

## Site 15 – Opal Ridge Rock Slide

This site is located upslope of Highway 40 and approximately 1.7 km south of Fortress Junction. This segment of the highway parallels the northwest/southeast trending Opal Range. There is a deposit of rockslide debris on the upper half of the slope and approximately 500 m above the highway. This rockslide deposit was mapped by Cruden and Eaton (1985) on airphotos of the site that were taken in 1958. An annotated copy of a 1999 airphoto of the site is attached as Figure E4. The extent of the rockslide debris did not change significantly between the 1958 and 1999 airphotos.

The rockslide above the highway originated in the uppermost portion of the slope above the highway in an over dip<sup>1</sup> slope of Etherington Formation limestone. The middle and lower portions of the slope above the highway also expose Etherington Formation limestone, however the slope angle is less steep and these areas are under dip slopes. The debris from the rockslide ran downslope for a maximum distance of approximately 500 m and the downslope extent of the rockslide debris is approximately 500 m above the highway. The extent of the rockslide debris and its location relative to the highway is shown on Figure E4. It appears on both the 1958 and 1999 airphotos that small amounts of the rockslide debris have been moving further downslope along a small creek channel, likely transported by surface runoff, entrainment in snow avalanches and ongoing downslope creep due to gravity.

Cruden and Eaton (1985) mapped this rockslide as a low frequency/high magnitude event. The timing of the rockslide prior to the 1958 airphoto is not known, and it may have occurred hundreds, or even thousands, of years earlier because the majority of the debris is at or above treeline and the limestone debris would not readily weather into soils that could support vegetation. This rockslide illustrates the type of rock slope instability that could occur along the over dip bedrock slopes above this segment of the highway. However, the hazard to the highway from this type of rockslide is judged to be low based on the distance between the highway right-of-way and the over dip slopes on the upper portion of the slope above the highway that would be the source area of such a rockslide if one were to occur in the future.

Cruden and Eaton (1985) also showed an area of active talus deposits along the upslope edge of the rockslide debris. These talus deposits are generated by ongoing, high frequency/low magnitude rockfalls from the oversteepened cliffs around the scarp of the rockslide. These rockfalls are not a hazard to the highway.

AMEC recommends the following Risk Level factors for this site using the rockfall frequency-severity matrix:

- Probability Factor of 2 based on the estimated very low to low probability of a similar rockslide occurring above the segment of the highway around

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<sup>1</sup> See Figure C1 in Appendix C for a definition and illustration of “over dip” and “under dip” slopes.

Fortress Junction. The overdip bedrock slopes across the upper portion of the slope above the highway are conducive to this type of rockslide, however the airphotos show that only one such major rockslide has occurred to date in this area.

- Consequence Factor of 1 based on the likelihood that any rockslide debris would be deposited on the middle portion of the slope above the highway and not impact on the highway.

Therefore, the recommended Risk Level for this site is 2.

No further work is recommended for this site.



AIRPHOTO REFERENCE: PROVINCE OF ALBERTA, 99-091, AP 82J, LN-23, AS5084 No.298, 1:20, 000, 99-07-12

SCALE



	PROJECT: HWY 40/HWY 541 GEOHAZARDS REVIEW				
	TITLE: OPAL RIDGE ROCK SLIDE				
CLIENT:	DATE: DECEMBER 2005	JOB No.: CG25211	CAD FILE: 25211N01.dwg	FIGURE No.: FIGURE E4	REV. A