



# MEMORANDUM

STATE OF ALASKA



Department of Natural Resources  
Office of Habitat Management & Permitting

---

**TO:** Jerry Ruehle  
Regional Environmental Coordinator  
Alaska Department of Transportation

**DATE:** March 6, 2007

**TELEPHONE:** 269-6987  
**FAX:** 269-5673

**FROM:** Stewart Seaberg *SS*  
Habitat Biologist  
OHMP

**SUBJECT:** Minimum Bridge  
Heights  
Projects # 52503 & 55012

The Department of Natural Resources, Office of Habitat Management and Permitting (OHMP) has reviewed ADOT&PF's letter of February 16, 2007 regarding options for increasing the Campbell Creek bridge height on the West Dowling Road Connection Project (55012). We have also reviewed the final Environmental Assessment (EA) and Finding of No Significant Impact for the New Seward Highway Rabbit Creek Road to 36<sup>th</sup> Avenue project (52503).

The OHMP and the Alaska Department of Fish & Game (ADF&G) have concerns about the heights under these bridges. The EA's for both projects proposed a 12 foot minimum height under the bridges. The current proposal for the Dowling Road crossing only provides 10 feet. OHMP and ADF&G recommended a minimum bridge height of 14 feet to restore movement corridors for moose and reduce the likelihood of moose-vehicle collisions in these movement corridors.

During our February 1, 2007 meeting on the West Dowling Project, OHMP requested that the team look at a combination of three ways of increasing the effective bridge clearance at Campbell Creek. OHMP encourage the combination of: 1) raising the roadbed slightly; 2) reducing the depth of the girders; and 3) reducing the ground elevation on the banks under the bridge. The most recent correspondence from ADOT&PF appears to have eliminated potential bridge options based on only two of these factors, not looking at the potential for raising the road bed slightly in combination with the other factors. The proposed option only provides 10 feet of clearance on the east side of the Dowling Road bridge.

The bridge height and the openness ratio are the two critical factors in wildlife passage structures. Providing a bridge height that is too low for a species nullifies any benefit of an adequate openness ratio. Research has found that some moose do not accept underpasses with heights of 13 feet; that height should be considered the absolute minimum. The minimum height of wildlife passages may need to be adjusted based on less-than-optimal openness ratios, as well as other site specific variables such as vegetation, topography, hydrology, disturbance and the target species. As we have pointed out earlier, the Dowling Road and Seward Highway bridge crossings of Campbell Creek should be higher than 13 feet to allow for moose utilization in the winter when snow and aufeis conditions are likely to reduce the effective height of the bridge. Traffic noise, traffic movement and use of the underpass by humans will adversely affect moose utilization of the underpass. All of these factors indicate that the structure should be designed higher than the minimum and with as much separation from the trail as possible in order to be effective.

Neither of the proposed bridges provides adequate clearance for the movement of moose. This could result in a public safety issue by forcing moose to cross busy roadways, potentially increasing the likelihood of moose-vehicle collisions.

The Municipality of Anchorage's *Anchorage Bowl Park, Natural Resource and Recreation Facility Plan* and their *Living with Wildlife in Anchorage: A Cooperative Planning Effort*; state that greenbelts are, in part, managed to protect fish and wildlife habitats, to maintain riparian corridors and to conserve, enhance or restore important wildlife habitat on public lands. OHMP recommends that the minimum bridge height on these two projects be at least 14 feet to maintain adequate clearance for moose movements, maintain habitat connectivity in these riparian corridors and reduce the likelihood of moose-vehicle collisions.

Calculations provided by the consultant indicate that the openness ratios were calculated incorrectly. There appears to be some discrepancies with the clearances between the trail and the various girder options. A bridge alternative analysis for the Dowling Road bridge is provided in Appendix A. We have added three additional calculations which we feel more accurately represent ADOT&PF's proposed option as well as what could be achieved by using a combination of raising the road, lowering the bank and reducing the girder depth. As in the original analysis, the openness ratios are all above the recommended 2.0, however, the differences are significant and affect the conclusions drawn from the original analysis. We feel that by looking at a combination of increasing road height, reducing bank height and reducing girder depth, an acceptable solution can be found.

OHMP encourages ADOT&PF to reevaluate the proposed structures for the Dowling Road and New Seward Highway crossings of Campbell Creek and provide designs that will adequately address the movement of moose through the corridor. Please contact Habitat Biologist Ed Weiss at (907) 269-5901 if you have questions or need further information.

cc: J. Childers, ADOT&PF  
M. McCulloch, ADOT&PF  
B. Ballard, ADOT&PF

R. Sinnott, ADF&G  
T. Tobish, MOA  
T. Haugh, FHWA

M. Fink, ADF&G  
C. Ballard, OPMP  
A. Ott, OHMP

**Attachment A**

The openness ratio is calculated by taking the cross sectional area of the underpass divided by the distance to cross under (opening height x span length divided by width of the six lanes). Please note that the width factor should be the length of the bridge span, which is the width of the opening as an animal views it when approaching the bridge. The length factor is the bridge width or the length the animal would have to traverse under the crossing.

For the Dowling Road bridge, the drawings indicate there is between 3 and 10 feet of clearance on the west side of the bridge. We have not seen openness ratios calculated for underpasses with cross sections that are not rectangular. The openness ratio for the proposed action is the sum of a rectangular cross section of 58.011 m<sup>2</sup> and the remaining triangular cross section of 12.37 m<sup>2</sup> divided by the underpass length of 28.04 m<sup>2</sup>.

The revised figures include a modified calculation for this partially useable area under ADOT&PF preferred option. They also assume a consistent elevation for the trail and adjust minimum clearances based on reduced girder thickness or additional excavation.

The differences in the minimum clearances of 10 ft., 11.5 ft. and 12.2 feet also do not agree with the differences in depth between the 65, 54 and 36 inch girders.

Also included are calculations for:

1. The proposed action if the west bank was cut down to match the 10 foot clearance on the east bank.
2. A modified shallow girder option where the roadbed is raised one foot and the west bank is cut down to 6 inches above the OHW elevation.
3. A modified steel girder option where the roadbed is raised one foot and the west bank is cut down to 6 inches above the OHW elevation.

Revised original submittals

Bridge Option	Height (ft)	Height (m)	Width (ft)	Width (m)	Length (ft)	Length (m)	Openess
<b>Proposed Action w/ 3 -10 ft. clearance on west span</b>	10	3.05	62.4	19.02	92	28.04	2.51
	triangular area approx. $(8.11 \times 3.05)/2 = 12.37 \text{ m}^2$				92	28.04	
<b>Shallow Girder</b>	11.5	3.51	89	27.13	92	28.04	3.39
<b>Steel Girder w/ MSE Abutments</b>	12.2	3.72	113.6	34.63	92	28.04	4.59
<b>Proposed Action w/ 10 clearance across full span</b>	10	3.05	89	27.13	92	28.04	2.95
<b>Shallow Girder w/ 1 ft. roadbed raise &amp; 0.5 ft. reduced bank height on west side</b>	12.5	3.81	62.4	19.02	92	28.04	3.73
	13	3.96	26.6	8.11	92	28.04	
<b>Steel Girder w/ MSE Abutments, 1 ft. roadbed raise &amp; 0.5 ft. reduced bank height on west side</b>	13.2	4.02	78.1	23.80	92	28.04	5.03
	13.7	4.18	35.5	10.82	92	28.04	