

MDT Activity 112

PRELIMINARY TRAFFIC REPORT

July 2021



I-90 STRUCTURES-W OF ALBERTON
NHPB 90-1(239)65
UPN 9786000

Prepared for :
MONTANA DEPARTMENT OF TRANSPORTATION



Prepared by:
MORRISON-MAIERLE
www.m-m.net



Introduction / Summary

A bridge replacement without added capacity project is proposed to address the deterioration issues observed during routine inspections that exist in three bridges on westbound Interstate-90 west of Alberton. The extent of the deterioration and lack of meeting future transportation needs warrants the full replacement of the three structures on Interstate 90.

This Preliminary Traffic Report is intended to address engineering solutions to improve the safety and operations within the project area, i.e. determine the feasibility of making changes that will provide long-term benefits for the travelling public. However, minimal change to the Interstate horizontal and vertical alignments are anticipated.

Horizontal and vertical alignment modifications may be proposed for Old Highway 10 and / or Elizabeth Lane to shorten the length of the replacement structure at RP 65.5. Some modification to the vertical alignment of the eastbound on-ramp may be necessary to provide adequate vertical clearance under the replacement structure at the Cyr interchange at RP 70.1.

The three bridges will include two through lanes and be widened to provide inside and outside shoulders to meet Rural MDT Baseline Criteria for the Interstate System. Guardrail improvements and other minor enhancements will also be considered to improve safety at these locations.

Study Location and Limits

This project is located west of Alberton on westbound Interstate 90 (I-90), between RP 65.5 and RP 70.1 in Mineral County. I-90 is classified as an NHS Interstate route; stationing and reference posts increase from west to east. The three bridges to be replaced carry westbound I-90 over Old Highway 10 and Elizabeth Lane approximately 9.5 miles west of Alberton, over the Clark Fork River approximately 8.7 miles west of Alberton, and over the Clark Fork River again approximately 4.9 miles west of Alberton.

Existing Conditions

This segment of I-90 essentially parallels the Clark Fork River as a four-lane rural interstate through mountainous terrain consisting largely of public lands adjacent to the highway. Initial construction of the westbound lanes was completed in 1965 with Project I-IG 90-1(27)65.

The traffic information for I-90 below was provided by the Traffic Data Collection and Analysis Section. The data shown below is considered relevant to the entire segment from RP 65.0 to RP 71.0, as there are no significant / high volume interchanges within the current project area limits.

2021 AADT	7,370	Present
2026 AADT	7,740	Letting Year
2046 AADT	9,450	Design Year
DHV	890	
T	33.4%	
ESAL	1,628	
AGR	1.0%	

Old Highway 10 within the project limits serves minimal through traffic or property access functions, but is the “cross road” connection between the Exit 65 - Crystal Springs half interchanges at RP 65.0 (eastbound) and RP 66.0 (westbound). From limited data for the on- and off-ramps at the two half interchanges and observations during field reviews, Design Year AADT is estimated to be approximately 100.

The eastbound on-ramp at the Cyr interchange has an AADT of approximately 70. Assuming 1.0% growth in traffic volume, the Design Year AADT is estimated to be 85.

Crash History

Crash information was provided by the Department’s Safety Management Section and can be used for guidance. The following are brief summaries of the crash data for reported incidents contained in the MDT Crash Database for Interstate 90 (westbound travel lanes only) from reference post 65.0 to reference post 71.0 for the 3-year time frame January 1, 2017 through December 31, 2019.

Montana Highway Patrol records show 23 total crashes along this section of roadway. Of these crashes, 12 were wild animal-vehicle collisions, 8 road departure crashes, a rear end collision, a vehicle striking a drive shaft lying in the roadway, and a commercial motor vehicles axle failing and starting a fire adjacent to the roadway. The severity of the crashes resulted in a suspected serious injury crash, two suspected minor injury crashes, and 20 no apparent injury crashes.

Two of the road departure crashes were bridge-related crashes. One of these crashes occurred on the approach to the Old Highway 10 / Elizabeth Lane Structure (RP 65.5) involving a westbound vehicle losing control while performing a passing maneuver drifting off road right (while merging back into driving lane) and striking the w-beam guardrail approach section. The remaining bridge related crash occurred on the Clark Fork River Structure (RP 66.3), which involved a westbound commercial motor vehicle drifting off road left across centerline striking the w-beam guardrail approach section, overcorrecting off road right back across centerline and striking bridge barrier rail/w-beam guardrail approach section, and jackknifing in a roadside ditch. The severity of the bridge related crashes both resulted in a no apparent injury crash.

A Level of Service of Safety (LOSS) Analysis was also completed for this section of roadway, which is classified as a rural, mountainous 4-lane freeway from January 1, 2017 through December 31, 2019. This section of roadway is performing at a LOSS I rating for total crashes. A LOSS I rating indicates a low potential for crash reduction. From a fatal and injury crash perspective, this section of roadway is performing at a LOSS II rating. A LOSS II rating indicates a low to moderate potential for crash reduction.

Given the low to moderate potentials for crash reduction, no modifications to I-90 alignments are indicated. The subject replacement bridges will include two through lanes and be widened to provide inside and outside shoulders to meet Rural MDT Baseline Criteria for the Interstate System. Guardrail improvements and other minor enhancements will also be considered to improve safety at these locations.

A graphic of the 10-year crash history locations is shown below. Other graphics are included in the Appendix.



2017 thru 2019 I-90 Westbound Crash Locations

Geometric Design Recommendations

The major highway design criteria recommended to be integrated into the design process are as follows:

- The design speed for I-90 would be 50 mph based on Rural MDT Baseline Criteria for Interstate in mountainous terrain (see Appendix). However, the current posted speed limit is 80 mph. Given the context of this project, a design speed of 70 mph is recommended.
- Shoulder widths across the three new structures should meet interstate standards of 4' inside and 10' outside, as recommended in the Route Segment Plan and detailed in the Baseline Criteria Practitioner's Guide.
- Because the Cyr Interchange eastbound on-ramp provides direct access to the interstate highway, a minimum vertical clearance under the replacement structure of 17.0' should be provided in accordance with Rural MDT Baseline Criteria for Interstate roads in mountainous terrain.
- All other design criteria for the Cyr Interchange eastbound on-ramp should follow MDT design standards for loop ramps in rural areas, including a theoretical basis for the

horizontal alignment assuming turning-roadway conditions and a minimum design speed of 30 mph.

- Old Highway 10 does not have posted speed limits. 25 mph advisory speed plaques are posted in the vicinity of the curves under I-90. With any improvements to Old Highway 10, a design speed of 30 mph should be met in accordance with the Rural MDT Baseline Criteria for Local Roads in mountainous terrain.
- Old Highway 10 serves as the cross road for the Crystal Springs - Exit 65 half interchanges, but is classified as an off-system, local road. In accordance with the Baseline Criteria a minimum vertical clearance under the replacement structure of 15.0' should be provided, but the design team is encouraged to achieve 17.0' clearance to match interstate criteria.
- All other design criteria for Old Highway 10 should be in conformance with Mineral County Subdivision Road Design Standards for 81 - 160 ADT (see Appendix).
- Design criteria for any modifications to Elizabeth Lane should be in conformance with Mineral County Subdivision Road Design Standards for 1 - 40 ADT.

APPENDIX

Traffic Data

Crash and Level of Service Safety Analysis

Crash Locations Graphics by Site

Rural MDT Baseline Criteria

Mineral County Road Design Standards

RAIL TRANSIT AND PLANNING DIVISION
TRAFFIC DATA COLLECTION SECTION
Worksheet for Engineering and Planning Purposes

Project Description:

Interstate Flexible
NHPB 90-1(239)65,NHPB 90-1(240)65
I-90 Structures-W of Alberton
UPN: 9786000
I-90: RP 065+0.000 - 071+0.000

*Truck Distribution**

DATE: 03-Mar-21

<u>2021</u>	AADT= <u>7,370</u>	PRESENT		5	3.7 %	1.2 %
				6	1.9 %	0.6 %
				7	0.1 %	0.0 %
<u>2026</u>	AADT= <u>7,740</u>	LETTING YEAR		8	2.3 %	0.8 %
<u>2046</u>	AADT= <u>9,450</u>	DESIGN YEAR		9	76.3 %	25.5 %
	DHV= <u>890</u>			10	6.6 %	2.2 %
	D= _____			11	1.3 %	0.4 %
	T= <u>33.4%</u>			12	1.9 %	0.6 %
	ESAL= <u>1628</u>			13	6.0 %	2.0 %
	AGR= <u>1.0%</u>					
					100.0 %	33.4 %

2019

AADT*= 7,220

BUS= 0.3% **20**

COM= 33.4% **2413**

AGR= 1.0%

K Factor= 9.40%

* Distribution: 2019 Continous Count Site (A-030)

* AADTs and Growth Rate: 2019 TYC

PROJECT DESCRIPTION: Interstate Flexible DATE: 03-Mar-21
 NHPB 90-1(239)65,NHPB 90-1(240)65
 UPN: 9786000

PAVEMENT: RIGID:
 FLEXIBLE: X

LETTING YEAR ADT: 7,740 LETTING YEAR 2026 LANE DESIGN FACTOR 95 %
 DESIGN YEAR ADT: 9,450 DESIGN YEAR 2046

VEHICLE TYPE	% OF TYPE	LETTING YEAR ADT	DESIGN YEAR ADT	MEAN YEAR ADT	DIRECTIONAL ADT	DESIGN LANE ADT	18K EQUIV RATE FAC	MEAN YEAR ADL
CLASS 1 & 2	35.3	2732.22	3335.9	3034.0	1517.0	1441.2	0.001	1.82
CLASS 3	31.0	2399.40	2929.5	2664.5	1332.2	1265.6	0.003	4.25
CLASS 4	0.3	21.44	26.2	23.8	11.9	11.3	0.59252	6.70
CLASS 5	1.2	94.42	115.3	104.8	52.4	49.8	0.13874	6.91
CLASS 6	0.6	49.15	60.0	54.6	27.3	25.9	0.50476	13.09
CLASS 7	0.0	2.85	3.5	3.2	1.6	1.5	0.87596	1.31
CLASS 8	0.8	59.24	72.3	65.8	32.9	31.2	0.38366	11.99
CLASS 9	25.5	1974.50	2410.7	2192.6	1096.3	1041.5	1.27780	1330.82
CLASS 10	2.2	170.21	207.8	189.0	94.5	89.8	0.96574	86.71
CLASS 11	0.4	33.89	41.4	37.6	18.8	17.9	1.37954	24.66
CLASS 12	0.6	47.86	58.4	53.1	26.6	25.2	0.79938	20.18
CLASS 13	2.0	154.69	188.9	171.8	85.9	81.6	1.46494	119.53
CLASS 14		0.00	0.0	0.0	0.0	0.0		0.00
CLASS 15		0.00	0.0	0.0	0.0	0.0		0.00
CLASS 16		0.00	0.0	0.0	0.0	0.0		0.00
TOTAL VALUES	33.4	2586.79	3158.3	2872.5				1627.96

AVERAGE DAILY 18 KIP EQUIVALENT AXLE LOAD: 1627.96

20 YEAR EQUIVALENT AXLE LOAD: 11,884,075

2021 AADT = 7,370
 2026 AADT = 7740
 2046 AADT = 9450
 DHV = 890
 Direction =
 Com Trks = 33.4%
 ESAL = 1627.96
 AGR = 1.000%

* Equivalency Factors: WIM Data (2015 to 2019)



Montana Department of Transportation

PO Box 201001
Helena, MT 59620-1001

VISION ZERO
zero deaths
zero serious injuries

Memorandum

To: Dave Holien, P.E., TA Engineer
Consultant Design Section

Attn: Phill Forbes, P.E., Senior Transportation Engineer
Morrison-Maierle, Inc.

From: Patricia W. Burke, P.E., Safety Engineer *PWB*

Date: April 28, 2020

Subject: NHPB 90-1(239)65
I-90 Structures – W of Alberton
UPN 9786000
Work Type 221– Bridge Replacement w/o Added Capacity

The Montana Department of Transportation must comply with Title 23 USC, Section 409 which may prohibit the distribution of the enclosed material. Further distribution of this material should be made by the Traffic & Safety Bureau only. Any other requests for this information should be directed to the Traffic & Safety Engineer.

Summary

The crash analysis for the subject project is summarized below. The analysis is for three (3) crossing structures in the Missoula District. Locations of the crossing structures are summarized in the table below:

BRIDGE NAME	R.P.
Old Highway 10/Elizabeth Lane (WB)	65.500
Clark Fork River (WB)	66.300
Cyr/Clark Fork River (WB)	70.100

The crash data used in this crash analysis is for Interstate 90 (westbound travel lanes only) from reference post 65.000 to reference post 71.000 from January 1, 2017 through December 31, 2019.

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vehicles axle failing and starting a fire adjacent to the roadway. The severity of the crashes resulted in a suspected serious injury crash, two suspected minor injury crashes, and 20 no apparent injury crashes.

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A Level of Service of Safety (LOSS) Analysis was also completed for this section of roadway, which is classified as a rural, mountainous 4-lane freeway from January 1, 2017 through December 31, 2019. This section of roadway is performing at a LOSS I rating for total crashes. A LOSS I rating indicates a low potential for crash reduction. From a fatal and injury crash perspective, this section of roadway is performing at a LOSS II rating. A LOSS II rating indicates a low to moderate potential for crash reduction.

If you need additional information, please contact me at 444-9420.

e-copies: Gabe Priebe, P.E. – Traffic & Safety Engineer
 Bob Vosen, P.E. – Missoula District Administrator
 Damian Krings, P.E. – Highway Engineer
 Jason Senn, P.E., Engineering Project Manager

copies w/ attachment: Project File NHPB 90-1(239)65 UPN 9786000



Old Highway 10 / Elizabeth Lane

Clark Fork River

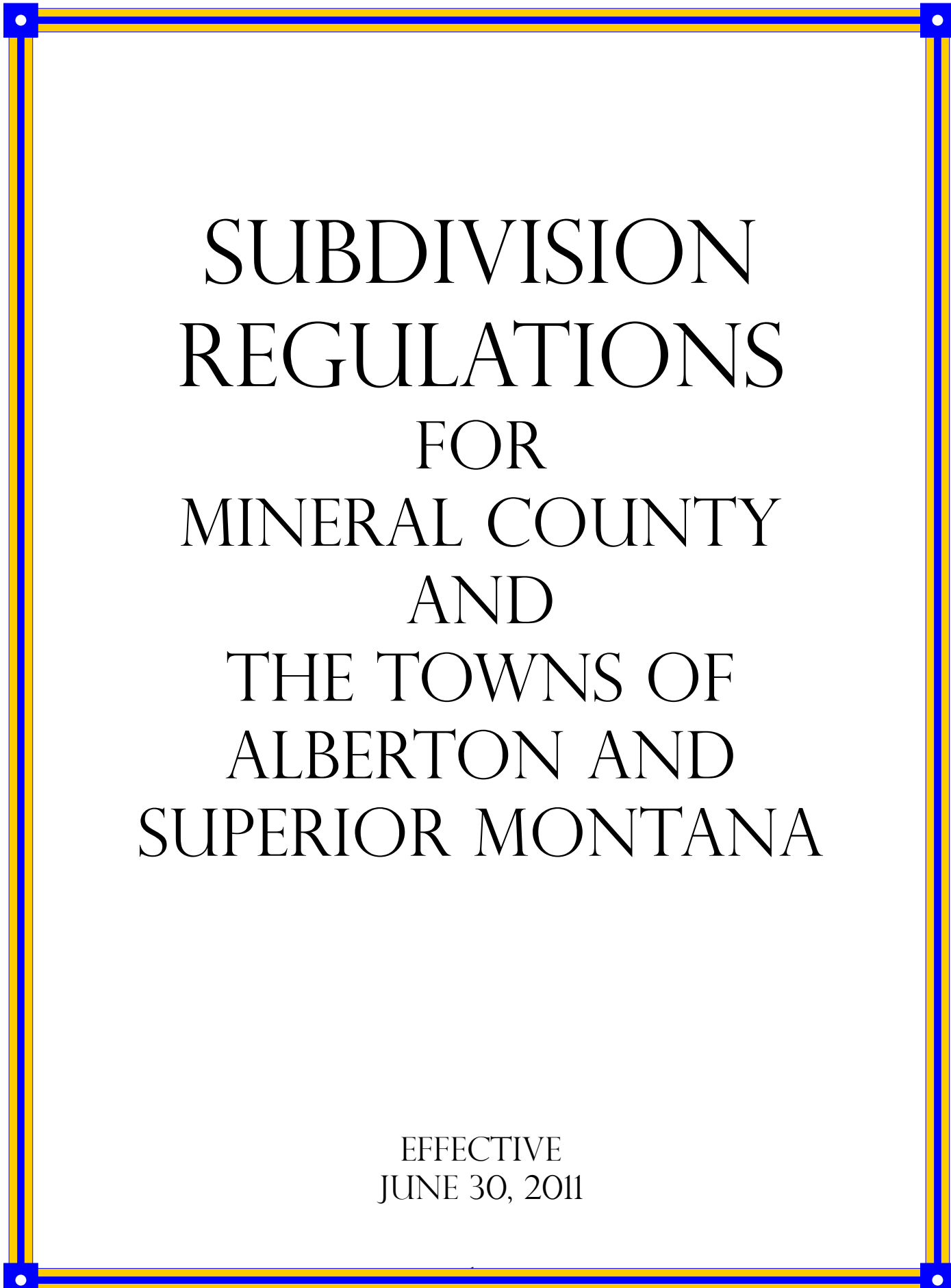


Cyr Interchange

	B	C	D	E	F	H	J	K	L	M			
	Design Element			Rural MDT Baseline Criteria									
				Interstate ^(a)	Arterial		Collector ^(a)	Local Roads ^(a,b)					
					Principal	Minor	Major Collector	Paved	Gravel				
6	Design Control	Design Speed ^(b) (minimum)	Level	70 mph	70 mph	60 mph	60 mph	50 mph	40 mph		2.5		
7			Rolling	70 mph	60 mph	55 mph	50 mph	40 mph	30 mph				
8			Mountainous	50 mph	50 mph	45 mph	40 mph	30 mph	20 mph				
9	Roadway Elements	Travel Lane Width		12'			11'	11'	12'		5.2		
10		Minimum Number of Lanes		2 in each direction		N/A							
11		Shoulder Width		10' outside; 4' inside		Varies with AADT		Varies with AADT		1'		0'	
12		Cross Slope	Travel Lane		2%			2%		3%			
13	Shoulder		2%			2%		3%					
14	Roadside Elements	Ditch	Inslope	6:1 (10' width)			6:1 (10' width) for DHV≥200, 4:1 (6' width) for DHV<200				5.4		
15			Width	10'			10'		V-Ditch				
16			Slope	20:1 towards backslope									
17		Backslope Cut Depth	0-5'	5:1			4:1				5.4		
18			5-10'	Level/Rolling 4:1; Mountainous 3:1			Level/Rolling 3:1; Mountainous 2:1						
19			10-15'	Level/Rolling 3:1; Mountainous 2:1			Level/Rolling 2:1; Mountainous 1.5:1						
20			>15'	Level/Rolling 2:1; Mountainous 1.5:1			1.5:1						
21		Fill Slopes	Fill Height 0-10'	6:1			6:1 for DHV≥200 4:1 for DHV<200		4:1				
22				Fill Height 10-20'	4:1			4:1 for DHV≥200 3:1 for DHV<200		3:1		5.4	
23			Fill Height 20-30'	3:1									
24	Fill Height > 30'			2:1			1.5:1						
25	Median Width	Level	50' minimum		See RDM Section 5.3						5.3		
26		Rolling	50' minimum										
27		Mountainous	10' minimum										
28	Clear Zone		See RDM Section 9.2									9.2	
29	Alignment Elements	SSD		See RDM Section 2.8								2.8	
30		ISD		N/A		See RDM Section 2.8						2.8	
31		Horizontal Alignment	Minimum Radius (e=8%)		See RDM Section 3.2.3								3.2
32			Spiral Curve Selection		e ≥ 7%					N/A			3.2
33			Superelevation Rate		e _{max} = 8%					e _{max} = 8%		e _{max} = 4%	3.3
34		Vertical Alignment	Maximum Grade Level		3%	3%	3%	5%	6%	7%		4.3	
35			Maximum Grade Rolling		4%	4%	5%	7%	10%	10%			
36			Maximum Grade Mountainous		6% for V < 65 mph 5% for V ≥ 65 mph	7%	7%	10%	14%	16%			
37	Minimum Vertical Clearance		17'			16.5'		15.0'			4.5		
38	Loading Structural Capacity		HL-93										

(a) Federal functional classification defined by MDT and approved by the Montana Transportation Commission and FHWA.

(b) The design criteria for rural collector roads should be used for Local Roads > 2000 AADT and/or functionally classified as a rural collector. For local roads with current AADT < 2000, County or MDT local road standards or AASHTO Guidelines for Design of Very Low-Volume Local Roads may be used as the basis of design.



SUBDIVISION
REGULATIONS
FOR
MINERAL COUNTY
AND
THE TOWNS OF
ALBERTON AND
SUPERIOR MONTANA

EFFECTIVE
JUNE 30, 2011

TABLE 1

Mineral County Subdivision Road Design Standards

Old Highway 10

Minimum Design Standards	<u>1 – 40 ADT</u>	<u>41 to 80 ADT</u>	<u>81 – 160 ADT</u>	<u>161+ ADT</u>
1. Minimum right-of-way width	50 – 60 ft.	60 ft.	60 ft.	60 ft.
2. Minimum roadway (driving surface) width <i>A</i>	20	24 ft.	24 ft.	24 ft.
3. Minimum approach radius at intersections	15 ft.	25 ft.	25 ft.	35 ft.
4. Maximum grades <i>B</i>	8%	8%	8%	8%
5. Minimum stopping sight distance	150 ft.	150 ft.	200 ft.	200 ft.
6. Angle of intersecting centerlines	At least 75°	At least 75°	At least 75°	At least 75°
7. Maximum cul-de-sac road length <i>C</i>	1,500 ft.	2,500 ft.	2,500 ft.	2,500 ft.
8. Cul-de-sac minimum outside right-of-way	50 ft.	50 ft.	50 ft.	50 ft.
9. Minimum centerline roadway radius	75 ft.	100 ft.	154 ft.	250 ft.
10. New bridges	Must comply with Mineral County Bridge Standards or AASHTO design guidelines <i>D, E</i>			
10.a. Design load (AASHTO) minimum	HS – 20	HS – 20	HS – 20	HS – 25
10.b. Vertical clearance	14.5 ft.	14.5 ft.	14.5 ft.	14.5 ft.
11. Paving requirements <i>F, G, H</i>	--	--	Double chip seal or paving required <i>I</i>	Paving required
12. Dust abatement	Considered	Required		

A- Roads must also have 2-foot wide compacted gravel shoulders on each side.

B- Grades greater than 8% shall be by variance and not exceed 100 feet in length.

C- Measured from center of intersection to center of cul-de-sac. Turnouts may be required.

D- American Association of State Highway Transportation Officials.

E- Roadway surface on bridge shall not be less than roadway driving surface it connects to.

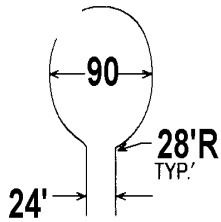
F- See Mineral County Paving Requirements.

G- Where all lots are less than 1-acre in size and connected to public water and sewer, double chip seal or paving is required regardless of ADT.

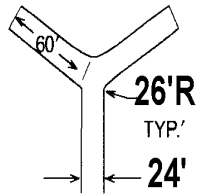
H- Roads within mobile home parks and RV parks shall be paved or double chip sealed, regardless of ADT.

I- The choice of double chip seal or paving is made at the discretion of the subdivider.

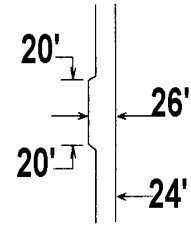
ROAD DIAGRAM ONE



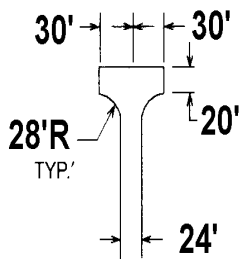
90' DIAMETER
CUL-DE-SAC



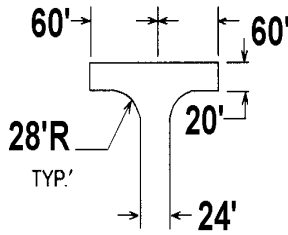
ACCEPTABLE
ALTERNATIVE TO
120' HAMMERHEAD



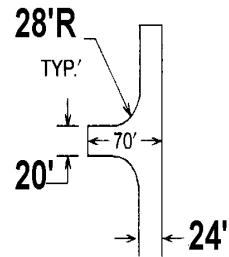
MINIMUM
CLEARANCE AROUND A
FIRE HYDRANT



60'
HAMMERHEAD



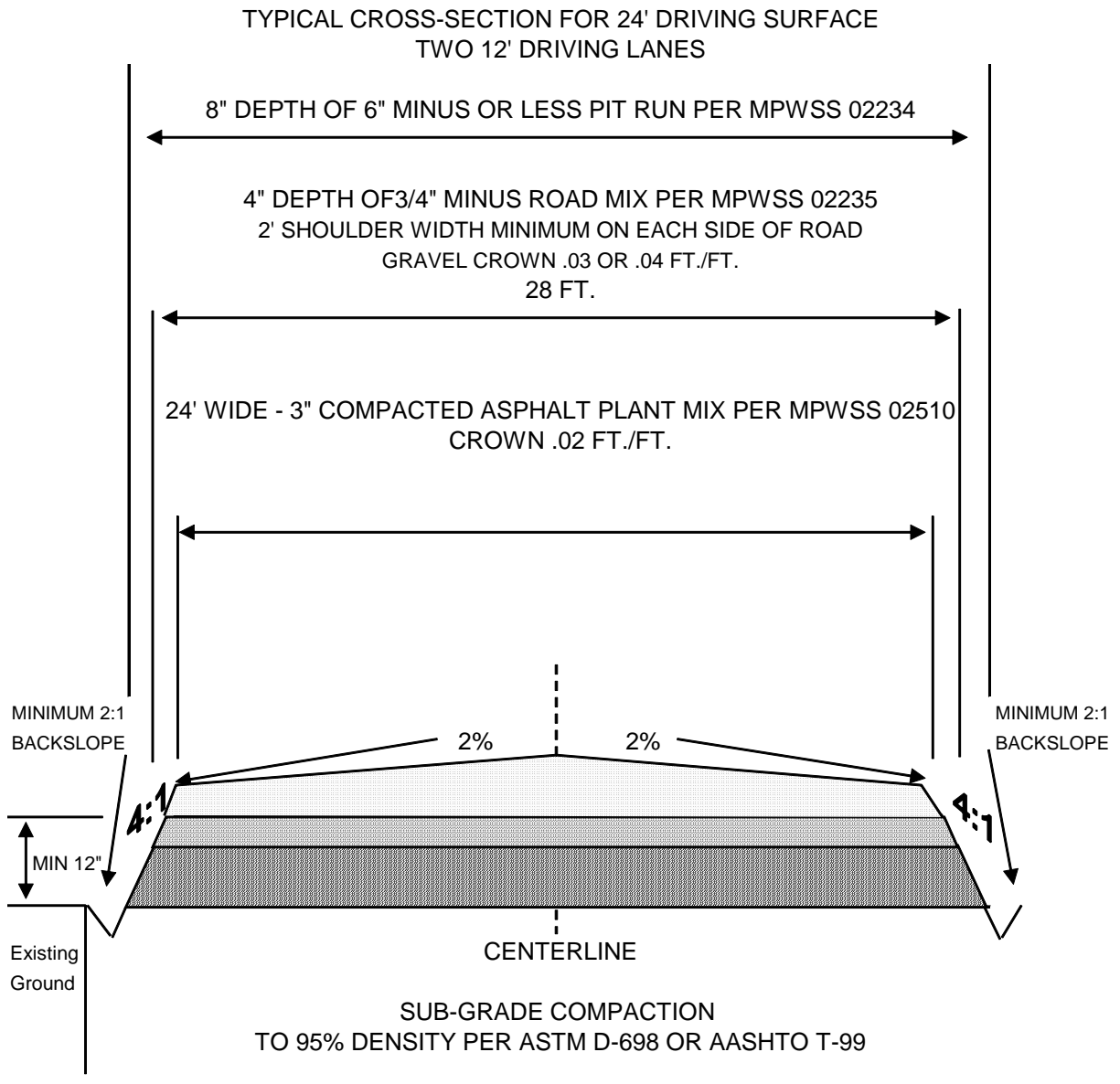
120'
HAMMERHEAD



ACCEPTABLE
ALTERNATIVE TO 120'
HAMMERHEAD

ROAD DIAGRAM TWO

MINERAL COUNTY MINIMUM ROAD CONSTRUCTION STANDARDS



ENGINEER INSPECTION OR WRITTEN APPROVAL REQUIRED ON EACH OF THE FOLLOWING:

- (1.) SUB-GRADE AND DITCHES
- (2.) COMPACTED PIT RUN MATERIAL, 6 IN. MINUS OR LESS
- (3.) COMPACTED CRUSHED TOP SURFACING TYPE "A" 3/4 MINUS
- (4.) FINISHED ROADWAY AND STREET SIGNS PER MUTCD