


# memorandum

Tel: 3731

GEOCRES  
No: 31F-172  
  
Ontario

To: E.C. Lane  
Head, Structural Section  
Kingston

Date: 1988 12 20

Atten: A. Van Dalen

RE: Douglas Creek Culvert  
6.4 km West of Former Hwy. 17  
W.O. 88-46016, Site 29-155  
Hwy. 60, District 9, Ottawa

This letter summarizes our telephone conversation dated December 16, 1988 at which time the observations of an inspection of the aforementioned culvert and the proposed scheme to remedy the situation were discussed. The comments and suggestions discussed are described below.

## INSPECTION

An inspection of the culvert implemented by this Section on December 1, 1988, confirmed your observations of considerable translation and rotation of the south corner of the east culvert wall. Observation revealed the absence of weep holes along this section. Weep holes, of course are designed to provide channels for the release of hydrostatic pressure. Undermining of culvert footings were noticeable along various sections of both culvert walls. However, it was difficult to ascertain the presence of undermining in the south corner of the east culvert where the significant displacements have occurred because of the elevation of the Douglas Creek waters at that location. The possible coexistence of undermining and water at the footing base can result in not only excessive horizontal force exerted by the water and a potential "jacking" effect produced by the formation of ice, but the resisting forces could also be substantially reduced as a result of the absence of contact between the concrete footing and the bedrock founding material. Furthermore, voids between the footing and founding material can provide routes for potential corrosive attack on the dowels which produces further reduction of lateral resistance.

In addition, the sloping surcharge backfill appears to have been placed at an approximate 1H:1V slope rather than the standard 2H:1V. The steeper slope produces greater lateral earth pressures and it is unknown as to whether this was accounted for in the original design.

## FIELD INVESTIGATION

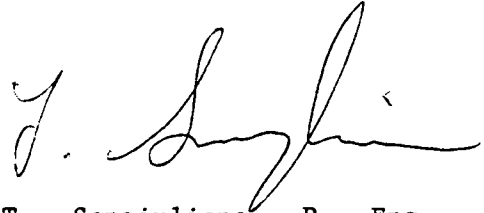
As discussed, it is the intent of this section to carry out a field investigation prior to the submission of any recommendation that would arrest further movements. The purpose of the investigation is to:

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- 1) Determine the characteristics of the backfill and bedrock by advancing boreholes behind the culvert wall.
- 2) Attempt to ascertain extent of undermining and provide recommendations for repair.

In view of the weather conditions that presently confront us and the fact that the investigation will entail mobilization on the steep fill slopes behind the culvert wall, the field investigation, as agreed in our telephone conversation would be implemented far more economically under improved climatic conditions in May, 1989. Although it is unlikely that a total collapse will develop within the deferred time period, it is recommended that the culvert wall and associated southeast retaining wall be monitored for displacement within this interim period. A summary of the monitoring records should be supplied to this Section.

If you have any questions regarding the above comments or require additional information, please do not hesitate to contact this office.

A handwritten signature in dark ink, appearing to read 'T. Sangiuliano', with a stylized, flowing script.

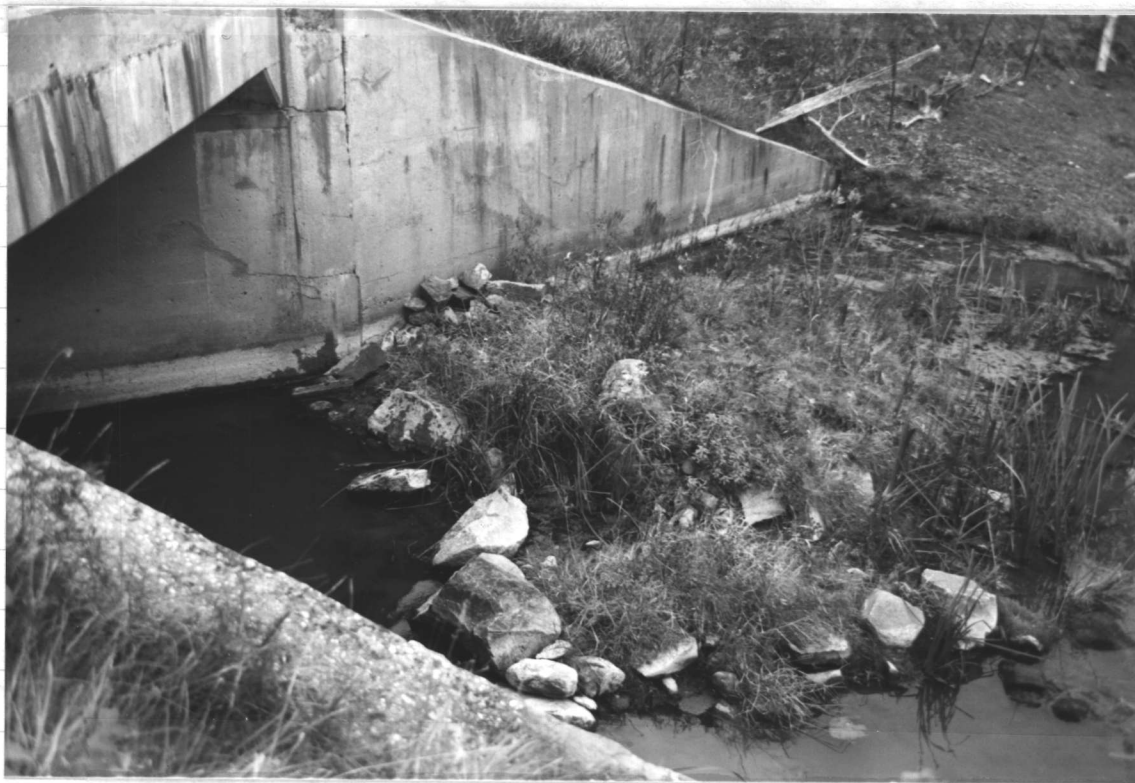
T. Sangiuliano, P. Eng.  
Foundation Engineer

TS/mmj



SITE 29-155  
DOUGLAS CREEK CULVERT  
HIGHWAY 60

OCT. 1988



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