

1.0 Site Visit

The Annual Inspection site visit was conducted on 30 May 2002. At the time of the visit, the weather was clear and blustery.

2.0 Significant Observations

The following observations, considered to be relevant to the stability of the slope were made:

- The large landslide complex in the valley wall continues to be active as described in the previous assessment reports, although retrogression of the crest appears to be very minor or unchanged. Please see Photos 1 to 3.
- The current closest point of the overall slide crest to the highway is still approximately 1 m from the fence line located approximately 25 m east of the edge of the highway (Photo 4). Minor retrogression of nearby portions of the slide crest was noted, but was largely attributed to weathering of the vertical scarp left by the previous slide block.
- A new slide block was seen to be forming on the north flank of the slide area, north of SI #10. This slide block is similar to those in the main slide area, with fresh tension cracks developing in the field behind the previous crest. Please see Photos 5 and 6.
- Creek erosion at the toe of the slope continues to be the primary trigger for the slide activity. Several locations showing oversteepening and erosion were noted at the toe of the slide. Please see Photos 7 and 8.
- No signs of tension cracks or extension of the slide between the fence line and the highway were observed.
- The island in the creek near the center of the landslide complex toe is still providing erosion protection to the central portion of the slide.
- The northern portion of the slide complex still appears to be more active than central and southern.
- The drainage gully located near the southern end of the slide area does not appear to have changed significantly since last year's inspection.

3.0 Changes from Previous Visits

No significant changes in the slide condition or crest position were noted in comparison to the last inspection, aside from the new slide block developing north of SI #10. The body of the slide continues to move in response to creek erosion at the toe.

4.0 Discussion

Although changes since the previous inspection appear to be relatively minor, the mode of this slide is such that crest loss will occur in successive steps, with slide blocks dropping rapidly, followed by periods with little or no crest retrogression. As noted in the previous assessment reports, the toe of the central portion of the slide appears to be somewhat protected from direct erosion at this time by a small island in the stream (possibly an eroded, former slide block itself).

The central portion of the slide may begin to move at a greater rate in the future as this island erodes away.

AMEC considers retrogression of this slide to the west to be inevitable. It is likely that portions of the ROW and fence line will be lost in the next few years as the crest retrogresses. However, it will likely take decades for the crest to retrogress to a position in the vicinity of the northbound lanes of the highway. An historical airphoto study could be undertaken to better estimate the rate of crest retrogression. Although it may be some time before the highway is directly undercut, there may be prior safety concerns as the near-vertical crest approaches the edge of the road.

Mitigation of this landslide complex would be a major undertaking. As a minimum, significant river training works would be required. Significant earthwork volumes would also be required to flatten the slopes, which would continue to retrogress towards a stable angle even after toe erosion is mitigated. Mitigative measures would require significant investigation and design studies prior to implementation.

It may be most practical to allow the landslide to run its course and realign the highway to the west as the slide crest retrogresses. There do not appear to be any topographical constraint to relocation of the highway and such works may be less costly and have fewer environmental impacts than attempting to mitigate this slide.

As noted in the previous assessment report, the current monitoring using slope inclinometers is not considered wholly adequate at this site. The failure mode is such that new slide blocks can develop and move rapidly for short periods of time, followed by long periods of relative inactivity. Therefore, the slope inclinometers would show little or no signs of movement prior to a rapid movement period where the crest could retrogress several metres, after which the slope inclinometer would be unreadable. AMEC has previously recommended additional monitoring via surveys of the crest position and slope profiles. The primary purpose of the additional monitoring would be to monitor crest retrogression and assess changes in the slope conditions. This is discussed further in the recommendations section.

5.0 Assessment

This is a very large, active landslide complex. The lower portions of the south and central areas and all of the northern areas are considered to be currently active. Although there has been little crest retrogression within the past two years in the south and central areas, continued crest retrogression in these areas is considered to be inevitable within the next few years. On this basis the Probability Factor with respect to this slide is taken as 11 since the slide is active and crest retrogression near the highway will continue.

It is likely that, in the short term, continuing retrogression of the current slide will not impact the highway, but over the medium to long term the highway is at risk. On this basis a Consequence

Factor of 2 is assigned for the **present location** of this slide. This value will increase with time as the slide retrogresses toward the highway.

Based on the above, the **present** Risk Level at this site is calculated as 22, which is unchanged from the 2001 assessment. This value will increase with time as the slide retrogresses toward the highway.

6.0 Recommendations

The monitoring programs currently in place should be continued. As the slide crest retrogresses to the west in the future, the existing slope inclinometers will be destroyed. Despite the limitations of slope inclinometers with respect to monitoring this type of landslide, it is worthwhile to continue reading them as planned.

Annual inspections should be continued as planned.

The crest position should be surveyed on a regular basis. During the Spring 2002 inspection, AT personnel surveyed the crest position with a hand-held GPS unit. It is understood that the intention is to repeat this survey in the future to track the position of the crest over time. AMEC recommends repeating this survey on a semi-annual basis in order to estimate the rate of crest retrogression.

An historic airphoto review should be conducted. This review could help to estimate the historic rate of crest retrogression towards the highway.

The owner of the buried telephone line adjacent to the fence should be notified of the proximity of the slide crest to their line.