

Alberta Transportation
#301, 9621 – 96 Avenue
Bag 900, Box 29
Peace River, AB
T8S 1T4

December 31, 2008

Attention: Mr. Ed Szmata
Sr. Construction Technologist

**Re: Peace Region (Swan Hills) GeoHazard Assessment
(SH-29) Hwy2:50 Drift Pile River Bank Erosion
at local road at Indian Reserve
AT Regional Geotechnical Contract 107/08
- Part B – Annual Site Inspection (Slide Tour) Report**

In compliance with requirements of the captioned Contract, an annual site inspection of the site was carried out and a report (for 2008 year) is provided with this letter.

On July 17, 2008, Messrs. Karl Li and Shawn McArthur both of Karl Engineering Consultants Ltd. (KarlEng) under took the site inspection in the presence of Messrs. Ed Szmata, and Rocky Wang of Alberta Transportation (AT).

1.0 SITE and BACKGROUND

The site location is presented in Figure 1. A local road runs south from the T intersection at Hwy 2:50 junction located at about 120m west of the Hwy 2:50 highway-bridge crossing at Drift-Pile River. The local road runs alongside the channel of the Drift-Pile River which meanders to flow north with the erosion of its scouring bank encroaching into the local road. The scour bank of the meander channel is located at about 500m distance south from the Hwy 2:50 junction (a church is located on north side of highway and at north end of the T intersection of the local road) and channel erosion has caused a steepening of the river bank to encroach toward the local road. From aerial photo assessment, it is apparent that the process of channel erosion will continue into the future and will cause future encroachment of the steepened bank towards the local road.

2.0 OBSERVATIONS

From site observation, the Drift-Pile River meanders to flow north and it eroded a scour bank alongside the local road. The channel erosion has caused a steepening and slumping of the river bank resulting in a retrogression (drop) of top of bank along a 5-10m stretch alongside the local road. The steep river bank (about 0.3H:1V) can be estimated about 7m to 10m in height. The high-water mark was not obviously demarcated but can be estimated at about 5m high (i.e. @ ½ bank height). At the time of this inspection, low water flow about 0.1 to 0.3m water depth can be estimated. The top of river bank is well vegetated with shrub and tree growth along the riparian zone. A setback distance of about 7m can be estimated between top of the bank and the shoulder of the located road.

On the opposite (land) west side of the roadway, a dugout can be located with about 14m separation distance to west edge of local road. Thus, there was estimated about 14m buffer space for shifting of roadway west away from future adverse influence of the river bank erosion.

3.0 RISK ASSESSMENT

The following risk rating is assessed.

$$\begin{aligned}\text{Risk} &= \text{Probability Factor (PF)} * \text{Consequence Factor (CF)} \\ &= 9 * 2 \\ &= 18\end{aligned}$$

PF = 9

- The lateral erosion of river bank will remain active in line with channel meandering and ongoing scouring meander Drift Pile River channel at this local road location. This erosion process may invoke sliding movement of the bank slope with time and slide retrogression may cause a reduction of setback along top of bank.
- The future reduction of setback and retrogression of bank slope may affect the local road in future.
- Rate of bank erosion is uncertain and its effect on future operation of roadway remains to be monitored. The assessment of future roadway operation will require inspection assessment (s.a. yearly inspection)

CF = 2

- It is unlikely that the erosion of river bank will accelerate to affect roadway within next few years (prior to year 2010)
- In the case of accelerated rate of bank erosion and abrupt sliding movement of bank slope to adversely affect the local road, there is room to shift the roadway east (towards the dugout pond) away from the river bank.

Note:

- The risk assessment is provided based on a categorization of Hazard Probability Factor (PF) and Consequence Factor (CF) as provided by AIT's RFP 2000. The details are provided in Table II at front portion of this Report.

4.0 COMMENT and ACTION

The following assessment is updated, as appropriate, from previous AIT reports.

Retrogression of the river bank slope has occurred to gradually erode into the setback along top of river bank beside the roadway. The amount of erosion and retrogression of river bank (top of bank) apparently have accumulated over many years. At the time of inspection, there existed about 7m of setback distance from top of bank to the edge of local road. From review of previous aerial photo, the process of lateral degradation of meandering river channel has been ongoing over the years and abandoned meander channels (ox-bow lakes) infested the floodplain area of about 1km width.

It is advisable

- to preserve this setback space with riparian vegetative growth and
- to inspect annually to assess the extent of bank erosion to determine if the roadway will be adversely affected.
- Should an accelerated rate of erosion of unstable river bank slope be monitored during future inspections, the possibility of shifting the roadway westwards towards the dugout pond can be considered in the future.
- Presently for pragmatic operation of the road, the presence of a 7m setback space can be workable to provide a stable river bank slope for continual operation of the roadway.

5.0 CLOSURE

We appreciate the opportunity to provide the above information. Should you require further information, please contact the undersigned.

Karl Li, P.Eng.
Senior Geotechnical Engineer

cc. Roger Skirrow, P.Eng. AT Twin Atria

Attachment
- Site Photos