Colorado Department of Transportation

DESIGN DATA

Orig.Date:	01/23/2020
Rev.Date:	
Revision #:	0
Region #:	02

Status ☐ Preliminary ☒ Final ☐ Revised

Submitted by PM:	DALTONS
Date:	05/11/2021
Revised By:	
Date:	

Approved by Program Engineer: Shane Ferguson Digitally signed by Shane Ferguson Date: 2021.05.11 14:33:18 -06'00'

Project Code # (SA#):	23558	STIP#:	SR25216
Project #:	FBR R200-266		
PE Project Code:	23558		
Project Description:	R2B2 (REGION 2 BRIDGE BUNDLE) (GRANT)		
County:	093 071,089 015,093,119 043,093		
Municipality:	Timpas		
System Code:	2 NHS Non-Interstate		
Oversight By:	PoDi/State Administered		
Planned length:	70	Type of Terrain:	R Rolling
Geographic Location:	VARIOUS LOCATIONS ON SH 350, SH 9 AND US 24		

Remarks: A variance for the design criteria may be submitted, depending on thedesign proposed by the Contractor for the following locations:US 24 MP 227.095, MP 271.691<(>,<)> and MP 271.9CO 9 MP 15.97 and MP 20.107Draft forms 464 are attached.

1 Safety/Operations/ITS Considerations

Project Under: Other

AASHTO, BRIDGE ENTERPRISE

☐ Variance in Minimum Design Standards Required

☐ Justification Attached ☐ Request to be Submitted

☐ Bridge ☐ See Remarks

☐ Safety project, not all standards addressed

TSM&O Eval Completion Date: 08/11/2020

Guardrail meets current standards:

Comments:

2 Right of Way

	Yes/No	Est #
ROW &/or Perm. Easement Required:	No	
Relocation Required:	No	
Temporary Easement Required:	No	
Changes in Access:	No	
Changes to Connecting Roads	No	

3 Utilities(list names of known utility companies)

Century Link,San Isabel Electric,SEColorado Power Associ.,City of Trinidad,CDOT,SouthparkTele.,IntermtnRuralElect,Xcel,ColoNatGs

4 Railroad Crossings

Railroad(s): NA

Crossing Number(s):

Recommendations:

5 Environmental

Type: P CE Programmatic

Approved on:

Project Code # Cleared Under: 23559

Project # Cleared Under: FBR R200-267

Comments: 240 MBTA SPEC REQ'D, 250 SPEC REQ'D, WETLAND DELINEATIONS FOR EACH STRUCTURE WERE CLEARED BETWEEN 12/8/2020 AND 01/11/2021

Use Columns A, B, C, D, E and F to identify facility described below

6 Traffic

		A 009C	B 350A	C 024A	D 009A	E	F
Current Year:	ADT	3900	530	5900	1300		
2019	DHV	429	96	915	202		
	DHV% Trucks	3.7%	18%	5.1%	7.4%		
Future Year:	ADT	5487	705	7133	1872		
2041	DHV	604	78	1106	290		
Facility Location		☐ Industrial ☐ Commercial ☐ Residential ☒ Other	☐ Industrial ☐ Commercial ☐ Residential ☒ Other	☐ Industrial ☐ Commercial ☐ Residential ☒ Other	☐ Industrial ☐ Commercial ☐ Residential ☒ Other	☐ Industrial ☐ Commercial ☐ Residential ☐ Other	☐ Industrial ☐ Commercial ☐ Residential ☐ Other

Project Code # (SA#):	23558	Project #:	FBR R200-266	Rev.Date:	

	A 009C	B 350A	C 024A	D 009A	E	F
7 Roadway Classification						
Route	009C	350A	024A	009A		
Reference Point (Begin)	70.000	0.000	225.000	15.000		
Reference Point (End)	71.000	72.717	275.000	21.000		
Functional Classification	4	4	4	4		
Facility type	U	U	U	U		
Access Control Classification	R	R	R	R		

8 Major Structure(s):

N-21-C, N-21-F, M-22-Y, M-22-U, M-21-J, M-21-C, M-21-B, I-15-T,

H-13-N, I-15-AO, I-13-G , J-14-C, J-15-G, G-12-C

9 Design Criteria

Controlling Design Criteria: When Design Speed ≥ 50 mph on roadways part of the National Highway System (when Design Speed < 50 mph, the only two controlling criteria are Design Speed and Design Loading Structural Capacity). Elements requiring a variance are identified with an * & detailed in CDOT Form #464.

	Design Criteria Description	Proposed_A	Standard_A	Proposed_B	Standard_B	Proposed_C	Standard_C	Proposed_D	Standard_D	Proposed_E	Standard_E	Proposed_F	Standard_F	Design Criteria Reference and Notes
1.	Design Speed (mph)	60	60	75	75	75,60	75,60	65	65					
2.	Lane Width (ft)	12	12			12	12	12	12					AASHTO GDHS 2018, Table 7-3, pg. 7-7
3.	Shoulder Widths													
	- Inside Shoulder Width (ft)													
	- Outside Shoulder Width (ft)	8	8	12	12	8	8	8	8					AASHTO GDHS 2018, Table 7-3, pg. 7-7
4.	Horizontal Curve Radius (min) (ft)	1200	1200	2210	2210	2210,1200	2210,1200	1480	1480					AASHTO GDHS 2018, Table 3-7, pg. 3-34
5.	Superelevation Rate (e) (%)													
	- Maximum Superelevation Rate (emax) (%)	8	8	8	8	8	8	8	8					CDOT Roadway Design Guide 2018, Section 3.2.3.2, pg. 3-22
6.	Stopping Sight Distance (SSD) (min) (ft)													
	- Horizontal SSD													
	- Intersection Sight Distance													
	- SSD Level Road	570	570	820	820	820,570	820,570	645	645					AASHTO GDHS 2018, Table 3-1, pg. 3-4
	- SSD Downgrade													
	- SSD Upgrade													
7.	Grade (max) (%)	6	6	4	4		4,6	4,5	4,5					CDOT Roadway Design Guide 2018, Table 3-4, pg. 3-31
8.	Cross Slope (Xslope) (%)	2	2	2	2	2,2	2,2	2	2					AASHTO GDHS 2018, Section 3.3.3.1, pg. 3-31
9.	Vertical Clearance (min) (ft)													
	- Roadway Structure													
	- Sign & Pedestrian Structures													
	- Railroad Structure													
	- Overhead Utility													
10	Design Loading Structural Capacity													
	Additional Horizontal Alignment and Vertical Alignment Design Criteria (Elements requiring a Design Decision Letter are identified with an *.)													
	Posted Speed (mph)	55		65										
	Δ without Horizontal Curve (max) (dms)													
	Clear Zone on Tangent (min) (ft)	26	26	18	18	28,30	28,30	24	24					AASHTO Roadside Design Guide 2011, Table 3-2
	Clear Zone on Curve (min) (ft)	39	39	23	23	36,45	36,45	34	34					AASHTO Roadside Design Guide 2011, Table 3-2
	Deceleration Length (level) (min) (ft)													
	Acceleration Length (level) (min) (ft)													
	Redirect Taper Ratio													
	Lane Drop Taper Ratio													
	Transition Taper Ratio (Accel/Decel)													
	Vertical Curve Length (min) (ft)	300	300	300	300	300,300	300,300	300	300					CDOT Roadway Design Guide 2018, Section 3.3.4, pg. 3-33
	Grade Break without Vertical Curve (max) (%	0.2	0.2	0.2	0.2	0.2,0.2	0.2,0.2	0.2	0.2					CDOT Roadway Design Guide 2018, Section 3.3.4, pg. 3-33
	Crest Vertical Curve (K) (min)	151	151	312	312	312,151	312,151	193	193					CDOT Roadway Design Guide 2018, Table 3-1, pg. 3-2
	Sag Vertical Curve (K) (min)	136	136	206	206	206,136	206,136	157	157					CDOT Roadway Design Guide 2018, Table 3-1, pg. 3-2
	Algebraic Difference (Xslope) (max) (%)													
	Additional Typical Section Design Criteria (Elements requiring a Design Decision Letter are identified with an *.)													
	Design Vehicle	WB-67	WB-67	WB-67	WB-67	WB-67	WB-67	WB-67	WB-67					
	# Lanes each direction (auxiliary)													
	Median Width (ft)													
	Median Type													
	Side Slope Distance (“Zslope”) (ft)	8	8	8	8	8,8	8,8	8	8					CDOT Roadway Design Guide 2018, Table 4-2, pg. 4-13, Fig 5, pg. 4-9
	Sidewalk Width (ft)													
	Bike Lane Width (ft)													
	Curb & Gutter Type													

COLORADO DEPARTMENT OF TRANSPORTATION

DESIGN EXCEPTION VARIANCE REQUEST

FHWA Oversight: ■ Yes ☐ No

Project Code: 23358

Project name: Bridge Bundle: I-13-G

Date: 2/25/2021

Project Number:

Type (check all that are applicable)

☑ New construction ☐ Restoration ■ Resurfacing ☐ Rehabilitation ☐ _____
☑ Reconstruction ■ Safety ☐ Enhancement ☐ _____ ☐ _____

Revised:

Region: 2

Part 1 – Complete A through H for all projects.

A. Short project description (☐ see CDOT Form 463 for more detailed description)

Replacement of structure I-13-G (US24, MP 227.095) and reconstruction of US 24 to tie-in to existing.

■ AASHTO standards apply
☐ 3R standards apply
■ Other: State Standards

B. Description of standard(s) reduced

Design speed for US 24 reduced from 75 mph to 50 mph. Reduced K-value for sag vertical curve from 206 to 96.

C. Rational need for exception(s)

The structure has a deficient vertical curve. The raise in profile would be approximately 6' to meet standards significantly increasing the cost and project footprint. Horizontally, this is on a tangent section.

D. Mitigation measures proposed (include safety discussion)

Proposed safety measures would include new guardrails and widening shoulders from 4' (existing) to 8' (proposed).

E. Description of adjoining sections: (☐ see CDOT Form 463)
Other:

This segment of US 24 is a tangent section with consistent lanes and shoulders. It is approximately 3/4 of a mile from the US 285/US 24 intersection.

☑ same as existing project

☐ same as proposed project

F. Supporting Data Driven Safety Analysis (DDSA)
Analysis Completed: ☐ Yes ☑ No
DDSA Summary or explanation if no DDSA performed:

See H

G. Cost

Estimated item cost if built to full standard $ 3.9M
Estimated item cost with exception $ 2.8M
± difference in cost: $ 1.1M

Cost increase is due to additional embankment.

H. Other (as needed)

The Detailed Summary of Crashes Report indicates that there was 1 crash that occurred within the limits of the proposed design construction in a 5 year period. Type: overturn Factor: asleep at the wheel

Part 2 – Appropriate signatures required.

A. Submitted by (Project Manager)	Date	Program Engineer Approval	Date

Resident Engineer Approval	Date

Required for Federal aid oversight and Interstate projects

Approved by (FHWA Division Administrator)	Date

B. ☐ Not approved ☐ Approved with conditions	Conditions/comments

Previous editions are obsolete and may not be used.

Distribution: Project Manager
Program Engineer
Resident Engineer
HQ Records Center
FHWA, if applicable

CDOT Form #0464 12/18

COLORADO DEPARTMENT OF TRANSPORTATION

DESIGN EXCEPTION VARIANCE REQUEST

FHWA Oversight: ☒ Yes ☐ No

Project Code: 23558

Project name: Bridge Bundle: I-15-AO

Date: 2/25/2021

Project Number:

Type (check all that are applicable)

☒ New construction ☐ Restoration ☒ Resurfacing ☐ Rehabilitation ☐ _____
☒ Reconstruction ☒ Safety ☐ Enhancement ☐ _____ ☐ _____

Revised:

Region: 2

Part 1 – Complete A through H for all projects.

A. Short project description (☐ see CDOT Form 463 for more detailed description)

Replacement of structure I-15-AO (US24, MP 271.90) and reconstruction of US 24 to tie-in to existing.

☒ AASHTO standards apply
☐ 3R standards apply
☒ Other: State Standards

B. Description of standard(s) reduced

Design speed for US 24 reduced from 60 mph to 50 mph. Minimum curve radius reduced from 1200 to 758.

C. Rational need for exception(s)

Stucture has a deficient horizontal curve due to topography. A variance to design to 50 mph would minimizes the impacts to ROW, environmental, and cost/limits of footprint.

D. Mitigation measures proposed (include safety discussion)

Proposed safety measures would include new guardrail and widening shoulders from 3'-4' (existing) to 8'.

E. Description of adjoining sections: (☐ see CDOT Form 463)
Other:

12' lanes with 3'-4' shoulders. Structure I-15-T at MP 271.29 (approximately 0.6 miles away) also has substandard curves.

☒ same as existing project

☐ same as proposed project

F. Supporting Data Driven Safety Analysis (DDSA)
Analysis Completed: ☐ Yes ☒ No
DDSA Summary or explanation if no DDSA performed:

See H

G. Cost

Estimated item cost if built to full standard $ 7.6M
Estimated item cost with exception $ 2.0M
± difference in cost: $ 5.6M

Cost increase is due to significant increase in embankment, walls, and structure.

H. Other (as needed)

The detailed Summary of Crashes Report indicates that there were 3 crashes, involving 7 vehicles, that occurred within the limits of the proposed design construction in a 5 year period. Type: sideswipe, head-on, parked vehicles Factors:no apparent contributing factc

Part 2 – Appropriate signatures required.

A. Submitted by (Project Manager)	Date	Program Engineer Approval	Date

Resident Engineer Approval	Date

Required for Federal aid oversight and Interstate projects

Approved by (FHWA Division Administrator)	Date

B. ☐ Not approved ☐ Approved with conditions	Conditions/comments

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COLORADO DEPARTMENT OF TRANSPORTATION

DESIGN EXCEPTION VARIANCE REQUEST

FHWA Oversight: ■ Yes ☐ No

Project Code: 23558

Project name: Bridge Bundle: I-15-T

Date: 2/25/2021

Project Number:

Type (check all that are applicable)

☑ New construction ☐ Restoration ■ Resurfacing ☐ Rehabilitation ☐ _____
☑ Reconstruction ■ Safety ☐ Enhancement ☐ _____ ☐ _____

Revised:

Region: 2

Part 1 – Complete A through H for all projects.

A. Short project description (☐ see CDOT Form 463 for more detailed description)

Replacement of structure I-15-T (US24, MP 271.291) and reconstruction of US 24 to tie-in to existing.

■ AASHTO standards apply
☐ 3R standards apply
■ Other: State Standards

B. Description of standard(s) reduced

Design speed reduced from 60 mph to 50 mph. Minimum curve radius reduced from 1200 to 758.

C. Rational need for exception(s)

Structure has a deficient horizontal curve due to topography. A variance to design to 50 mph would minimize impacts to ROW, environmental, and cost/limits or footprint.

D. Mitigation measures proposed (include safety discussion)

Proposed safety measures would include new guardrails and widening shoulders from 4'-5' (existing) to 8'.

E. Description of adjoining sections: (☐ see CDOT Form 463)
Other:

12' lanes with 4'-5' shoulders. Structure I-15-AO at MP 271.90 (approximately 0.6 miles away) also has substandard curves.

☑ same as existing project

☐ same as proposed project

F. Supporting Data Driven Safety Analysis (DDSA)
Analysis Completed: ☐ Yes ☑ No
DDSA Summary or explanation if no DDSA performed:

See H

G. Cost

Estimated item cost if built to full standard $ 4.0M
Estimated item cost with exception $ 2.0M
± difference in cost: $ 2M

Cost increase is due to additional embankment, walls, and structure.

H. Other (as needed)

The detailed Summary of Crashed Report indicates that there were 3 crashes, involving 5 vehicles, that occurred within the limits of the proposed design construction in a 5 year period. Type: wild animal, rear-end, sideswipe Factor: no apparent contributing factors

Part 2 – Appropriate signatures required.

A. Submitted by (Project Manager)	Date	Program Engineer Approval	Date

Resident Engineer Approval	Date

Required for Federal aid oversight and Interstate projects

Approved by (FHWA Division Administrator)	Date

B. ☐ Not approved ☐ Approved with conditions	Conditions/comments

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COLORADO DEPARTMENT OF TRANSPORTATION

DESIGN EXCEPTION VARIANCE REQUEST

FHWA Oversight: ☒ Yes ☐ No

Project Code: 23558

Project name: Bridge Bundle: J-14-C

Date: 2/25/2021

Project Number:

Type (check all that are applicable)

☒ New construction ☐ Restoration ☒ Resurfacing ☐ Rehabilitation ☐ _____
☒ Reconstruction ☒ Safety ☐ Enhancement ☐ _____ ☐ _____

Revised:

Region: 2

Part 1 – Complete A through H for all projects.

A. Short project description (☐ see CDOT Form 463 for more detailed description)

Replacement of structure J-14-C (CO 9, MP 20.107) and reconstruction of CO 9 to tie-in to existing.

☒ AASHTO standards apply
☐ 3R standards apply
☒ Other: State Standards

B. Description of standard(s) reduced

Design speed for CO reduced from 65mph to 50 mph. Reduce curve radius from 1480 to 758.

C. Rational need for exception(s)

The structure has a deficient horizontal curve due to topography. A variance to design to 50 mph would minimize impacts of ROW, environment, and cost/limits of footprint.

D. Mitigation measures proposed (include safety discussion)

Proposed safety measures would include widened lane width (11' existing, 12' proposed), new guardrail, and widened shoulders (1'-2' existing to 6' proposed).

E. Description of adjoining sections: (☐ see CDOT Form 463)
Other:

This section of Colorado Highway 9 is mountainous with embankment and hillside immediately adjacent to the edge of existing roadway. Narrow shoulder throughout the corridor.

☒ same as existing project

☐ same as proposed project

F. Supporting Data Driven Safety Analysis (DDSA)
Analysis Completed: ☐ Yes ☒ No
DDSA Summary or explanation if no DDSA performed:

See H

G. Cost

Estimated item cost if built to full standard $ 7.9M
Estimated item cost with exception $ 2.9M
± difference in cost: $ 5.0M

Cost increase is due to increased roadway length, embankment, excavation of adjacent embankment, walls, and structure.

H. Other (as needed)

The detailed Summary of Crash Report indicates that there were 5 crashes, involving 5 vehicles, that occurred within the limits of the proposed design construction in a 5 year period. Type: sign, overturn X2, guard rail, fence Factors: no apparent contributing factors

Part 2 – Appropriate signatures required.

A. Submitted by (Project Manager)	Date	Program Engineer Approval	Date

Resident Engineer Approval	Date

Required for Federal aid oversight and Interstate projects

Approved by (FHWA Division Administrator)	Date

B. ☐ Not approved ☐ Approved with conditions	Conditions/comments

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COLORADO DEPARTMENT OF TRANSPORTATION

DESIGN EXCEPTION VARIANCE REQUEST

FHWA Oversight: ☐ Yes ☒ No

Project Code: 23558

Project name: Bridge Bundle: J-15-G

Date: 2/25/2021

Project Number:

Type (check all that are applicable)

☒ New construction ☐ Restoration ☒ Resurfacing ☐ Rehabilitation ☐ _____
☒ Reconstruction ☒ Safety ☐ Enhancement ☐ _____ ☐ _____

Revised:

Region: 2

Part 1 – Complete A through H for all projects.

A. Short project description (☐ see CDOT Form 463 for more detailed description)

Replacement of structure J-15-G (CO 9, MP 15.97) and reconstruction of CO 9 to tie-in to existing.

☒ AASHTO standards apply
☐ 3R standards apply
☒ Other: State Standards

B. Description of standard(s) reduced

Design speed for CO 9 reduced from 65 mph to 30 mph. Reduce curve radius from 1480 to 214.

C. Rational need for exception(s)

The structure has a deficient horizontal curve due to topography. A variance to design to 30 mph would minimize the impacts to ROW, environmental, and cost/limits of footprint.

D. Mitigation measures proposed (include safety discussion)

Proposed safety measures include widened lane width (11' existing, 12' proposed, new guardrail, and widening shoulders (1-2' existing, 6' proposed).

E. Description of adjoining sections: (☐ see CDOT Form 463)
Other:

This section of Highway 9 is mountainous with embankment immediately adjacent to the edge of roadway. Narrow shoulder throughout the corridor

☒ same as existing project
☐ same as proposed project

F. Supporting Data Driven Safety Analysis (DDSA)
Analysis Completed: ☐ Yes ☒ No
DDSA Summary or explanation if no DDSA performed:

See H

G. Cost

Estimated item cost if built to full standard $ 9.9M
Estimated item cost with exception $ 2.6M
± difference in cost: $ 7.3M

Cost increase is due to increased roadway length, embankment, excavation of adjacent embankment, walls and structure.

H. Other (as needed)

The detailed Summary of Crash Report indicates that there were 8 crashes, involving 8 vehicles, that occured within the limits of the proposed design construction in a 5 year period. Type: fixed object x3, overturning(avoiding vehicle in road), embankment cut/fill slop

Part 2 – Appropriate signatures required.

A. Submitted by (Project Manager)	Date	Program Engineer Approval	Date

Resident Engineer Approval	Date

Required for Federal aid oversight and Interstate projects

Approved by (FHWA Division Administrator)	Date

B. ☐ Not approved ☐ Approved with conditions	Conditions/comments

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