

This letter transmits our speed limit evaluation report for the above-referenced project. The report outlines our findings for the recommendation of speed limit as requested by Laramie County Public Works.

It has been a pleasure participating in this project.

If you have any questions or comments, please contact us at (307) 635-6827.

Sincerely,

INBERG-MILLER ENGINEERS

Daniel J. Hayes, P.E.
Civil Engineer
dhayes@inberg-miller.com

REVIEWED BY

Gary L. Steele, P.E.
Senior Civil Engineer
gsteele@inberg-miller.com

DJH:GLS:bjs\p:\23682-HE LARAMIE COUNTY PUBLIC WORKS County Road Speed
Studies\Civil\Christensen Rd\23682-HE Christensen Road Speed Study Report.docx

Enclosures as stated



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Table of Contents

1.0 INTRODUCTION 1
1.1 TRAFFIC COUNT 1
1.2 ROADWAY SAFETY 1
1.3 DECLARATION OF SPEED LIMIT 3

APPENDICES

Appendix A- Road Overview

Appendix B- Traffic Counts

Appendix C- Speed Study Crash Data Overview

Appendix D- Crash Data

Appendix E- Sign Locations

Appendix F- USLimits 2 Report

1.0 INTRODUCTION

Christensen Road (CR 130) is a paved county road from Mile Point (MP) 0.0 to MP 2.25 with a speed limit from 40 to 50 mph from MP 0.0 to MP 2.0 as shown in figure 1 and 40 mph from Mile Post 2.0 to 2.25. The main traffic generator for Christensen Road is residential access. The roadway width is an average of 33 feet edge to edge (24 foot travel way) with 14 major access points and 28 minor access points which translates to 18.7 access points per mile. The type of terrain is flat and the adjacent land use is characterized as residential.



Figure 1: 50 mph speed limit sign

1.1 TRAFFIC COUNT

The automated traffic counter was located at MP 0.65 and is shown in Appendix A. The traffic counter results are shown in Appendix B. The traffic count was recorded from November 7, 2023, to November 20, 2023, with a total of 16,087 vehicles. The Average Daily Traffic (ADT) was recorded at 1,149 vehicles a day and the Average Daily Truck Traffic (ADTT) was recorded at less than 10 trucks a day. The 85th percentile speed was calculated at 57 mph with the 50th percentile speed at 49 mph. The pace speed included 58.2% of vehicles recorded and was calculated from 46 mph to 55 mph. According to the standards, the upper bound of the recommended speed limit is the rounded 85th percentile speed that was determined at 60 mph. The lower bound is either the rounded 50th-percentile speed or the lower limit of the 10-mph pace which was determined at 50 mph. Appendix C shows a table with general information, roadway characteristics, crash data, and the range of the speed limit.

1.2 ROADWAY SAFETY

Prior to conducting the speed study on Christensen Road (CR 130), a safety assessment was performed on November 10, 2023. This included a sign inventory, crash analysis, and a ball bank test.

Table 1 shows the detailed 10-year crash history from 2013 to 2022. 9 crashes occurred with 2 crashes resulting in an injury. The first harmful event shows that the most predominant crash was a motor vehicle in transport on the roadway resulting in a collision between multiple vehicles with 3 instances. There were two instances of an off-roadway collision with an earth embankment/berm, two instances of overturn/rollover, and two instances each of a collision with a delineator post or fence (including post). The time of day showed that 5 crashes occurred between 10:00 AM to 12:59 PM. The most crashes for a one-mile section of the road occurred between MP 0.0 to MP 1.0 where 5 crashes occurred. The location of each crash is shown on a map in Appendix D.

Table 1: Detailed 10-Year Crash History

MP	Year	Month	Day of the Week	Time	Crash Severity	First Harmful Event
0.0	2013	October	Friday	8 to 8:59 AM	Property Damage Only	Motor Vehicle in Transport on Roadway
0.01	2013	February	Wednesday	11 to 11:59 AM	Property Damage Only	Motor Vehicle in Transport on Roadway
0.1	2015	November	Friday	12 to 12:59 PM	Property Damage Only	Motor Vehicle in Transport on Roadway
0.3	2016	February	Friday	12 to 12:59 PM	Suspected Minor Injury	Ditch
0.98	2022	March	Monday	10:00 to 10:59 AM	Property Damage Only	Fence (Including Post)
1.002	2019	November	Monday	2 to 2:59 PM	Property Damage Only	Earth Embankment/Berm
1.121	2021	February	Saturday	3 to 3:59 PM	Property Damage Only	Traffic Sign Support Earth
1.908	2022	July	Wednesday	8 to 8:59 AM	Possible Injury	Embankment/Berm
1.928	2020	May	Thursday	11 to 11:59 AM	Property Damage Only	Trees/Shrubbery

Table 2 shows the sign inventory for Christensen Road (CR 130). Every sign on the road was inventoried, and given a GPS location and a picture. The condition of each sign was obtained visually with the wear and type of sheeting of the sign rated. There are a total of 9 signs located between MP 0.0 to MP 2.25. The visual inspection identified 2 signs in poor condition and 8 signs had reflective sheeting. The locations of all 9 signs are shown on a map in Appendix E. All the signs in poor condition should be replaced and all the signs with old sheeting should be updated with new ASTM sheeting when the sign is replaced in the future.

Table 2: Sign Inventory

MP	Sign	Travel Direction	MUTCD	Reflectivity	Condition	Comment
0.00	Stop	South	R1-1	Y	Poor	Chipped/Cracked
0.0	Buckel UP Symbol	North		Y	Good	
0.0	Buckel Up State Law	North		N	Poor	Cracked
0.0	50 mph Speed Limit	North	R2-1	Y	Good	
0.1	Stop Ahead	South	W3-1	Y	Fair	
2.0	40 mph Speed Limit	North	R2-1	Y	Good	
2.0	50 mph Speed Limit	South	R2-1	Y	Good	
2.1	Pavement Ends	North	W8-3	Y	Good	
2.1	40 mph Speed Limit	South	R2-1	Y	Good	

1.3 DECLARATION OF SPEED LIMIT

Posted speed limits (other than statutory speed limits) on Wyoming local roads should be documented by a Declaration of Speed Limit form as shown in Figure 2. Any speed limit change from the statutory limits shall be verified and sealed by a professional engineer in Wyoming. The form, with appropriate background information, should be presented to the county commission where a resolution approving the proposed speed limit should be approved. The resolution number should be added to the declaration of speed limit form. The form is then returned to appropriate county officials so that the necessary signing changes can be made. Enforcement of the new speed limit cannot occur until the appropriate signs giving notice of the new speed limit have been erected.

According to the speed study data overview summarized in Appendix A-3, the acceptable range of speed limit on Christensen Road (CR 130) is between 50 and 60 mph.

It is recommended that the speed limit be posted at 55 mph due to:

- ❖ Within acceptable speed limit range.
- ❖ Lower than the 85th percentile due to the high number of access points per mile.

Post a 55-mph speed limit sign by replacing the existing 50-mph speed limit sign at MP 0.0 and MP 2.0

A US Limits 2-speed zone report was completed through the Federal Highway Administration to verify our recommended speed limit. The USLimits 2 report came back at a 55-mph speed recommendation based on inputs from our speed study report. This report can be found in Appendix F. A Laramie County representative should consider safety measures at adverse curves such as signage, advisory speeds, delineation, shoulder widening, or guardrails.

Figure 2. Declaration of Speed Limit Form for Paved Roads

DECLARATION OF SPEED LIMIT ON PAVED ROADS

LOCATION: County Road 130, Christensen Road, MP 0.0 to MP 2.25.

Method Used: Visual inspection and engineering judgment.
Free flow spot speeds to determine 85th percentile speed and pace.
Procedures for locally establishing speed limits were followed.

Summary of Results:

The existing speed limit is 40 and 50 mph. The 85th percentile speeds was recorded at 57.0 mph and the 50th percentile speed at 49 mph. The 10-mph pace speed was recorded from 45 mph to 54 mph. The roadway width is 33 feet edge to edge (24-foot travel way) and the road has 32 access points along the section which translates into 18.7 access points per mile. There were 9 crashes in the last 10 years with 2 crashes resulting in injuries.

Recommendations:

It is recommended that the speed limit be set at 55 mph for this section of the road. Post a 55-mph speed limit by replacing the existing 50-mph speed limit sign at MP 0.0 and MP 2.0. **A Laramie County representative should consider safety measures at adverse curves such as signage, advisory speeds, delineation, shoulder widening, or guardrails.**

Data Collected by. Hayden Altenburg 11/10/2023 Data Summarized by. Daniel Hayes, P.E. 5/28/2024
Printed Name Initials Printed Name Initials

Approved. Daniel Hayes, P.E. _____ 5/28/2024
Professional Engineer P.E. Seal Date

ORDER TO ESTABLISH RESTRICTED SPEED ZONE

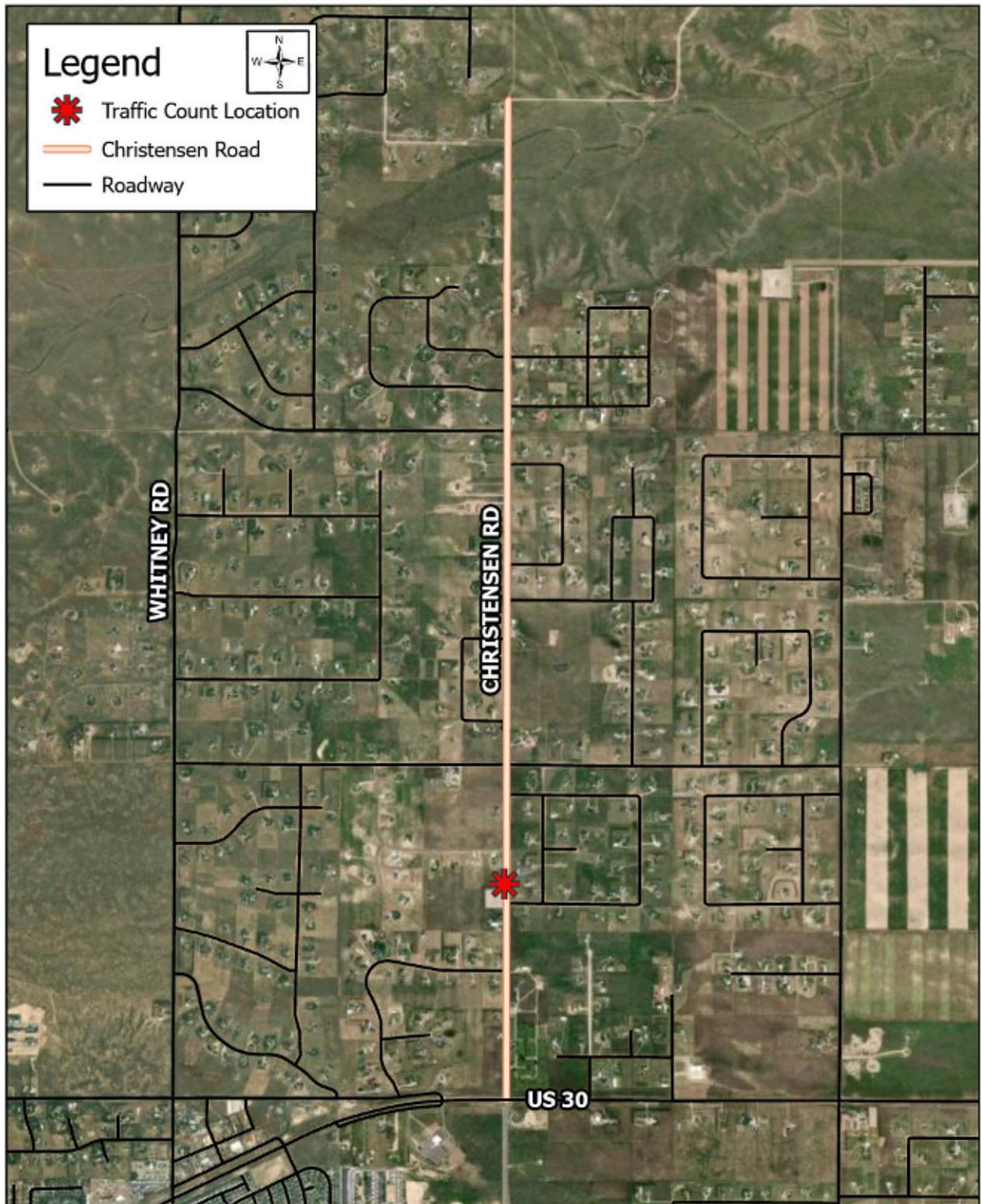
The County Commission approves changing the speed limit to 55 miles per hour on the paved roadway section described above.

Resolution number: _____

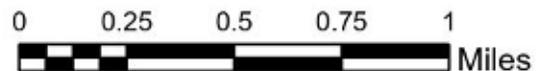
Date: _____

Appendix A

Christensen Road - Location Map



Mapbox



Appendix B

SPEED DATA ANALYSIS

Location



Latitude: 41.169028
Longitude: -104.713264



Analysis Time Period



Start	End
11/7/2023 2:26 PM	11/20/2023 11:34 AM

Vehicles Analyzed



16,087

Speed Limit



50

Total Enforceable Violations



8,305

Average Speed



50

85th Percentile Speed



57

Fastest Speed



117

10 MPH Pace Speed



46-55

Slowest Speed



1

Default Report Title
 Use Preferences to Define Titles

Site Code: 0CH SOUTH
 Station ID:
 Start Date: 11/7/2023
 End Date: 11/20/2023

Comment 1:
 Serial Number: 41398
 Latitude: 41.169028
 Longitude: -104.713264
 GPS Accuracy: 12.66667 ft

Combined Lanes 11/7/2023 to 11/20/2023

Peak Analysis

Classes Excluded From Peaks: None

Date	AM Peak	Hour Volume	Highest Interval Time	Highest Interval Volume	Peak Hour Factor	Pm Peak	Hour Volume	Highest Interval Time	Highest Interval Volume	Peak Hour Factor
11/7/2023	No Volume					5:34 PM	147	5:34 PM	46	0.80
11/8/2023	7:49 AM	135	8:24 AM	40	0.84	5:18 PM	139	6:01 PM	40	0.87
11/9/2023	8:10 AM	145	8:29 AM	43	0.84	5:50 PM	141	6:27 PM	48	0.73
11/10/2023	8:08 AM	88	8:32 AM	28	0.79	5:21 PM	133	6:05 PM	42	0.79
11/11/2023	10:57 AM	88	11:29 AM	30	0.73	12:36 PM	105	12:51 PM	35	0.75
11/12/2023	10:59 AM	93	11:13 AM	31	0.75	2:30 PM	111	2:31 PM	34	0.82
11/13/2023	7:49 AM	130	8:17 AM	41	0.79	5:35 PM	147	5:59 PM	49	0.75
11/14/2023	7:46 AM	138	8:13 AM	45	0.77	5:52 PM	145	5:59 PM	45	0.81
11/15/2023	8:03 AM	129	8:03 AM	39	0.83	5:21 PM	163	5:57 PM	47	0.87
11/16/2023	7:57 AM	131	8:01 AM	36	0.91	5:11 PM	126	5:55 PM	37	0.85
11/17/2023	7:54 AM	129	8:15 AM	38	0.85	4:16 PM	157	4:58 PM	48	0.82
11/18/2023	10:45 AM	112	10:45 AM	38	0.74	12:36 PM	118	12:38 PM	36	0.82
11/19/2023	10:46 AM	83	11:13 AM	35	0.59	1:30 PM	122	1:55 PM	46	0.66
11/20/2023	8:02 AM	128	8:18 AM	45	0.71	No Volume				

Axle Statistics

# Axles	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Count	15439	242	364	33	2	3	3	0	0	0	0	0	0	0	1
Avg.	120.7	305.4	411.5	617.2	642.5	102.0	1114.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0

WB
 Axles Per Vehicle: 2.0699

AADT

Date	Lane	Volume	x	User	x	Daily	=	ADT	x	Season	=
11/7/2023	A to B, None Specified	238		1.00		1.00		238		1.00	
11/7/2023	B to A, None Specified	415		1.00		1.00		415		1.00	
11/7/2023	Day Total	653						653			
11/8/2023	A to B, None Specified	673		1.00		1.00		673		1.00	
11/8/2023	B to A, None Specified	614		1.00		1.00		614		1.00	
11/8/2023	Day Total	1,287						1,287			
11/9/2023	A to B, None Specified	714		1.00		1.00		714		1.00	
11/9/2023	B to A, None Specified	665		1.00		1.00		665		1.00	
11/9/2023	Day Total	1,379						1,379			
11/10/2023	A to B, None Specified	666		1.00		1.00		666		1.00	
11/10/2023	B to A, None Specified	639		1.00		1.00		639		1.00	
11/10/2023	Day Total	1,305						1,305			
11/11/2023	A to B, None Specified	561		1.00		1.00		561		1.00	
11/11/2023	B to A, None Specified	537		1.00		1.00		537		1.00	
11/11/2023	Day Total	1,098						1,098			
11/12/2023	A to B, None Specified	500		1.00		1.00		500		1.00	
11/12/2023	B to A, None Specified	516		1.00		1.00		516		1.00	
11/12/2023	Day Total	1,016						1,016			
11/13/2023	A to B, None Specified	655		1.00		1.00		655		1.00	
11/13/2023	B to A, None Specified	636		1.00		1.00		636		1.00	
11/13/2023	Day Total	1,291						1,291			
11/14/2023	A to B, None Specified	678		1.00		1.00		678		1.00	

Default Report Title
 Use Preferences to Define Titles

Site Code: 0CH SOUTH
 Station ID:
 Start Date: 11/7/2023
 End Date: 11/20/2023

Comment 1:
 Serial Number: 41398
 Latitude: 41.169028
 Longitude: -104.713264
 GPS Accuracy: 12.66667 ft

Date	Lane	Volume	x	User	x	Daily	=	ADT	x	Season	=
11/14/2023	B to A, None Specified	643		1.00		1.00		643		1.00	
11/14/2023	Day Total	1,321						1,321			
11/15/2023	A to B, None Specified	713		1.00		1.00		713		1.00	
11/15/2023	B to A, None Specified	715		1.00		1.00		715		1.00	
11/15/2023	Day Total	1,428						1,428			
11/16/2023	A to B, None Specified	670		1.00		1.00		670		1.00	
11/16/2023	B to A, None Specified	639		1.00		1.00		639		1.00	
11/16/2023	Day Total	1,309						1,309			
11/17/2023	A to B, None Specified	742		1.00		1.00		742		1.00	
11/17/2023	B to A, None Specified	692		1.00		1.00		692		1.00	
11/17/2023	Day Total	1,434						1,434			
11/18/2023	A to B, None Specified	597		1.00		1.00		597		1.00	
11/18/2023	B to A, None Specified	594		1.00		1.00		594		1.00	
11/18/2023	Day Total	1,191						1,191			
11/19/2023	A to B, None Specified	484		1.00		1.00		484		1.00	
11/19/2023	B to A, None Specified	494		1.00		1.00		494		1.00	
11/19/2023	Day Total	978						978			
11/20/2023	A to B, None Specified	289		1.00		1.00		289		1.00	
11/20/2023	B to A, None Specified	108		1.00		1.00		108		1.00	
11/20/2023	Day Total	397						397			
Total		16087						16087			
Average		1149						1149			

Appendix C

SPEED STUDY DATA OVERVIEW (CHRISTENSEN ROAD CR 130)

GENERAL INFORMATION	
LOCAL JURISDICTION:	Laramie County
ROUTE:	CR 130
LOCATION:	Christensen Road
DATE:	11/10/2023

AUTOMATED TRAFFIC COUNT VALUES	
85th PERCENTILE:	57.0 mph
50th PERCENTILE:	49 mph
PACE SPEED:	45 - 55mph
AVERAGE DAILY TRAFFIC:	1149 vehicles a day
AVERAGE DAILY TRUCK TRAFFIC:	## trucks a day

ROADWAY CHARACTERISTICS	
ROADWAY LENGTH:	2.25 miles
NUMBER OF ACCESS POINTS:	32 access points
ACCESS POINTS PER MILE:	18.7 access points per mile
ROADWAY WIDTH:	33 edge to edge (24 foot travel way)
ADJACENT LAND-USE:	Residential
TYPE OF TERRAIN:	Rolling

HISTORICAL CRASH DATA	
FATAL:	0
INJURY:	2
PDO:	7
EPDO:	14
EPDO PER MILE:	6.2

RANGE OF SPEED LIMIT (MAXIMUM = 65 MPH)	
PREFERRED SPEED LIMIT:	60 mph
LOWEST ACCEPTABLE SPEED LIMIT:	50 mph

Christensen Road - Crash Location Map



Map: Microsoft, Maxar

SEGMENT CRASH HISTORY REPORT FOR CHRISTENSEN RD (ML6750B) FROM MILE POST 0 TO 2.25 FOR THE YEARS 2013 - 2022

LRS ID	CRASH STREET	MILE POST	CROSS STREET	DATE	TIME	CRASH SEVERITY	FATAL	INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	MANNER OF COLLISION	JUNCTION RELATION	VEHICLE		DRIVER ACTION	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #			
													#	DIRECTION													MANEUVER		
ML6750B	CHRISTENSEN RD	0.000	US 30	10/18/2013	849	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	South	Straight Ahead	1	Drove too Fast for Conditions	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Cloudy, Overcast	Ice/Frost	N	N	41.159710	-104.713230	13-15058
													2	South	Stopped in Traffic	2	No Improper Driving	1	Passenger	Shoulder and Lap Belt	No Apparent Injury								
ML6750B	CHRISTENSEN RD	0.010	US 30	02/27/2013	1130	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Sideswipe Opposite Direction (Meeting)	Intersection Related	1	South	Slowing	1	Drove too Fast for Conditions	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Cloudy, Overcast	Snow	N	N	41.159710	-104.713220	13-2697
													2	East	Turning Left	2	No Improper Driving	2	Driver	Shoulder and Lap Belt	No Apparent Injury								
													2	Passenger	Forward Facing Child	No Apparent Injury													
ML6750B	CHRISTENSEN RD	0.100		11/27/2015	1253	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Angle Same Direction (Front to Side)	Driveway Related	1	South	Straight Ahead	1	Avoiding MV	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Snowing	Snow	N	N	41.159980	-104.713210	15-19255
													2	South	Turning Left	2	Failed to Yield ROW	2	Driver	Shoulder and Lap Belt	No Apparent Injury								
ML6750B	CHRISTENSEN RD	0.300		02/26/2016	1215	SUSPECTED MINOR INJURY	0	1	Ditch	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	North	Straight Ahead	1	Ran Off Road	1	Driver	None Used	Suspected Minor Injury	Daylight	Clear	Dry	N	N	41.174240	-104.713070	16-3769
ML6750B	CHRISTENSEN RD CR 130-1	0.980		03/12/2022	1030	PROPERTY DAMAGE ONLY	0	0	Fence (including Post)	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	North	Straight Ahead	1	Ran Off Road	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Snow	N	N	41.173954	-104.713166	2022-4233
													1	Drove too Fast for Conditions	1	Passenger	Shoulder and Lap Belt	No Apparent Injury											
													1	Corrected/Over Steered															
ML6750B	CHRISTENSEN RD CR 130-1	1.002		11/11/2019	1400	PROPERTY DAMAGE ONLY	0	0	Earth Embankment/Berm	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	South	Straight Ahead	1	Failed to Keep Proper Lane Over Corrected/Over Steered	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	41.174182	-104.713135	2019-23807
ML6750B	CHRISTENSEN RD CR 130-1	1.121		02/27/2021	1500	PROPERTY DAMAGE ONLY	0	0	Traffic Sign Support	Off Roadway	Not a Collision w/2 Vehicles in Transport	Intersection Related	1	North	Straight Ahead	1	Ran Off Road	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Ice/Frost	N	N	41.175990	-104.713072	21-3657
ML6750B	CHRISTENSEN RD CR 130-1	1.908		07/27/2022	825	POSSIBLE INJURY	0	1	Earth Embankment/Berm	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	South	Straight Ahead	1	Ran Off Road	1	Driver	Shoulder and Lap Belt	Possible Injury	Daylight	Cloudy, Overcast Fog	Wet	N	N	41.187468	-104.713012	22-14225
ML6750B	CHRISTENSEN RD CR 130-1	1.928		05/21/2020	1110	PROPERTY DAMAGE ONLY	0	0	Trees/Shrubbery	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	North	Straight Ahead	1	Ran Off Road	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	Y	N	41.187760	-104.712969	20-8818

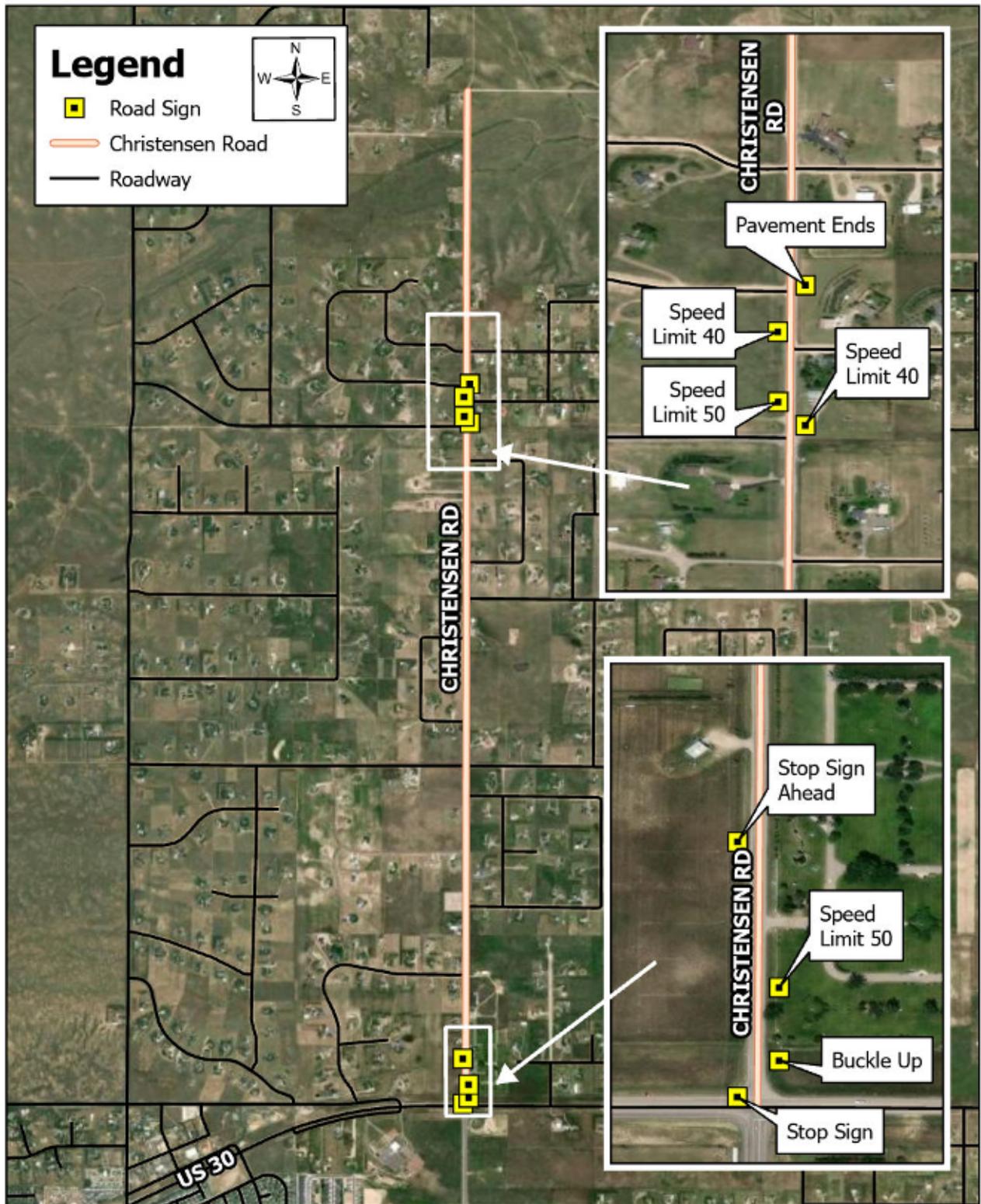
LRS ID	CRASH STREET	MILE POST	CROSS STREET	DATE	TIME	CRASH SEVERITY	FATAL	INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	MANNER OF COLLISION	JUNCTION RELATION	#	DIRECTION	VEHICLE MANEUVER	DRIVER ACTION	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #
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REPORT SUMMARY	
TOTAL CRASHES:	9
FATAL CRASHES:	0
INJURY CRASHES:	2
PDO CRASHES:	7
TOTAL FATALITIES:	0
TOTAL INJURIES:	2

YEAR	CRASH COUNTS				SEVERITY COUNTS			INJURY COUNTS				
	FATAL CRASHES	INJURY CRASHES	PDO CRASHES	TOTAL CRASHES	CRITICAL CRASHES*	SERIOUS CRASHES*	DAMAGE CRASHES*	FATAL INJURIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLE INJURIES	NO INJURIES
2013	0	0	2	2	0	0	2	0	0	0	0	6
2015	0	0	1	1	0	0	1	0	0	0	0	2
2016	0	1	0	1	0	1	0	0	0	1	0	0
2019	0	0	1	1	0	0	1	0	0	0	0	1
2020	0	0	1	1	0	0	1	0	0	0	0	1
2021	0	0	1	1	0	0	1	0	0	0	0	1
2022	0	1	1	2	0	1	1	0	0	0	1	2
	0	2	7	9	0	2	7	0	0	1	1	13

* PDO = Property Damage Only Crashes
 * Critical Crashes = Fatal & Suspected Serious Injury Crashes
 * Serious Crashes = Suspected Minor Injury & Possible Injury Crashes
 * Damage Crashes = No Apparent Injury & Unknown Injury Crashes

Christensen Road - Sign Location Map



Esri, NOAA, NGA, USGS, FEMA, Source: Esri, Airbus DS, USGS, NOAA, NASA, CGAIR, N Robinson, NOAA, NLS, GS, RMA, Gooddata/lyrics, Rijswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc., HERE/Mapbox, USGS, EPA, APF, US Census Bureau, USDA, USFWS, Maxar



Appendix F

USLIMITS2 Speed Zoning Report

Project Overview

Project Name: Laramie County Speed Studies

Analyst: Daniel Hayes

Date: 2024-05-22

Basic Project Information

Project Number: IME 23682-HE
Route Name: Christensen Road CR 130
From: Mile Post 0.0
To: Mile Post 2.25
State: Wyoming
County: Laramie County
City: Rural
Route Type: Road Section in Undeveloped Area
Route Status: Existing

Crash Data Information

Crash Data Years: 10.00
Crash AADT: 1149 veh/day
Total Number of Crashes: 9
Total Number of Injury Crashes: 2
Section Crash Rate: 95 per 100 MVM
Section Injury Crash Rate: 21 per 100 MVM
Crash Rate Average for Similar Roads: 118
Injury Rate Average for Similar Roads: 44

Roadway Information

Section Length: 2.25 mile(s)
Statutory Speed Limit: 65 mph
Existing Speed Limit: 50 mph
Adverse Alignment: No
Divided/Undivided: Undivided
Number of Lanes: 2
Roadside Hazard Rating: 3
Transition Zone: No

Traffic Information

85th Percentile Speed: 57 mph
50th Percentile Speed: 49 mph
AADT: 1149 veh/day

Recommended Speed Limit:



Disclaimer: The U.S. Government assumes no liability for the use of the information contained in this report. This report does not constitute a standard, specification, or regulation.

Equations Used in the Crash Data Calculations

Exposure (M)

$$M = (\text{Section AADT} * 365 * \text{Section Length} * \text{Duration of Crash Data}) / (100000000)$$
$$M = (1149 * 365 * 2.25 * 10.00) / (100000000)$$
$$M = 0.0944$$

Crash Rate (Rc)

$$Rc = (\text{Section Crash Average} * 100000000) / (\text{Section AADT} * 365 * \text{Section Length})$$
$$Rc = (0.90 * 100000000) / (1149 * 365 * 2.25)$$
$$Rc = 95.38 \text{ crashes per 100 MVM}$$

Injury Rate (Ri)

$$Ri = (\text{Section Injury Crash Average} * 100000000) / (\text{Section AADT} * 365 * \text{Section Length})$$
$$Ri = (0.20 * 100000000) / (1149 * 365 * 2.25)$$
$$Ri = 21.20 \text{ injuries per 100 MVM}$$

Critical Crash Rate (Cc)

$$Cc = \text{Crash Average of Similar Sections} + 1.645 * (\text{Crash Average of Similar Sections} / \text{Exposure}) ^ (1/2) + (1 / (2 * \text{Exposure}))$$
$$Cc = 117.88 + 1.645 * (117.88 / 0.0944) ^ (1/2) + (1 / (2 * 0.0944))$$
$$Cc = 181.33 \text{ crashes per 100 MVM}$$

Critical Injury Rate (Ic)

$$I_c = \text{Injury Crash Average of Similar Sections} + 1.645 * (\text{Injury Crash Average of Similar Sections} / \text{Exposure}) ^{(1/2)} + (1 / (2 * \text{Exposure}))$$

$$I_c = 43.99 + 1.645 * (43.99 / 0.0944) ^{(1/2)} + (1 / (2 * 0.0944))$$

$$I_c = 84.81 \text{ injuries per 100 MVM}$$