

S10 – SECONDARY HIGHWAY 762 MISCELLANEOUS SITES

Site A Background

Site A is located on Secondary Highway 762, approximately 12 km south of the junction with Highway 22X (as measured along the highway).

The highway is oriented roughly north/south along a cross slope down to the west at this site. There is limited background information available regarding this site. It is understood that there was a failure at this site in the mid-1990's – either a failure of the road subgrade and/or slope instability in the underlying native soil and the slope face downslope (west) of the road. This instability required temporary closure of at least the southbound lane of the road prior to repair. There are no details currently available on the associated investigation and repair aside from that the road was reconstructed with granular fill.

At least two overlays have been placed at this site in recent years – one between the May 2002 and July 2003 site assessments and a second shortly after the July 2003 site assessment.

Annual assessments have been performed at this site by AT and AMEC personnel since the spring of 2000.

Site Assessment

The site assessment was performed on May 25, 2004. The weather at the time of the site assessment was clear and calm.

The site assessment covered the highway surface 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 S10 for annotated photographs.

- There was continued cracking in the southbound lane in the same area as noted during previous assessments. Photos S10A-1 to S10A-3, S10A-5 and S10A-6 all show various views of the cracking. It is inferred that this cracking and displacement had formed since the July 2003 overlay. At the time of the May 2004 assessment, the lateral separation at the crack ranged between approximately 20 and 25 mm and the associated vertical displacements ranged between approximately 25 and 50 mm. The width of the cracking area, as measured along the west shoulder of the road, was approximately 30 m. The cracking had an overall semi-circular layout in plan view, with cracking extending to a maximum of 0.6 m east of the road centerline. This pattern is suggestive of a slump failure down towards the west.

- There was possible secondary cracking in road surface was noted in the road surface approximately 15 m south of the south flank of the main cracking area noted above, as shown in Photo S10A-4.
- Granular backfill was visible in the fill slope below (west) of the road adjacent to the main cracking and settlement area. This backfill was inferred to be related to the reconstruction of the road after the failure in the mid-1990's.

Discussion

The settlement and cracking affecting the southbound lane are continuing in the same pattern as noted during previous assessments. Since the July 2003 overlay was placed, the settlement has damaged the southbound lane to the extent where it requires repair in the near-future.

Assessment and Risk Level

The settlement and cracking has been treated as a maintenance issue to date and in recent years has required annual repaving of the site. The extent of the settlement and cracking at this site does not seem to have changed significantly since the annual assessments started in 2000. However, without information on the subsurface conditions and the instability mechanism(s) (e.g. movement within the fill embankment or extending into the underlying native soils) it is not possible to draw firm conclusions on the risk to the highway.

Therefore, AMEC recommends the following Risk Level factors for this site:

- A Probability Factor of 9 because the ongoing cracking and settlement has led to up to approximately 50 mm of vertical displacement since July 2003.
- A Consequence Factor of 4 based on the understanding that the mid-1990's failure caused the closure of at least one lane of traffic and the assumption that the currently observed settlement and cracking could cause the same damage if full reactivation of the movement occurred or if it is not repaired as required on an ongoing basis.

Therefore, the recommended Risk Level for this site is 36, which is an increase from the value of 24 recommended after the July 2003 assessment.

Recommendations

AMEC recommends the following future work for this site:

Perform a site investigation and follow-up instrumentation readings in order to gather information on the subsurface and stability conditions and provide a basis for the design of remedial measures. As discussed during the site assessment, the investigation would consist of borehole drilling (possibly supplemented by test pitting) along the road surface and on the slope face below (west) of the road, installation of geotechnical instrumentation, and a site survey. AMEC will submit a proposal and cost estimate for this work under separate cover.

Remedial measures should be considered for this site. As noted, the information from the recommended site investigation is required in order to fully consider practical options for remedial measures and their approximate costs.

AT and/or maintenance contractor personnel should check the settlement and cracking conditions at this site regularly. This would provide a level of due diligence in case the rate of settlement accelerates and cautionary signage and/or repaving is required promptly.

The annual site assessments should be continued.