Site 11 – Creek North of Fortress Junction II

This site is located at an unnamed creek channel approximately 1.8 km north of the Fortress Junction service station. A fan of cobble sized debris was noted in the upslope (east) ditch and along the small creek channel during the site inspection in October 2005 (Photos 1 and 2). It appeared that the debris washed down from the creek channel above the road during peak flows earlier in 2005. There was no surface flow along the creek channel at the time of the site inspection. As shown in Photo 2, the culvert placed to carry this creek beneath the highway fill embankment is offset approximately 10 m north of the current position of the creek channel.

The creek channel above the highway was traversed for approximately 150 m up to the powerline right-of-way that parallels the highway to the east. The creek channel was typically 2 to 3 m wide and incised approximately 1 to 1.5 m on average. The channel was generally lined with cobble to boulder sized rocks that had been exposed by erosion of the thin surficial soils. The upper portions of the channel walls exposed rocky soils. There was a second channel approximately 4 to 5 m south of the current channel, but it was largely overgrown and did not appear to have carried any significant flow in recent years.

There were no significant erosion areas noted along the segment of the channel that was traversed, nor were there any signs of a debris flow event that originated further upstream having flowed down the channel. It is judged that the debris in the upslope road ditch was washed downslope from various locations along the channel during peak flows, likely during heavy rains in June 2005, rather than as a single debris flow event.

Photo 3 shows the culvert outlet at the west toe of the highway embankment sideslope. There was an approximately 1.5 m drop below the culvert outlet and some soil erosion had occurred along the channel in this area. However, no significant erosion into the sideslope had occurred and the culvert outlet had not been undermined.

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

- Probability Factor of 9 based on the deposition of the debris fan in the upslope road ditch during the heavy rains in June 2005.

- Consequence Factor of 2 based on the assumption that if a future significant rainfall event caused a similar amount of debris to wash down the creek channel, the debris would nearly fill the ditch and possibly begin to encroach onto the road surface.

Therefore, the recommended Risk Level for this site is 18.

It is recommended that the debris in the upslope road ditch be cleared in order to restore the ditch capacity. When this is completed, the Consequence Factor can be reduced to 1 (i.e. the existing ditch should be sufficient to contain debris without it flowing onto the highway) and the Risk Level reduced to 9.

Photo 1 (top) – Fan of debris that has been deposited along the upslope (east) side of Highway 40 at an unnamed creek crossing approximately 1.8 km north of the Fortress Junction service station. The debris typically consisted of cobble sized rocks that appeared to have washed down along the creek channel during peak flows earlier in 2005.

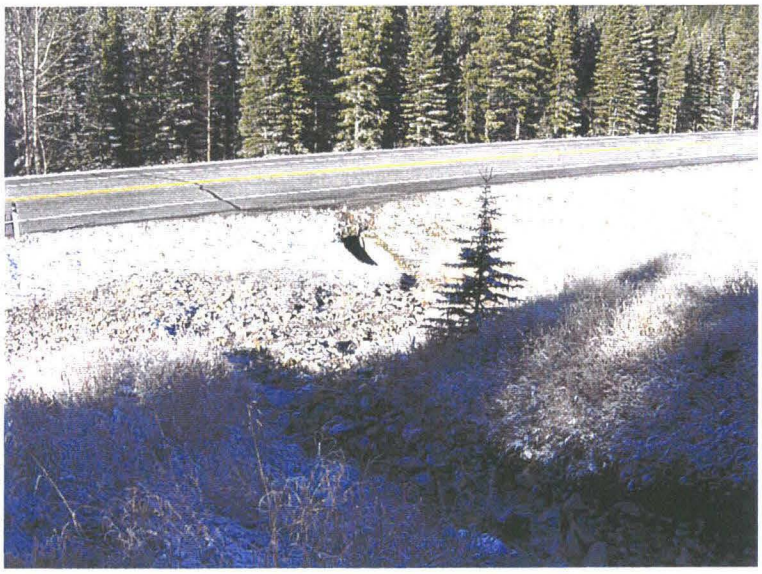

Photo 2 (bottom) – Facing downstream along the creek channel. The debris fan shown in Photo 1 is on the left side of this photo. Note how the culvert inlet is offset to the north (to the right, as seen in this photo) of the current position of the creek channel.

Photo 3 (top) – Culvert outlet at the west toe of the highway embankment sideslope. Some erosion has occurred around an approximately 1.5 m drop-off from the culvert outlet. There has not been any significant undermining of the culvert outlet to date.