

G.I.-30 SEPT. 1976

GEOCRES No. 31E-120DIST. 11 REGION W.P. No. 82-88-02CONT. No. W. O. No. STR. SITE No. 44-165HWY. No. 592LOCATION Recreational Overpass at
ScotiaNo. of PAGES -

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. REMARKS:

- Hourie ^{David}
Pattenden

North Bay

(705) 472-7900

EXT 6323

memorandum



GEOCREG No 31E-120

To: Mr. Per Furst
Head of Structural Section
Northern Region
Attention : Mr. Tom Pepper

Date: 91 06 06

From: Foundation Design Section
Room 315, Central Building

Re : Recreational Overpass at Scotia
W.P. 82-88-02, Site 44-165
Highway 592, District 11, Huntsville

We refer to your memorandum dated March 12, 1991, requesting a foundation investigation at the above noted site for a concrete open footing culvert beneath an existing bridge. This memorandum summarizes the findings of a site visit made by this office and the foundation recommendations pertaining to the proposed structure.

The site is located on Highway 592 in Scotia, about 20 km north of Huntsville, in the Town of Perry, District of Huntsville. The existing single span concrete bridge was built in 1931, with a span length of 6.7 m and a width of 8.3 m. Formerly, the bridge crossed over the CN railway tracks. The tracks have now been abandoned and removed. The structure is generally not in good shape with concrete spalled off at places.

Due to the repairs required, it has been proposed to remove the existing deck and the top portion of the existing abutments and wingwalls, regrade and realign the north and south approaches. A rigid frame open box culvert will then be built between and right against the existing abutment walls. The new culvert will be used as a highway overpass for recreational users to cross Highway 592.

The Regional Geotechnical Section has carried out investigation work in 1989 and again in 1990 with boreholes drilled along the approaches and beneath the existing bridge. According to the investigations results attached to your memorandum, the boreholes drilled around the abutment walls beneath the bridge all encountered refusals on rock at shallow depths (not more than 800 mm).

The site was visited on April 24, 1991 by the undersigned. As observed, massive rock outcrops were found on site. They were also found around the wingwalls. Apparently, concrete was poured neat against rock for the walls. The rock in this area is a medium strong Biotite Gneiss.

Two test pits were hand-dug at locations shown on the attached sketch. At TP 1 location, obstruction in the form of either rock or concrete was encountered at about 300 mm depth. The hole was filled with water and caved in material and the nature of the obstruction could not be identified. However, it is likely to be bedrock in view of the rock outcrops exposed on site. At TP 2 location, rock was encountered near the surface.

Based on our site observations, it is envisaged that bedrock is shallow (probably less than 1 m) at the location of the proposed structure. In view of the relatively light loadings expected from the proposed structure, no further drilling of testholes is considered necessary. The bedrock elevations should be determined during construction.

For footings founded on rock, the bearing capacities recommended as per the O.H.B.D.C., are as follows.

Factored Bearing Capacity at U.L.S. = 1000 kPa

Bearing Capacity at S.L.S. Type II does not govern in the case of 'unyielding soil'.

A relatively low allowable bearing capacity for rock is recommended due to the uncertainties on the rock quality and joint orientations. We understand from our discussions with Mr. Tom Pepper that it is adequate for the proposed structure. The founding material, being rock, is not frost susceptible and hence no frost cover is necessary.

Backfill to the wingwalls should consist of granular material in accordance with Ministry of Transportation Standard Special Provision #121 (83 10). Computation of earth pressures should be in accordance with Section 6.6.1.2 of the O.H.B.D.C. Foundation on bedrock will be unyielding and at-rest condition will govern in the design. For design purposes, the following properties for backfill are recommended.

<u>Material</u>	<u>ϕ</u>	<u>γ</u>	<u>Ko</u>
Granular 'A'	35 degrees	22.8kN/cu.m	0.43
Granular 'B'	30 degrees	21.2kN/cu.m	0.50

Sliding resistance between concrete and bedrock should be calculated in accordance with Section 6-7.3.3.2 of the O.H.B.D.C. assuming an unfactored ϕ value of 35 degrees. The founding bedrock surface should be roughened prior to placement of concrete. If necessary, sliding resistance can be supplemented by dowelling into bedrock.


For dowel design purposes, the following O.H.B.D.C. capacities may be assumed for the bond between bedrock and grout :

Factored Bond Capacity at U.L.S. = 500 kPa
Bond Capacity at S.L.S. Type II will not govern design

The minimum dowel embedment should be 1 m. The dowels should have a minimum grout cover of 20 mm around it. The structural strength of the dowel should not be exceeded.

During construction, excavations will be carried out along the base of the existing walls. It is recommended that excavations be carried out in alternate strips of short panels (about 2.5 m) to avoid undermining a long section of the existing wall footings at one time. Dewatering, if required, can be carried out by sump pumping to allow concrete be placed in the 'dry'.

We believe that the above is sufficient for the design to proceed. Should you have any questions or require further information, please contact our office.



D. Kwok, P. Eng
Project Foundation Engineer
for

D. Dundas, P. Eng
Senior Foundation Engineer

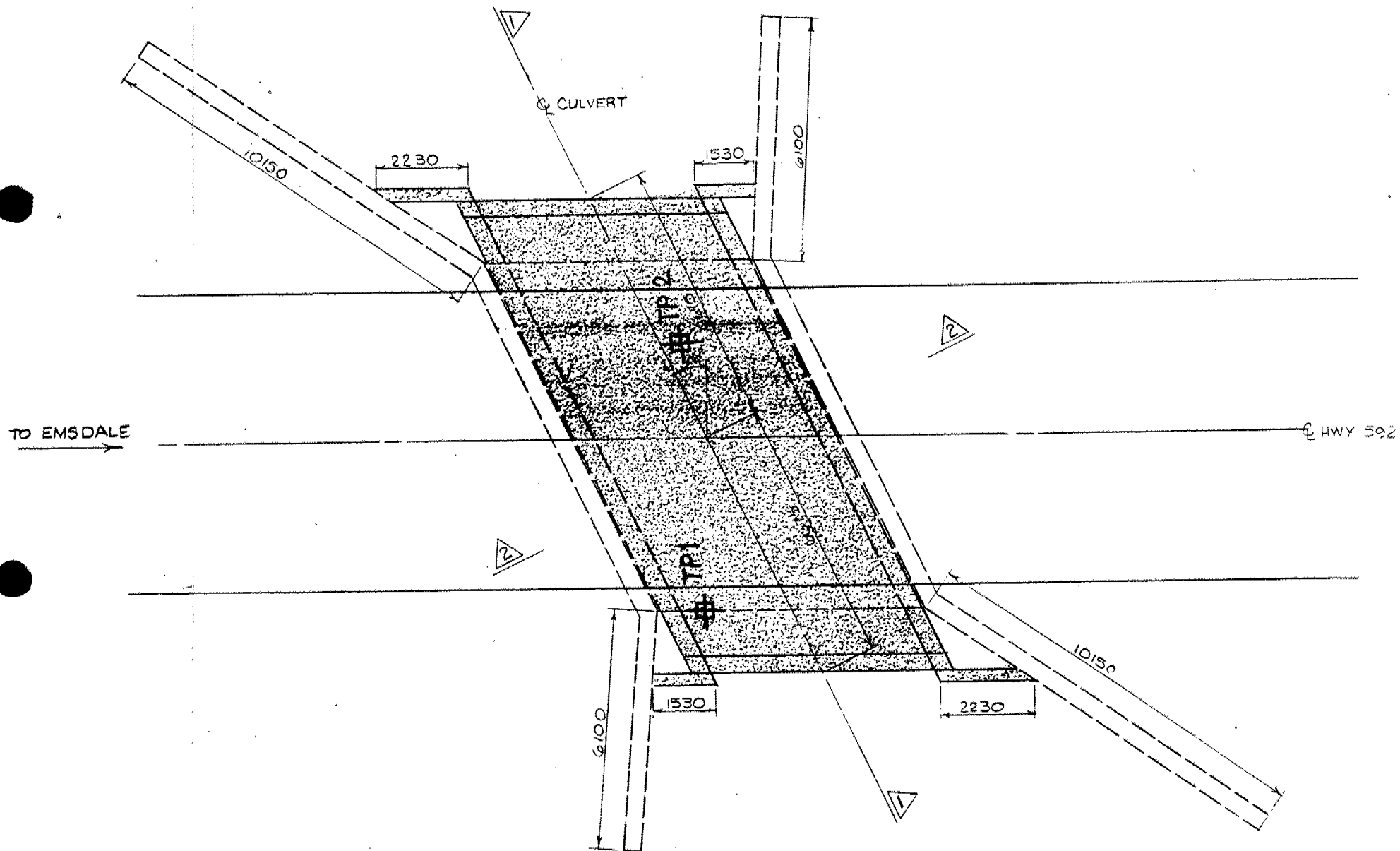




Photo 1



Photo 2 (Edgar St.)



Photo 3



photo 4



Photo 5

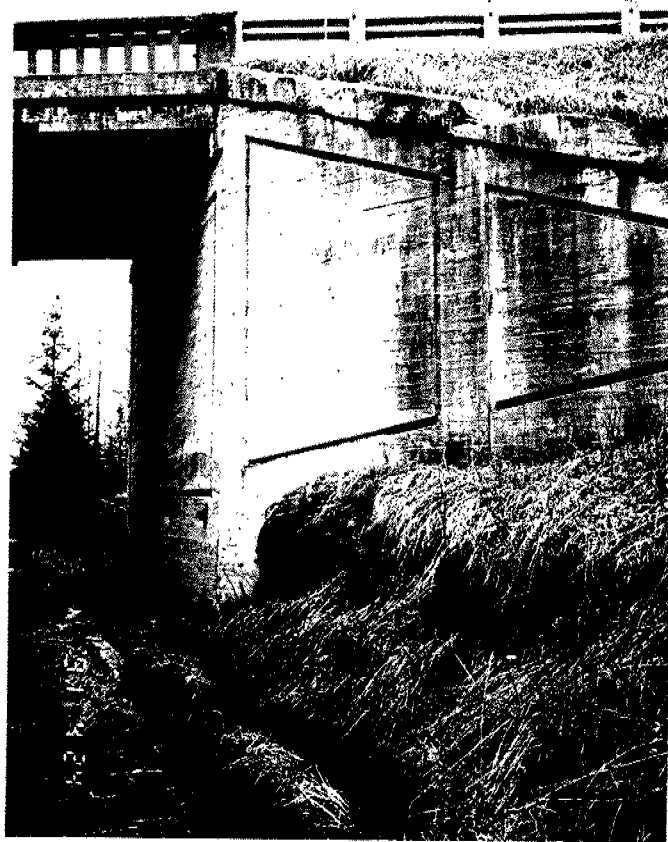


photo 6



Photo 7



Photo 8



photo 9

note rock ~~at~~ outcrop on rail bed.



Photo 10

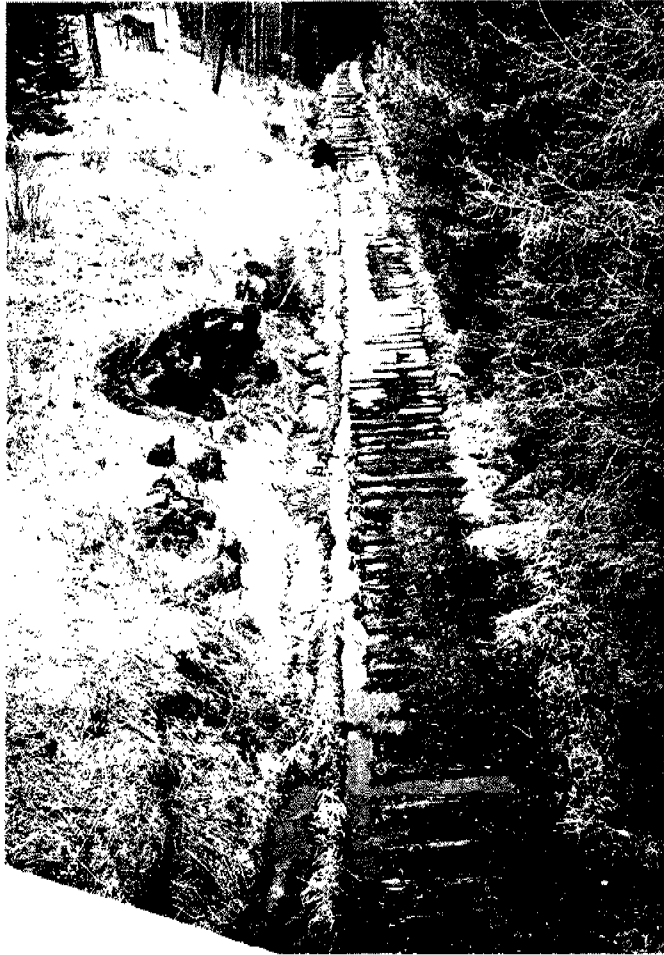


photo 11



photo 12



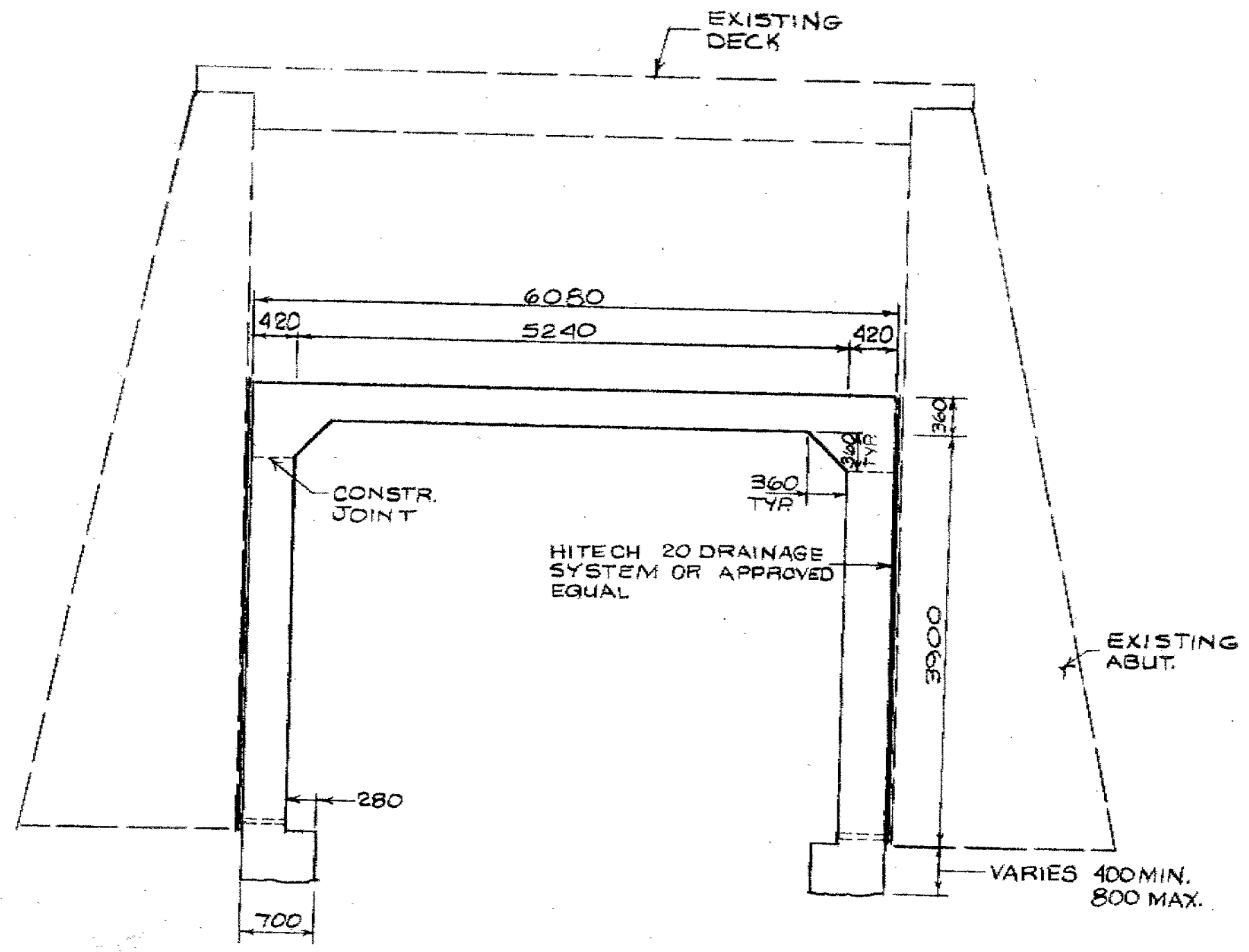
Test pit 1 location

Photo 13

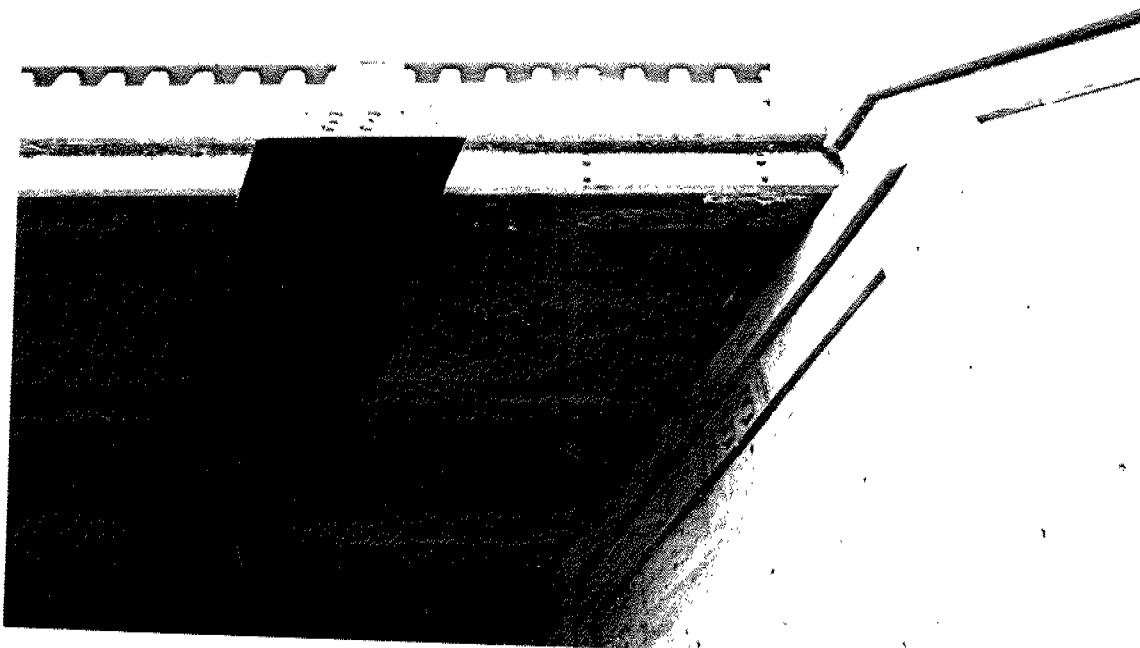


Test Pit 2 location
(note rock outcrop.)

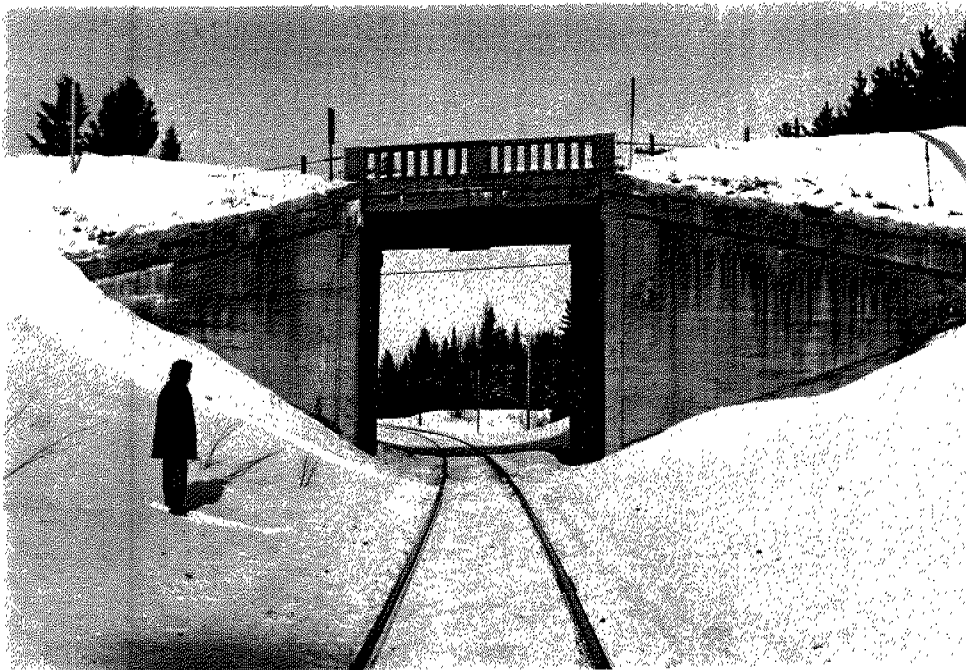
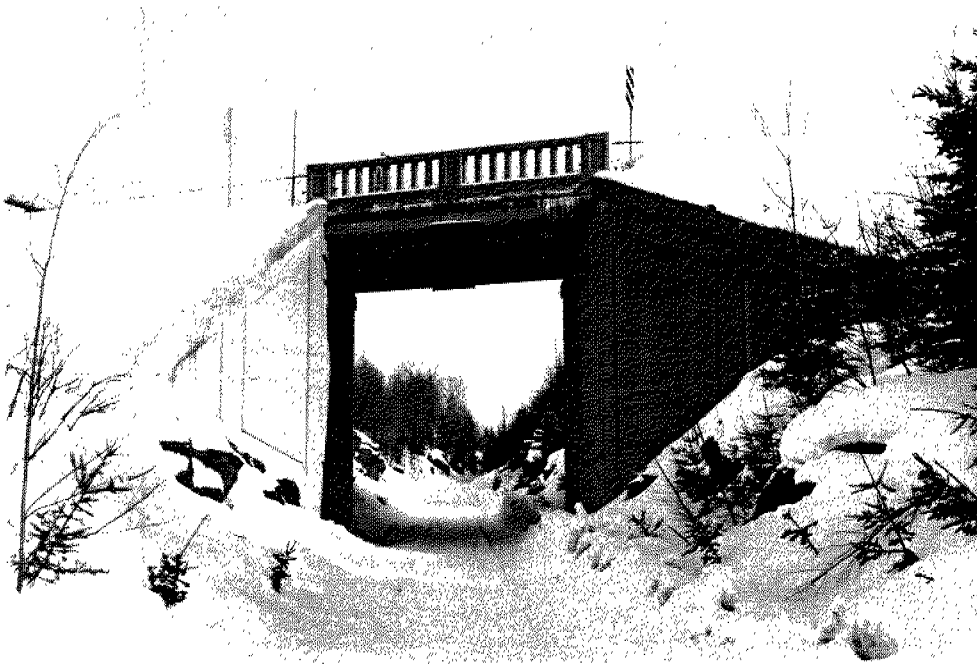
photo 14



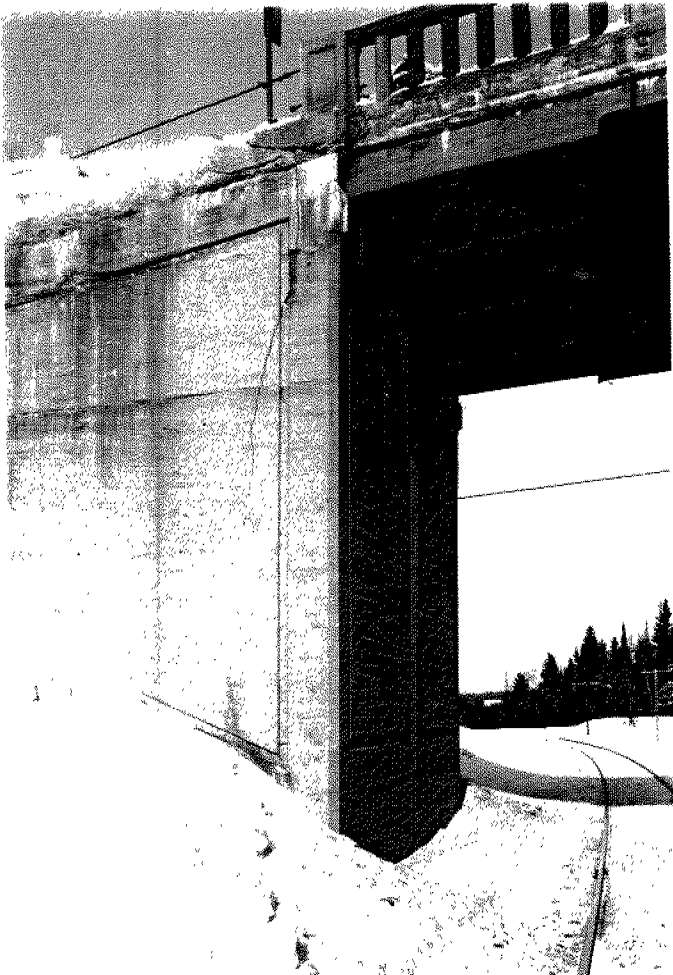
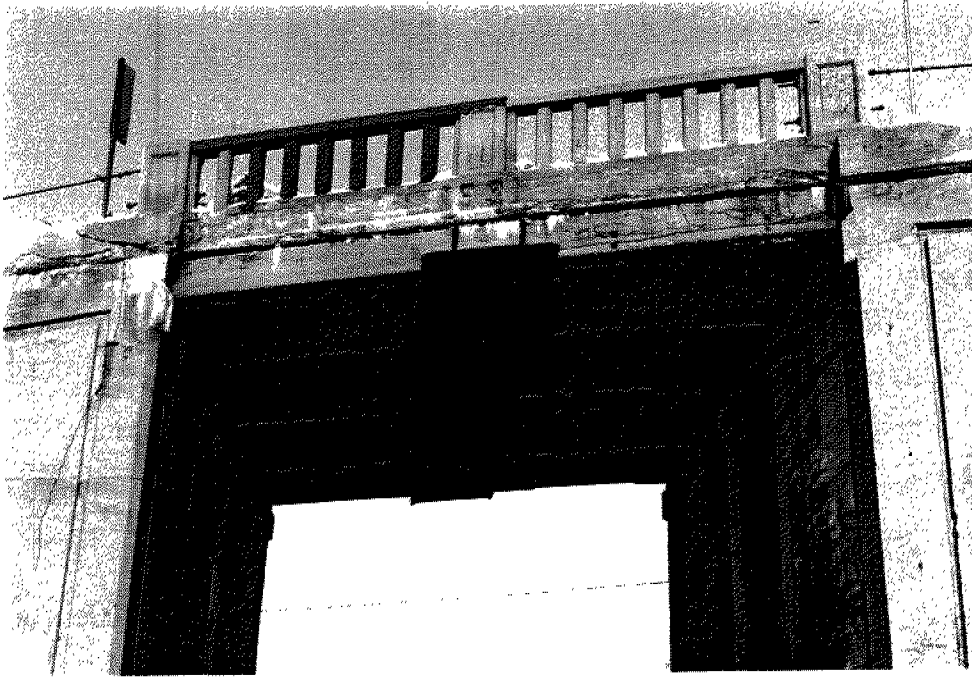
SNR OVERHEAD @ SCOTIA
HWY 592 SITE 44-165



CNR OVERHEAD @ SCOTIA
HWY 592 , SITE 44-165



CNR OVERHEAD @ SCOTIA
Hwy 592 SITE 44-165



memorandum

AUG 03 1989

Ministry of Transportation & Communications



Mr. G. Todd
To: Head, Planning & Design Section
Northern Region

Date: 89 07 27

Phone 1-705-472-7900
Ext. 286, 7

Attention: W. Barker

FROM: Geotechnical Section
Northern Region

WP 82-88-00

Sec. Hwy 592, CNR Overhead in Scotia
District # 11, Huntsville

STRUCTURAL	INIT.	✓
Head	<i>[Signature]</i>	✓
Sr. Eng. 1	<i>[Signature]</i>	✓
Sr. Eng. 2		
Sr. Eng. 3		
Officer 1		
Officer 2		
Drafter 1		
Drafter 2		
Secretary		
File		
Site No.		

At present the CNR tracks have been removed and the abandoned right-of-way is being used by snowmobile enthusiasts. Because of the repairs required it is proposed to remove the structure or part of it and maintain access for the snow machines.

A Profile was available with a proposed grade shown in 1975. The project is located in the Territorial District of Parry Sound, Township of Perry. Investigation of the soils occurred on 1989 07 13 using power equipment. Boreholes were related to chainage painted on the highway.

Generally, the soils consisted of asphalt over crushed gravel underlain by fine sand with silt over fine sand with a trace of silt. The frost susceptibility of the material is low or low to medium. Bedrock was encountered in five (5) of the boreholes and concrete, probably at the battered face of the abutment, was encountered at three (3) boreholes.

RECOMMENDATIONS

Based on the investigations, the following consists of Recommendations for the site.

1) Approach Slabs

In the vicinity of the abutments the boreholes showed concrete at 1.5 to 2.0 m below the surface of the asphalt which may be on the battered surface of the abutment. It can be seen that there are no approach slabs at the existing structure.


2) Granular Depths

The subbase material does not meet the gradation requirements for Select Subgrade Material. It is recommended that 600 mm granular materials be provided over the existing earth materials. Granular materials shall consist of 150 mm Granular 'A' over Granular 'B' Type I.

3) Bedrock

It is apparent that bedrock will not be encountered with the proposed gradeline. Should bedrock be involved a transition should be applied with 't' = 1.2 m. Provide 300 mm on rock cuts and fills although presence of bedrock is not expected.

A copy of the log of boreholes recorded during the investigation is attached for your information and use.



E. W. Veritsky
Pavement Design &
Evaluation Officer

EWV/ap

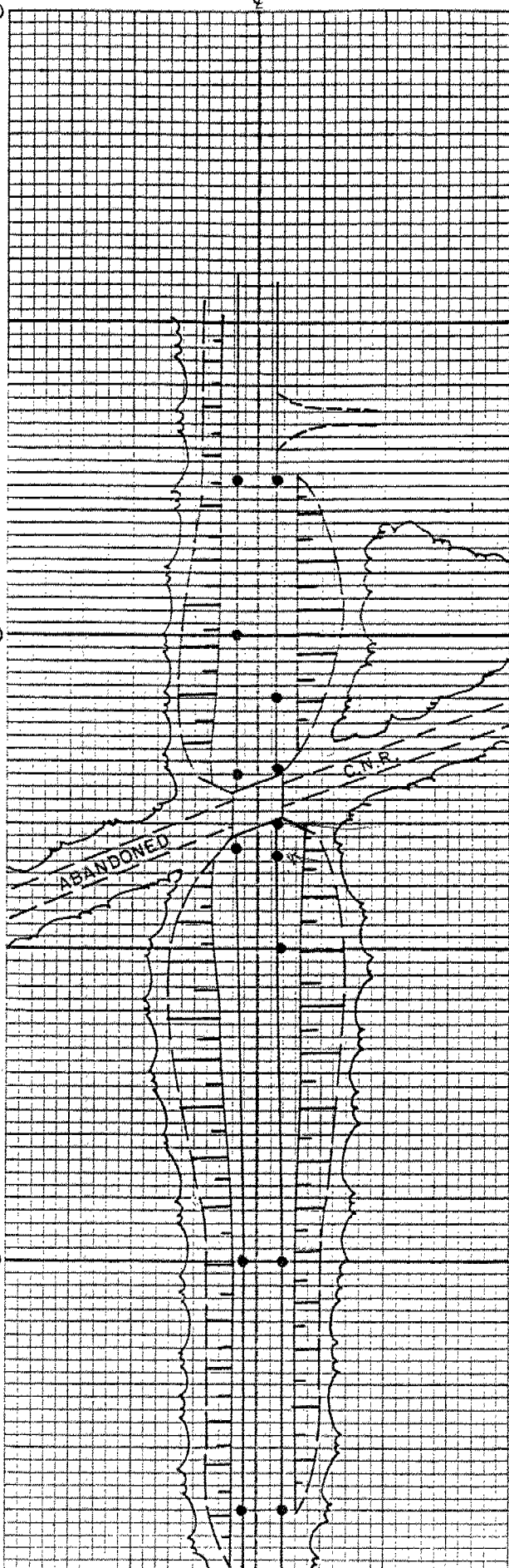
Attach:

cc: S. G. Wilson
P. Furst ✓
L. E. Authier
T. Kazmierowski
C. Goldthorpe
C. Watson
File (2)

10+400

10+300

10+200



WP 82-88-00
TWP. PERRY
OHD CNR @ SCOTIA
89 07 13

10+060 4.00 RT C/L

0	-	100	Asph
100	-	310	Cr Gr
310	-	470	F Sa with Si Moist
470	-	2.00	F Sa Tr Si Moist

10+200 4.00 RT C/L

0	-	100	Asph
100	-	330	Cr Gr
330	-	570	F Sa with Si Moist
570	-	5.00	F Sa Tr Si Moist

89 MBL 77 SM

w @ 1.50 = 12%

% Pass	5 mm	= 100
"	2 mm	= 99
"	425 um	= 97
"	75 um	= 30
"	5 um	= 3

LSFH

10+250 3.00 RT C/L

0	-	080	Asph
080	-	170	Cr Gr
170	-	520	F Sa with Si Moist
520	-	6.00	F Sa Tr Si Moist

10+265 3.00 RT C/L

0	-	160	Asph
160	-	370	Cr Gr
370	-	910	F Sa with Si Moist

89 MBL 78 SM

w @ 700 = 14%

% Pass	5 mm	= 100
"	2 mm	= 98
"	425 um	= 94
"	75 um	= 40
"	5 um	= 2

L-MSFH

910	-	4.50	F Sa Tr Si Moist
	-	4.50	NFP BR

10+270 3.00 RT C/L

0	-	190	Asph
190	-	420	Cr Gr
420	-	1.70	F Sa with Si Moist
	-	1.70	NFP Conc

10+279 3.00 RT C/L

0	-	120	Asph
120	-	390	Cr Gr
390	-	1.50	F Sa with Si Moist
	-	1.50	NFP Conc

10+290 3.00 RT C/L

0	-	100	Asph
100	-	240	Cr Gr
240	-	6.00	F Sa with Si Moist

10+325 3.00 RT C/L

0	-	120	Asph
120	-	320	Cr Gr
320	-	680	F Sa with Si Moist
680	-	4.70	F Sa Tr Si Moist
	-	4.70	NFP BR

10+325 3.00 LT C/L

0	-	180	Asph
180	-	350	Cr Gr
350	-	480	F Sa with Si Moist
480	-	3.70	F Sa Tr Si Moist
	-	3.70	NFP BR

10+300 3.00 LT C/L

0	-	150	Asph
150	-	240	Cr Gr
240	-	460	F Sa with Si Moist
460	-	3.10	F Sa Tr Si Moist
	-	3.10	NFP BR

10+278 3.00 LT C/L

0	-	120	Asph
120	-	360	Cr Gr
360	-	5.00	F Sa with Si Moist
	-	5.00	NFP BR

WP 82-88-00
TWP. PERRY
OHD CNR @ SCOTIA
89 07 13

10+266 3.00 LT C/L

0	-	180	Asph
180	-	520	Cr Gr
520	-	1.10	F Sa with Si Moist
1.10	-	2.00	F Sa Tr Si Moist
		2.00	NFP Conc

10+200 2.00 LT C/L

0	-	050	Asph
050	-	210	Cr Gr
210	-	290	F Sa with Si Moist
290	-	6.00	F Sa Tr Si Moist

10+160 2.00 LT C/L

0	-	130	Asph
130	-	240	Cr Gr
240	-	5.00	F Sa Tr Si Moist