

CONT. 69-168

BEAR CR. #3

HWY. 21

40J16-46

Ontario
Department of Transportation and Communications

~~RESTRICTED DOCUMENT~~
MEMORANDUM

cc: Foundations - Rm.110

TO: Mr. J. Roy, Mgr. Eng. Services - FROM: Foundation Section,
Regional Materials Engineer, Room 107, Lab. Bldg.
Southwestern Region,
London, Ontario.

ATTENTION: Mr. J. Forster

DATE: June 10, 1971

OUR FILE REF.

IN REPLY TO

SUBJECT:

Contract 69-168, Bear Creek #3
Stream Diversion, Highway #21
District No. 1 (Chatham)

WP. 130-67-1
71-11-058

This memo confirms verbal recommendations given to you during our visit to the above mentioned site, relating to the treatment for the cut slopes of the stream diversion which shows signs of failure:

(1) The East banks of the diversion, where slip failures have occurred, lie between Stations 1+50 and 14+00. There are three main areas where failures have occurred - Station 1+50 (North end), Station 8+00 (centre), and Station 14+00 (South end). At these areas the heights of the cuts are 12 ft., 8 ft., and 20 ft. above water level, respectively. The natural slopes continue much higher above the cut sections, and the toe of slope is estimated to be about 6 to 8 ft. below water level. The lengths of the various 'failed' areas are in the order of 100 - 150 ft.

(2) Subsoil at the site consists of silty clay which is estimated to be stiff at the surface, but appears to decrease in strength with depth. A three-foot thick layer of sand was observed roughly at stream level covering an area about 100 ft. long in the vicinity of Station 8+00. In each of the three 'failed' areas, two or three springs were observed on the cut slopes. Thus it is apparent that, on the lower portions of the slopes, the groundwater is under slight artesian pressures. These pressures would, of course, be much less now than in the spring of the year. The natural slopes in this area are about 3 horizontal to 1 vertical; the cut slopes of the diversion are 2:1 above stream water level, but are believed to be steeper below water level.

(3) The failures can be attributed to: a) loss of shear strength due to swelling and absorption of water of the clay subsoil, b) erosion of material at the toe within the stream, and c) the increase of pore-water pressure within the subsoil during the spring season. The first effect a) is caused by reduction of effective stresses by removal of overburden during the initial construction of the cut and, in cohesive soils, takes time to develop. This is why failures of cut slopes do not generally occur immediately after construction and may, in fact, not occur for several months or, in some cases, years.

Mr. J. Roy, Mgr. - Eng. Services -
Regional Materials Engineer,
Southwestern Region, London, Ont.
Attn: Mr. J. Forster

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June 10, 1971

Re: Contract 69-168, Bear Creek #3 Stream Diversion, Highway #21
District No. 1 (Chatham).

(4) The following remedial measures are suggested to improve the present situation. Initially, only the areas which have actually failed may be treated and, if other failures take place later, the same treatment can be applied: Flatten the existing slopes as much as possible within the present right-of-way and place rock fill rip-rap material from a point on the existing slope, 3 ft. above water level so as to make a 3 horizontal to 1 vertical slope downwards to the river bed from this point. In addition, construct 4-ft. deep drains on the slope face running from the top of cut slope down into the stream. These drains should contain a 6-inch, perforated pipe surrounded with 12 inches of Granular 'A'. The remainder of the trench should be filled to the surface with a free-draining granular type material. The surface of this drain must be protected against erosion by covering with rip-rap. Drains should be constructed at all locations where wet areas and springs exist.

(5) It is believed that the foregoing measures, if carried out, will greatly improve the present situation with the minimum of expenditure. If, as time goes by, it becomes evident that more extreme measures are necessary, they will probably involve further flattening of the slopes and the acquisition of more property. However, the remedial measures, as recommended, will not in any way be wasted and should certainly be carried out.

K. G. Selby

KGS/MdeP

K. G. Selby
SUPERVISING FOUNDATION ENGR.
For:
A. G. Stermac
PRINCIPAL FOUNDATION ENGR.

cc: Messrs. F. C. Brown
J. Harris

Foundations Files
Gen. Files

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

W.P. - M.L.

TO: Mr. A. Stermac,
Principal Foundations Engineer,
Foundation Office,
Downsview,

FROM: Materials and Testing Office,
London.

ATTENTION: Mr. A. Prakash.

DATE: September 27, 1973.

CUR FILE REF

IN REPLY TO

SUBJECT: Contract 69-168, Petrolia Diversion,
Highway #21, Bank Erosion.

130-65-7
7-6-052
Encl. 2/2/73

We have received a request from the District at Chatham to review the above site.

As reviewed in the field with you on September 21, 1973, this failure is still developing following proposals by your office and ensuing work carried out by the District in 1971. As indicated in our telephone conversation of September 27, 1973 we are requesting that your office review this again. It is understood this can be done shortly since you are working in the area.

We will arrange permission from the property owner in order that equipment may enter.

JMcK:hp

c.c. - J. E. Wice,
J. McKeown,
File.

J. McKeown

J. McKEOWN,

FOR: J. G. FORSTER,
SENIOR SOILS ENGINEER.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. J.G. Forester,
Materials and Testing,
Southwestern Region,
London.

FROM: P.O. Box 910,
District #1, Chatham.

ATTENTION:

DATE: September 18th, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: Contract 69-168
Petrolia Diversion
Highway Number 21
Bank Erosion

On checking our files we do not appear to have a reply to Mr. Katarynczuk's teletype of April 3rd, 1973, wherein he requested your people to investigate and advise on the corrective action we should employ to overcome this bank erosion.

Mr. Herbert Rust has again contacted the District expressing his concern and asking what we are going to do to overcome this erosion problem.

If you did reply to Mr. Katarynczuk's teletype, please send us a photostat copy. If you did not reply your early attention to the matter would be appreciated.

J.E. Wice
J.E. Wice,
Maintenance Engineer,
for
F.C. Brown,
District Engineer.

JEW/cf

