Government of Alberta
Transportation

DESIGN STANDARDS/PRACTICE EXCEPTION REQUEST SUMMARY

Title: Vertical Alignment, North of Lovett River to Hwy 47, 3R/4R Design Standards vs New Construction Design Standards

Memorandum Date: April 16, 2010
Design Exception Request Date: March 17, 2010
Region: North Central
Approval Status: Provided Alternative

Project Location					
Highway	Control Section	At km	From km	To km	Existing AADT
40	24		16.650	36.100	450

Project Type (Mark all that apply with an X)							
Functional Planning:		New Construction:	X	Reconstruction:		Paving/Surfacing:	
Bridge:		Operations:		Geotechnical:		Environmental:	
Other:							

Project Description

Highway 40:24 is gravel highway being upgraded to a paved surface. As part of a GBC/APC project, TSB recommended improving the vertical alignment of the highway to new construction standards.

Summary

3R/4R Standards were requested to be used for the vertical alignment in place of the normal new construction standards. The use of 3R/4R standards was not approved, but the following was permitted:

- Design speed based on the posted speed (rather than the usual practice of 10 km/h above the posted speed).
- 600 mm object height for stopping sight distance (based on the AASHTO 2004 standard) rather than the 380 mm object height that is normally used in Alberta.

New Construction Standard

Posted Speed (km/h)	Design Speed (km/h)	Min K Value (Crest)	Min K Value (Sag)
100	110	100	60
90	100	75	50
80	90	55	40

AASHTO Standard

Posted Speed (km/h)	Design Speed (km/h)	Min K Value (Crest)	Min K Value (Sag)
100	100	52	45
90	90	39	38
80	80	26	30

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Rationale for Approval/Rejection
3R/4R standards are intended only for roads that are already paved (to extend the service life of existing paved roads and enhance highway safety on a network basis). As the road in question is a gravel road, it is not appropriate to use 3R/4R standards. However, this roadway is unusual compared to typical Alberta rural highways in many respects which warrant the use of special geometric standards: ▪ The AADT is approximately 450 ▪ The terrain is rolling or mountainous (grades between 3% and 8%) ▪ The estimated construction cost is high ($32 million for 20 km), assuming no rock excavation ▪ Much of the common excavation is rock ▪ The traffic composition is about 50% commercial vehicles (which will mean mostly professional drivers and lower average speeds) ▪ The collision rate is lower than the provincial average for highways of this volume. The majority of the reported collisions are animal related. There is no collision pattern related to the existing vertical curves
Additional Mitigation Required
No mitigation is required.

Key Words
Design speed, posted speed, vertical alignment, 3R/4R

Photograph/Diagram (If Available)