

4.7 S8 – FISHER CREEK

Background

The Fisher Creek site is located on Secondary Highway 762:02, approximately 2 km north of the junction with SH 549 and approximately 900 m north of the Fisher Creek bridge.

The highway runs north-south on a cross-slope down to the west in this area. Settlement and cracking of the road surface was first noted at this site in 1988. Several geotechnical investigations have been performed by the Municipal District, AIT and consultants working for AIT since that time. These investigations generally concluded that the settlement and cracking of the road surface was the result of surface drainage percolating into poor-quality fill and remnant organic matter underlying the road alignment. Remedial measures including lime/gravel columns and the installation of a drainage blanket are understood to have been installed, however the available records of this work are incomplete. Please refer to Section A of the site binder for further discussion.

The most recent geotechnical investigations at this site were performed by AMEC in 2001 and 2002 in response to continued settlement and cracking at the north end of the site and the observation of additional cracking at a previously undisturbed area at the south end of the site. AMEC submitted the design to AIT in the fall of 2004 for two shear keys to repair the damage to the road at the north and south ends of the site and prevent future settlement and cracking.

Site Assessment

The site assessment was performed on May 30, 2006. The weather at the time of the site assessment was sunny and clear.

Please refer to Appendix S8 for a site plan illustrating the layout of the site. The assessment covered the highway surface through the settlement and cracking areas as well as the slope face below (west of) the highway.

Observations

The following points summarize the observations made during the site assessment. Please also refer to Appendix S8 for a site plan and annotated photographs illustrating key observations.

- The site appeared to have been repaved since the 2005 inspection, however the exact limits of the repaving could not be visually discerned relative to the previous patches and overlays.
- Some new cracking was noted in the previous cracking and settlement areas at the north end of the site. This area was repaved after the 2005 geotechnical inspection, and the visible cracking had developed since repaving. The pattern of the cracking was consistent with that noted in previous inspections. Photos S8-1 and S8-2 show this area.

- A new crack was noted in the road surface approximately 12 m south of the estimated north edge of the area that was repaved since the June 2005 inspection (Photo S8-3). The crack had negligible aperture (i.e. hairline crack) and no vertical displacement. The crack was oriented perpendicular to the road centerline.
- The south end of the site did not show any new cracking or settlement of the road surface since the 2005 inspection (Photo S8-4).
- The east (upslope) road ditch was in good condition. The portion of the ditch that is lined with rip-rap placed over filter cloth did not show any damage from high volumes of ditch flow during the heavy rains in June 2005.
- As noted in previous reports, the SI in Borehole 2002-3 was paved over and cannot be accessed for instrument readings.

Discussion

The road surface at the north end of the site has shown renewed cracking in a similar pattern to that noted in previous annual inspections. The road surface will require patching within the next year to maintain a safe running surface. Since the SI's at the north end of the site sheared off or were paved over in 2001 and 2002 there have been no functioning instruments for subsurface monitoring of slope movement affecting the road in this area. However, because the ongoing cracking and settlement is in the same pattern as in previous years it is judged that the slope movement affecting the road is occurring at the same depth noted in the SI's in 2001 and 2002 and therefore the previous shear key design for the north end of the site is still valid.

The SI's installed in the south end of the site have been showing ongoing slope movement beneath and to the west of the road that could affect the road. However, the road surface in this area has not shown any cracking or settlement in recent years.

Assessment and Risk Level

AMEC has previously recommended separate Risk Levels for the north and south ends of the site. However, based on the instrument data since the fall of 2004 and the observations from the current site inspection, AMEC now recommends that a single Risk Level be assigned to this site as follows:

- The Probability Factor should be set at 8 to reflect the recent cracking and settlement at the north end of the site that is consistent with previously observed patterns and rates.
- The Consequence Factor should be set at 4 to reflect the magnitude and extent of previous damage to the road surface at this site, which could reasonably be expected to occur again if the settlement and cracking continues.

Therefore, the current recommended overall Risk Level for this site is equal to 32.

Recommendations

The following recommendations from the 2005 assessment are still valid:

The implementation of remedial measures should be deferred pending the installation and monitoring of additional instrumentation to check if the previously-noted movement at the north and south ends of the site is actually a single, continuous area of instability.

If the additional instruments show that the north and south movement areas are continuous, then the previous design of two separate shear keys (one for the north end of the site and another for the south end of the site) should be revised to combine them as necessary to stabilize the entire site.

The semi-annual readings of the instrumentation at the south end of the site should be continued.

The paved-over SI in Borehole 2002-3 should be recovered and read.

Annual assessments should be continued.