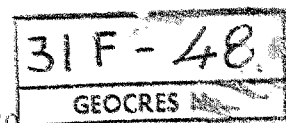


MEMORANDUM

Mr. A. Stearns
Principal Foundation Eng.
Materials & Testing
Downsview
ATTENTION

FROM: Bridge Planning
North Bay

DATE: November 23, 1970



OUR FILE REF.

IN REPLY TO

SUBJECT:

WP 18-68-01 Site 29-7
Chalk River Bridge
Hwy. #17, District #13

70-11-120

A foundation investigation is required at the above location. Attached are two prints of site plan E-5016-1 showing the probable location of the structure footing. A completed Field Reconnaissance Report is also attached.

The structure proposed will be slightly smaller than the existing, ie about 50' single span. It is proposed to raise the grade at the crossing by about 2'.

Should you have any questions on our proposals here, please do not hesitate to call.

(Signature)
J. C. McAllister
Regional Bridge
Planning Supervisor

FEBRUARY 3, 1971

/pc

c. c. - R. Murphy

FIELD RECONNAISSANCE REPORT
REQUIRED BY FOUNDATION SECTION
FOR

SEP. 1968

V.P. NO. 18-68-01 HIGHWAY NO. 17 DISTRICT 13 SITE PLAN NO. E-5016-1 PROFILE NO. C-675-7
RIVER CROSSING ☒ SIDE SEPARATION ☐ R.R. X. ☐ OTHER (SPECIFY) _____
ALTERNATE SCHEME (IF ANY) _____

EXISTING SITE CONDITIONS

DESCRIPTION:

TOPOGRAPHY: HILLY ☐ ROLLING ☐ VALLEY ☐ GULLIED ☐ FLAT ☒ - rolling
VEGETATION: TREES ☐ BRUSH ☒ GRASS ☒ SWAMP ☐ FARM CROPS ☐ CLEARED ☐
SNOW COVER: 0"-6" ☐ 6"-12" ☐ >12" ☐
ROCK OUTCROP (SPECIFY LOCATIONS) Poss. rock d/stream at rapids. B/R control 300' upstream

UNDERGROUND UTILITIES: UTILITY COMPANY _____ TELEPHONE NO. FOR DEFINITE LOCATION _____

- 1 None
- 2 Overhead Bell & Hydro on E & W side of R. O. W.
- 3 _____
- 4 _____
- 5 _____

EXISTING STRUCTURE(S): No Dwg. available

FOUNDATIONS: SPREAD FOUNDATIONS ☐ SIZE _____ ELEVATION(S) _____
PILES ☐ TYPE _____ LENGTH(S) _____
DESIGN LOAD _____ TS.F. _____ TONS/PILE _____
CONDITION OF STRUCTURE Bailey reinforced

APPROACHES: CUT ☐ FILL ☒ SIDE SLOPES 2:1
BERMS YES ☐ NO ☐

OTHER OBSERVATIONS (USE BACK OF SHEET TO DESCRIBE ANY FAILURES IN AREA, PAST PERFORMANCE OF EXISTING APPROACHES & STRUCTURE, ETC.) _____

ACCESSIBILITY

IS STRUCTURE LOCATED ON D.H.O. RIGHT OF WAY? YES ☒ NO ☐ IF NO, _____
HAS PERMISSION BEEN OBTAINED TO ENTER PROPERTY? YES ☐ NO ☐ IF NO, _____
PROPERTY OWNER(S): _____

NAME ADDRESS TELEPHONE NO.

- 1 _____
- 2 _____
- 3 _____
- 4 _____

WHO WILL OBTAIN NECESSARY PERMISSION? _____

HAS SITE BEEN SURVEYED & ~~STAKED~~? YES ☒ NO ☐ IF YES, DATE OF MOST RECENT SURVEY Aug. 1970

WILL CLEARING BE NECESSARY TO ENTER SITE AREA? YES ☐ NO ☒

IS SITE ACCESSIBLE TO WHEELED VEHICLES? YES ☒ NO ☐

IF RIVER CROSSING:

WILL A RAFT BE NECESSARY? YES ☐ NO ☒ IF YES, GIVE MAX. DEPTH OF WATER _____ FT.

CURRENT: SWIFT ☐ MODERATE ☐ SLOW ☒

DRILLING OPERATIONS

NEAREST SOURCE OF WATER (GIVE HAULING DISTANCE, IF KNOWN) River

ADDITIONAL INVESTIGATION REQUIRED FOR THE FOLLOWING PURPOSES:

ALTERNATE SCHEME: YES ☐ NO ☐ IF YES, SPECIFY _____

HYDROLOGIC REASONS: YES ☐ NO ☐ IF YES, SPECIFY (SCOUR, ETC.) _____

REMARKS

NEAREST AVAILABLE ACCOMODATION Towns of Chalk Ri. or Deep River

OTHER COMMENTS: _____

DATE Nov. 23/70

REGIONAL BRIDGE LOCATION ENGINEER J. C. McAllister

MEMORANDUM

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Office,
Admin. Bldg.

From: Foundation Section,
Materials & Testing Office,
Room 107, Lab. Bldg.

ATTENTION: Mr. S. McCombie

DATE: January 28, 1971

OUR FILE REF.

IN REPLY TO *Sub. 8/71*

SUBJECT:

31F-48

FOUNDATION INVESTIGATION REPORT

For

Proposed Structure

At the

Crossing of Chalk River and

Highway #17 (Line 'E')

District No. 13 (North Bay)

W.O. 70-11120 -- W.P. 18-68-01

31F-48

DOCRES No.

Attached, we are forwarding to you our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that the factual data and recommendations contained therein, will prove adequate for your design requirements. Should additional information be required, please feel free to contact our Office.

AGS/MdeF
Attach.

cc: Messrs. B. R. Davis
H. A. Tregaskes
D. W. Farren
H. McArthur
G. E. French
J. C. McAllister (2)
E. R. Saint
B. J. Giroux
E. A. Singh

Foundations Files ✓
Gen. Files

A. G. Stermac
A. G. Stermac
PRINCIPAL FOUNDATION ENGINEER

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-

FOUNDATION INVESTIGATION REPORT
For
Proposed Structure
At the
Crossing of Chalk River and
Highway #17 (Line 'E')
District No. 13 (North Bay)
W.O. 70-11120 -- W.P. 18-68-01

1. INTRODUCTION:

Reconstruction is proposed for Hwy. #17 from the Town of Pembroke westerly to the Town of Chalk River. As part of this reconstruction the existing structure, at the crossing of Hwy. #17 and Chalk River, is to be replaced by a new one. The Foundation Section was requested to carry out a subsurface investigation at the site proposed for the new structure. The request was contained in a memo from Bridge Planning, North Bay (Mr. J. C. McAllister, Regional Bridge Planning Supervisor), dated November 23, 1970. Subsequently, an investigation was carried out by this Section to determine the subsoil, bedrock and groundwater conditions at the site.

The results of this investigation are presented in this report, together with our recommendations for the design of structure foundations and the stability of approach fills.

2. DESCRIPTION OF THE SITE AND GEOLOGY:

The site is located some 4 miles east of the Village of Chalk River, at the intersection of Hwy. #17 and Chalk River. The ground surface has a rolling topography, with the differences in relief being as much as 15 feet. The land is undeveloped except for a main line of the C.F.R. which is located about 2,000 feet south of the structure.

The river has a meandering character with some oxbows noticeable south of the site. In the vicinity of the crossing the river channel is approximately 55 feet wide and 11 feet deep.

2. DESCRIPTION OF THE SITE AND GEOLOGY: (cont'd.) ...

At the time of the investigation the river water level was at about elevation 474 - i.e., it was some 5 feet deep.

Hwy. #17 has two paved lanes. There is an existing single-span structure at this crossing, the pertinent details of which will be discussed in Section #6 of this report.

Physiographically the site is located in the region known as the 'Petawawa Sand Plains'. The overburden deposits in this area are composed of silts and sands of deltaic origin. The delta was built by the Petawawa, Barrow, Indian and Ottawa rivers during the Fossmill stage of Lake Algonquin.

The overburden is underlain by granite bedrock of Precambrian Age.

3. FIELD AND LABORATORY WORK:

Three boreholes, all of which were accompanied by a dynamic cone penetration test, were carried out at the site during the course of the field investigation. The boreholes and dynamic cone penetration tests were advanced by means of a diamond drill adapted for soil sampling purposes.

Samples of the overburden were obtained at required depths in a 2-inch O.D. split-spoon which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests. Bedrock was proven by obtaining BX size rock core samples in 2 of the boreholes. During sampling and drilling operations, detailed logs of the borings were made; these logs contain a record of the drilling and sampling techniques used, together with the soil and bedrock types encountered.

The location and elevations of all the boreholes are shown on Drawing #70-11120A, together with the estimated stratigraphical profile across the site. Surveying at the site was carried out by the personnel from the Northern Region Engineering Surveys Section. The elevations given in this report are referred to a geodetic datum.

3. FIELD AND LABORATORY WORK: (cont'd.) ...

All samples were subjected to a careful visual examination in the field and subsequently in the laboratory. Following this examination, laboratory testing was carried out on selected representative samples to determine the following physical properties of the overburden:

Natural Moisture Content
Grain-Size Distribution

The results of these tests are plotted on the Record of Borelog sheets as well as on Figure 1, all of which are contained in the Appendix of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

The subsoil at this site consists of a 15.5 to 18.5 feet thick deposit of compact to dense silty sand to sand with some gravel. This granular stratum is underlain by granitic bedrock.

About 7 feet of fill has been placed over the granular overburden deposit along the approaches to the existing structure

The boundaries between the various soil and bedrock types present are shown on the accompanying Borelog sheets. The stratigraphical profile, along the centre-line for the new structure, is plotted on Drawing No. W.O. 70-11120A.

A brief resumé of the stratigraphical sequence encountered is given in the following sub-sections.

4.2) Roadway Fill:

Roadway fill, composed of silty sand to sand and gravel was encountered along both approaches to the existing structure. The thickness of the fill varies from 7.5 ft. (B.H. #1) to 6 ft. (B.H.'s #2 and 3). Occasional boulders up to 8 inches in size were encountered throughout the fill.

4. SUBSOIL AND BEDROCK CONDITIONS: (cont'd.) ...

4.2) Roadway Fill: (cont'd.) ...

Standard penetration resistance testing, carried out within the deposit, gave 'N' values which range from 6 blows/ft. to 10 blows/ft.; however, an 'N' value of 60 blows for 3 inches was encountered in B.H. #2, probably due to the presence of a boulder. Based on these results, it is estimated that the fill material was inadequately compacted.

4.3) Silty Sand to Sand with Some Gravel:

Underlying the granular roadway fill, or immediately below the river bed, is a stratum of silty sand to sand with some gravel. The gravel content within the granular deposit appears to increase with depth. The thickness of this deposit varies from 15.5 feet at B.H. #1 to 18.5 feet at B.H. #2. At B.H. #1 the lower 4 feet of the stratum is bouldery. The boulders, at this location, are up to 8 inches in size. Grain-size distribution testing was carried out on typical samples of this deposit; the results are shown on Fig. #1 in Appendix I.

Standard penetration resistance tests, carried out within the stratum, gave 'N' values which range from 5 blows/ft. to 60 blows for 6 inches. Based on these results, it is estimated that the relative density of the granular deposit varies from loose to very dense, being generally in the compact to dense range.

4.4) Granite Bedrock:

Bedrock was established at B.H.'s #1 and 3 by obtaining up to 7 feet of BX size rock core samples. The bedrock was encountered at a depth of between 23 and 24.5 feet below ground surface - i.e., between elevations 460 and 462.

The bedrock is composed of a pink granite, which is relatively sound as indicated by the high percentage of core recovered.

5. GROUNDWATER CONDITIONS:

The groundwater level conditions across the site, during the period of the investigation (January 1971), were observed by taking readings in open boreholes. The results of the readings are summarized on the borelog sheets as well as on Drawing No. 70-11120A.

The observations indicate that the groundwater at the site varied from elevation 472 to 475, which corresponds to depths of from 9.5 to 10.5 feet below existing ground surface. The river level at the time of investigation, was found to be at elevation 474.

6. EXISTING STRUCTURE:

The existing structure is a 57-ft. single-span, 26-ft. wide steel-timber Bailey Bridge.

The profile grade of Hwy. #17, in the vicinity of the structure, is about elevation 487; the heights of the existing east and west approach embankments are of the order of 7.5 and 6 feet, respectively. The slopes of the approaches in the transverse direction are about 3:1.

In general, the structure and approaches appear to be performing quite satisfactorily.

7. DISCUSSION AND RECOMMENDATIONS:

7.1) General:

It is proposed to construct a single-span (50 feet), 40-ft. wide, rigid frame structure to replace the existing structure at the crossing of Chalk River and Hwy. #17. The crossing is located 4 miles east of the Village of Chalk River, in the Township of Buchanan, County of Renfrew. The existing alignment is to be maintained, but the profile grade in the vicinity of the structure is to be raised by 2 feet. The existing approach embankments will, therefore, be heightened as well as widened.

7. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

7.1) General: (cont'd.) ...

The predominant stratum across the site is a loose to very dense silty sand to sand with some gravel, the thickness of which varies between 15.5 feet to 18 feet. This granular deposit is underlain by granitic bedrock.

7.2) Structure Foundations:

In view of the possible scour problems at this crossing, it is recommended that the proposed abutments be supported on end-bearing piles driven to bedrock. The allowable pile load would be dependent on the pile section chosen - for example, 12 BP 74 steel H-piles could be designed for 95 tons/pile.

The underside of the pile caps should be provided with at least 4 feet of earth cover for frost protection purposes. The pile caps will have to be protected against the scour action of the river.

A temporary dewatering scheme will be necessary, since pile caps will be located below the river water level.

No bouldery or rock fill should be placed in areas where piles are to be driven.

7.3) Approach Embankments:

No stability problems are anticipated for the proposed heightened and widened approach embankments. The settlement, induced in the foundation subsoil, will be elastic in nature and negligible in magnitude.

In order to have a smooth transition from the existing to the new fill sections, it is recommended that all topsoil be stripped from the existing fill sections prior to placing future fill, and the future fill be 'keyed' into the existing approaches as per current D.H.O. methods.

For scour protection, rip-rap should be provided according to hydrological requirements.

8. MISCELLANEOUS:

The field work, performed during the period of January 4 to 9, 1971, was carried out under the supervision of Mr. S. Ahmad, Project Foundation Engineer, who also prepared this report.

The equipment was owned and operated by Master Soil Investigation Ltd., Toronto.

This report was reviewed by Mr. M. Devata, Supervising Foundation Engineer.

January, 1971

APPENDIX I

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 70-31120

LOCATION Sta. 312 + 53 o/s 18' Lt.

ORIGINATED BY SAA

W.P. 18-68-01

BORING DATE January 5-7, 1971

COMPILED BY SAA

DATUM Geodetic

BOREHOLE TYPE Washboring-NX Casing, BX Rock Core; Cone

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT		WATER CONTENT %					
							20	100	10	20	30			
							SHEAR STRENGTH P.S.F.							
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE							
485.2	Ground Level													
0.0	Sand with some silt & gravel Roadway Fill		1	SS	10								 472.2 in open BH Jan. 7/71 20 61 (19) 32 59 (9)	
477.7	Loose Brown		2	SS	6									
7.5	Silty sand to sand with some gravel		3	SS	23									
	Compact Dense Grey		4	SS	30									
			5	SS	32									
474.2	Bouldery Zone		6	BY	258									
472.2	Boulders up to 2" size		7	SS	15									
23.0	Bedrock - Granite		8	BY	100									
458.2	Coarse Pink													
27.0	End of Borehole													

CHECKED BY AK.

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT					WATER CONTENT % w_p — w — w_L					
484.8	Ground Surface							20 40 60 80 100									
								SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE									
0.0	Sand and gravel, trace of silt - Roadway Fill	◇	1	SS	60.7"	480										48 43 (9)	
478.8	Very Dense Brown	◇	2	SS	10												
6.0	Silty sand with some gravel	●	3	SS	60.7"												
	Compact to Very Dense	●	4	SS	11	470											
	Grav boulders up to 3" in size	●															
460.3	Probable Bedrock	●															
24.5	End of Borehole	▨				460											

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 70-11120 LOCATION Sta. 143 + 65 o/s 18' Rt. ORIGINATED BY SAA
W.P. 18-68-01 BORING DATE Jan. 9, 1971 COMPILED BY SAA
DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing, BX Rock Core; Cone CHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT — W_L PLASTIC LIMIT — W_P WATER CONTENT — W		BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.		WATER CONTENT %			
494.7	Ground Level											
484.7	Silty sand with occ. boulders-Roadway Fill		1	SS	6	480						474.2 in open BH Jan. 9/71
478.7	Loose Brown		2	SS	5							
460.6	Sandy silt to silty sand		3	SS	17							
	Loose to Compact Grey		4	SS	20							
			5	SS	11							
453.7	Bedrock - Granite		6	BX	95%	460						
	Sound Pink		7	BX	100%							
453.7	End of Borehole					450						

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS:-

<u>CONSISTENCY</u>	<u>'N' BLOWS / FT.</u>	<u>c LB. / SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

S.S	SPLIT SPOON	T.W	THINWALL OPEN
W.S	WASHED SAMPLE	T.P	THINWALL PISTON
S.B	SCRAPER BUCKET SAMPLE	O.S	OESTERBERG SAMPLE
A.S	AUGER SAMPLE	F.S	FOIL SAMPLE
C.S	CHUNK SAMPLE	R.C	ROCK CORE
S.T	SLOTTED TUBE SAMPLE		
	P.H. SAMPLE ADVANCED HYDRAULICALLY		
	P.M. SAMPLE ADVANCED MANUALLY		

SOIL TESTS

Q _u	UNCONFINED COMPRESSION	L.V	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V	FIELD VANE
Q _{cu}	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Q _d	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_s	UNIT WEIGHT OF SOLID PARTICLES
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
S_r	DEGREE OF SATURATION
w_L	LIQUID LIMIT
w_p	PLASTIC LIMIT
I_p	PLASTICITY INDEX
s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
I_C	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
C_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
T_v	TIME FACTOR = $\frac{C_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION INTERCEPT
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
μ	COEFFICIENT OF FRICTION
S_f	SENSITIVITY

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

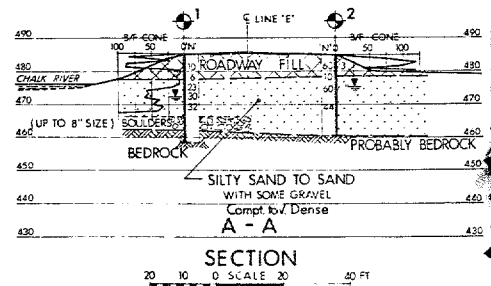
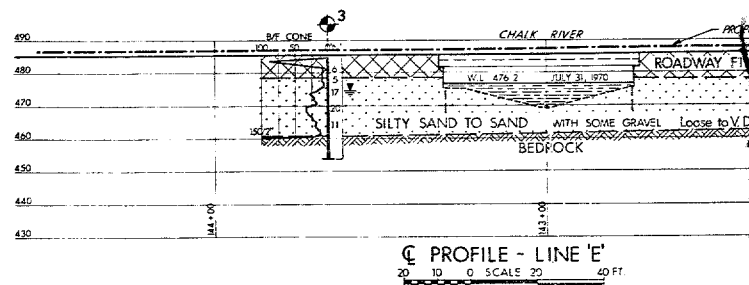
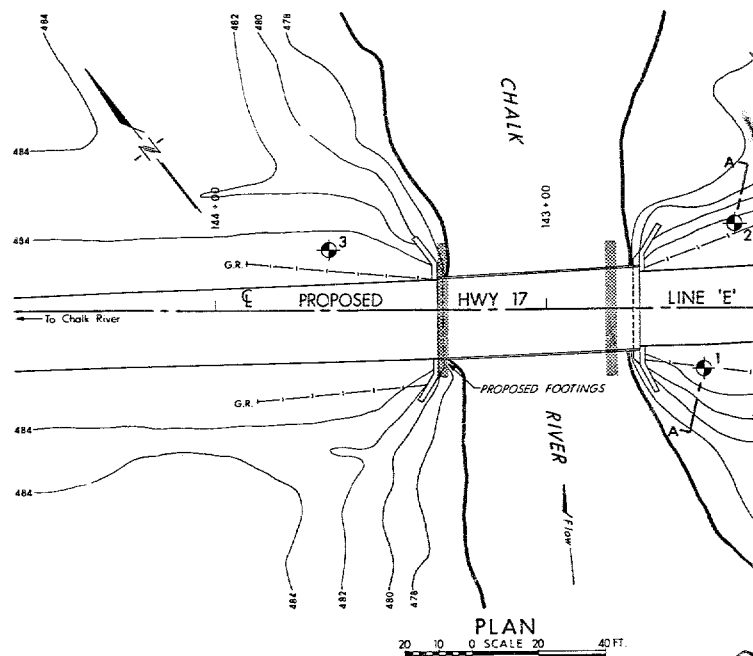
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

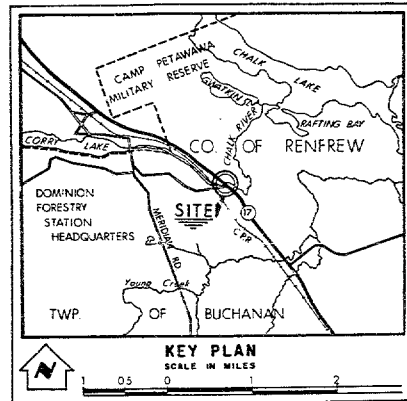
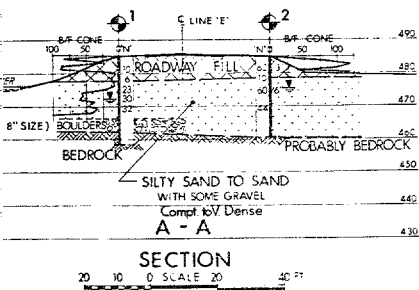
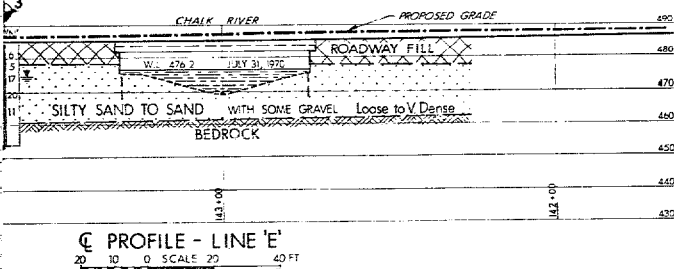
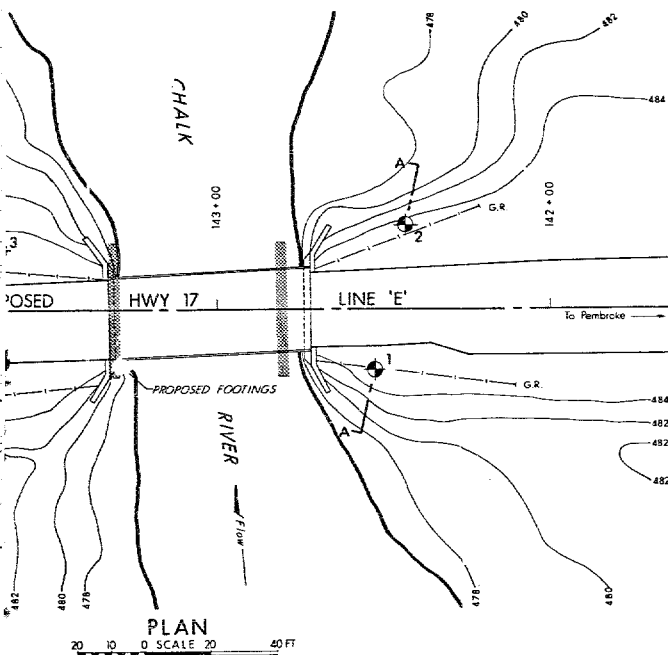
B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL



WT RECORD
FOR DATE



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation. JAN. 1971		
NO.	ELEVATION	STATION	OFFSET
1	485.2	142+53	18' LT.
2	484.8	142+43	25' RT.
3	484.7	143+65	18' RT.

- NOTE -

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & TESTING OFFICE - FOUNDATION SECTION			
CHALK RIVER			
KING'S HIGHWAY NO. 17 LINE 'E'		DIST. NO. 13	
CO. RENFREW		TWP. BUCHANAN	
LOT 9		CON. 5	
BORE HOLE LOCATIONS & SOIL STRATA			
SUBM'D S.A.	CHECKED	W.P. NO. 15-53-31	M.B.T. DRAWING NO.
DRAWN S.R.	CHECKED	JOB NO. 70-11120	70-11120 A
DATE JANUARY 29 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>[Signature]</i> CONT NO.			

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT <u>70-11120</u>		SITE <u>HWY 17 E CHALK RIVER</u>		BOREHOLE No. <u>1</u>		GROUND ELEVATION _____										
SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	3-4.5	1"	ANGULAR	20	50	30	LOW	DRILL	QUICK		EARTHY	BROWN	LOW		SILTY SAND WITH SOME GRAVEL	RF
2	6-7.5	1/2"	SUB ANGULAR	5	60	35	"	"	"		"	"	"		SILTY SAND WITH TRACE OF GRAVEL	RF
3	9'-10.5	1"	SUB ANGULAR	15	50	35	"	"	"		"	"	"		SILTY SAND WITH TRACE OF GRAVEL	RF
4																
5	5-16.5	1"	ANGULAR	20	50	30						GREY	"		SANDY SAND WITH SOME GRAVEL	RF
6	16															
7	20-22.5	1 1/4"	ANGULAR	20	70	10									SAND WITH SOME GRAVEL - TRACE OF SILT	RF

NOTES:- VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 70-11120 SITE Highway 17 & Chalk River BOREHOLE No. 2 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION			DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE										
				GRAVEL	SAND	SILT & CLAY								
1	3'-3.7'	1"	SLUB ANGULAR	20	50	30	Low	Dull	Quick		Earthy Brown	Low	SILTY SAND WITH SOME GRAVEL	SP
2	6'-7'-6"	3/4"	"	10	60	30	"	"	"	"	"	"	SILTY SAND WITH TRACE OF GRAVEL	SP
3	10'-0" 11'-6"	1/2"	"	30	45	25	"	"	"	Brown GREY	"	"	SILTY SAND WITH GRAVEL	SP
4	15'-0" 16'-0"	1/2"	"	30	40	30	"	"	"	"	"	"	SILTY SAND AND GRAVEL	SP

NOTES:— VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT _____ SITE _____ BOREHOLE No. 3 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION			DRY STRENGTH	SHINE	DILATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE										
				GRAVEL	SAND	SILT & CLAY								
1	3-4.5	1/2	200' ANGULAR	0	60	30	low	D/L	QUICK		Light Brown	LOW	SILTY SAND WITH SOME GR/CL	SC
2	6-7.5	-	-		60	40	"	"	"	"	"		SILTY SAND	SC
3	10-11.5	-	-		60	40	"	"	"	"	"		SAND	SC
4	15-16.5	-	-	-	-	100	Med	"	slow		Grey	"	SILT TO CLAYEY SILT	ML
5	20-21.5	-	-	-	-	100	"	"	"		"	"	SILT TO CLAYEY SILT	ML

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

Department of Highways Ontario

Copy for the information of

Mr. A. Stermac
Mr. J. C. McAllister,
Regional Bridge Planning
Supervisor,
North Bay Regional Office.

Bridge Office,
Downsview.

May 13, 1971.

Chalk River Bridge,
W.P. 18-68-01, Site No. 29.7
Highway #17, District #13.

70-11-120

Attached herewith are prints of the Preliminary
Bridge Plan Drawing B-7044-P1 for the above-mentioned
structure.

The estimated cost of the proposed structure is
\$70,000 which includes tender, materials, engineering and
sundry construction.

Any comments or revisions you may have should be
submitted within three weeks.

C. S. Grebski,
Bridge Design Engineer.

CSC/mh
ENCL*

cc: B. Davis,
A. Stermac (2),
J. Anderson,
R. Murphy.

May 17/71

No Comment

R. S. H.

No Comment

M. Sivata

May 17/71

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. A. Stermac,
Principal Foundation Engineer,
Room 107, Central Building.

FROM: C. S. Grebski,
Structural Office.

ATTENTION:

DATE: September 21, 1971.

OUR FILE REF.

IN REPLY TO

SUBJECT: Chalk River Bridge,
W.P. 18-68-01, Site #29-7,
Highway #17, District #13.

70-11-120

Attached herewith we are submitting the final bridge drawings which show the foundation design for this structure.

Kindly give us your comments at your earliest convenience.

for *Walton Linn*
C. S. Grebski,
Structural Design Engineer.

CSG/mh
ENCL*
cc: Foundation Office.

No comments.
M. Devata
Sept 26/71

df
Sept 26/71

G.I.-30 SEPT 1976

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31F - 48

W.P. No. 18-68-01

CONT. No. 72-027

W. O. No. 70-11120

STR. SITE No. 29-7

HWY. No. 17 DIST. 13

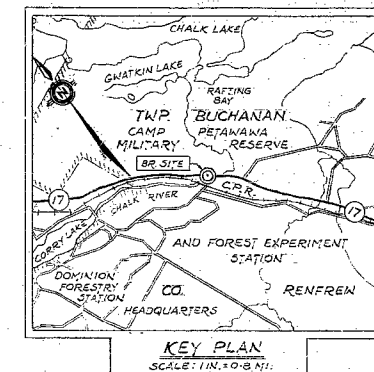
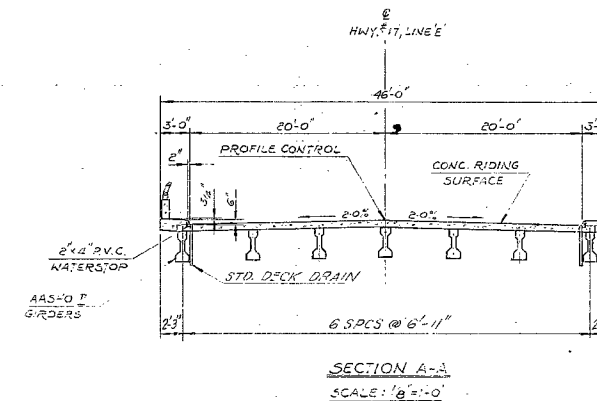
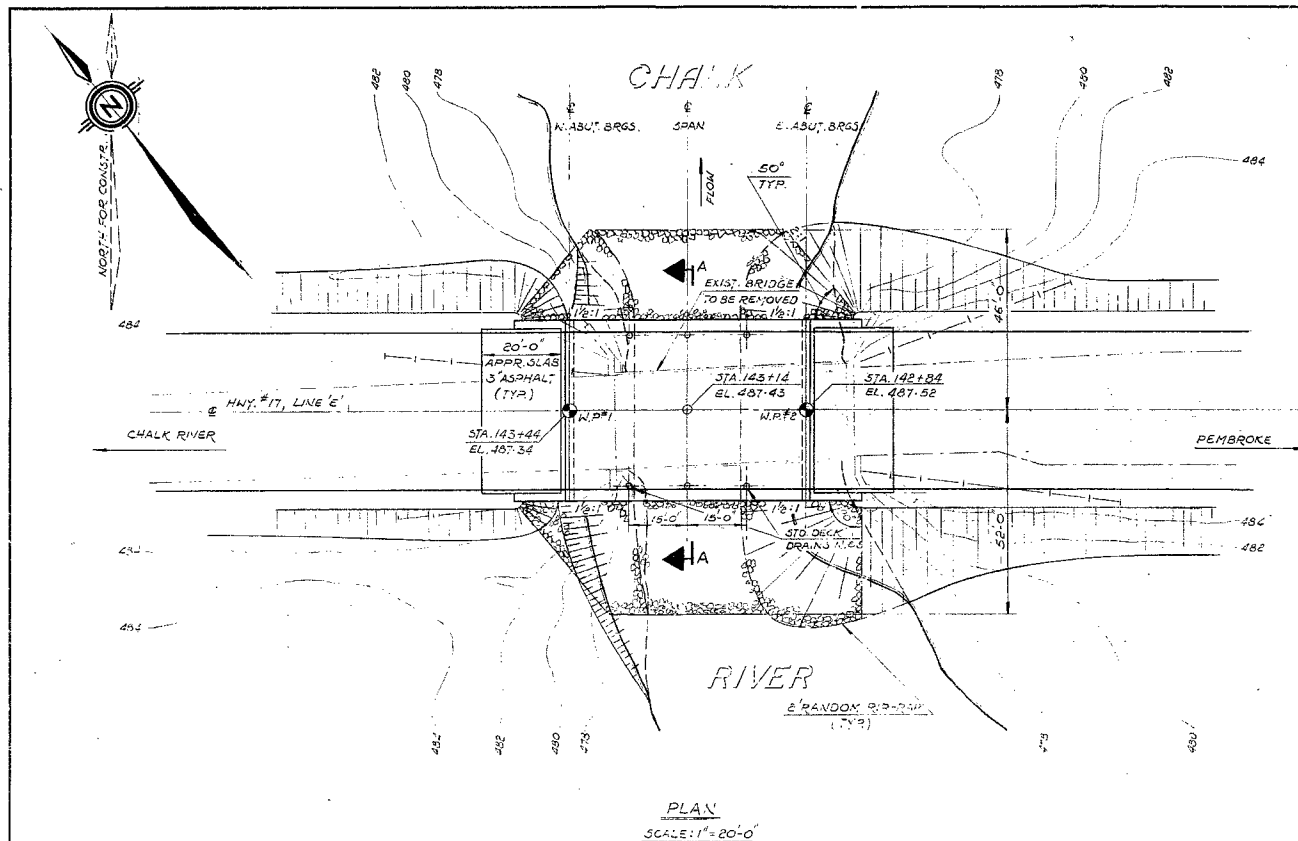
LOCATION CHALK RIVER

BRIDGE 2.9 mi. E. of CHALK

RIVER

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: _____



NOTES:

CLASS OF CONCRETE

DECK, CURBS OVER DECK & PARAPET WALLS... 4,000 PSI.
REMAINDER... 3,000 PSI.
FOR PRESTRESSED GIRDER SEE D-7044-5

CLEAR COVER ON REINFORCING STEEL

FOOTINGS & ABUTMENTS --- 3"
DECK --- 1/2" TOP ; 1" BOTTOM
DIAPHRAGMS & CURBS --- 2"
AND/OR AS NOTED ON THE DRAWINGS

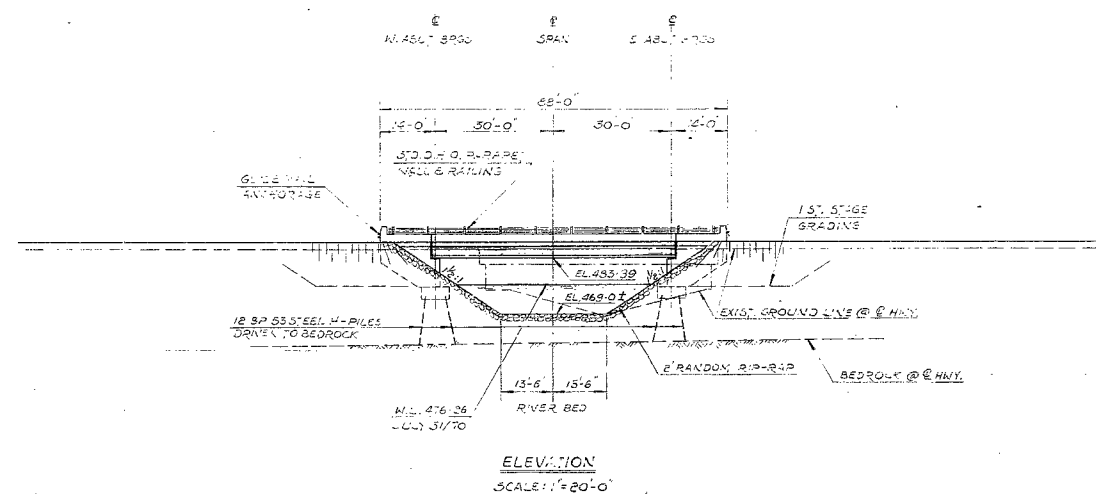
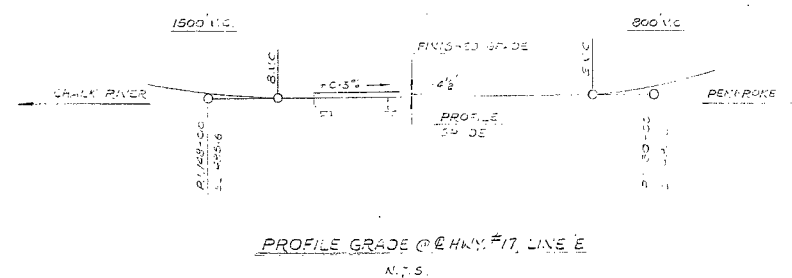
CONSTRUCTION NOTES

THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF $\pm 1/8"$.

NO CONCRETE SHALL BE PLACED ABOVE THE
SUBTENT BEARING SEATS UNTIL THE
CONCRETE IN THE DECK HAS BEEN PLACED.

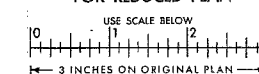
LIST OF DRAWINGS

- 1. GENERAL LAYOUT
- 2. PROPOSED LOCATIONS & SOIL STRATA
- 3. PROPOSED
- 4. FOUNDATION DETAILS
- 5. PROPOSED SADDLES & BEARINGS
- 6. DECK SCHEME I
- 7. DECK SCHEME II
- 8. SPACING
- 9. DISPERSED WALL DETAILS
- 10. INTERIOR STEEL PARAPET RAIL
- 11. STANDARD DETAILS

[illegible]

B.M. 486-90
GEODETIC DATUM
CUT X ON BOULDER
98.5' LT. 140+90

FOR REDUCED PLAN

[illegible]

DEPARTMENT OF HIGHWAYS ONTARIO

BRIDGE OFFICE

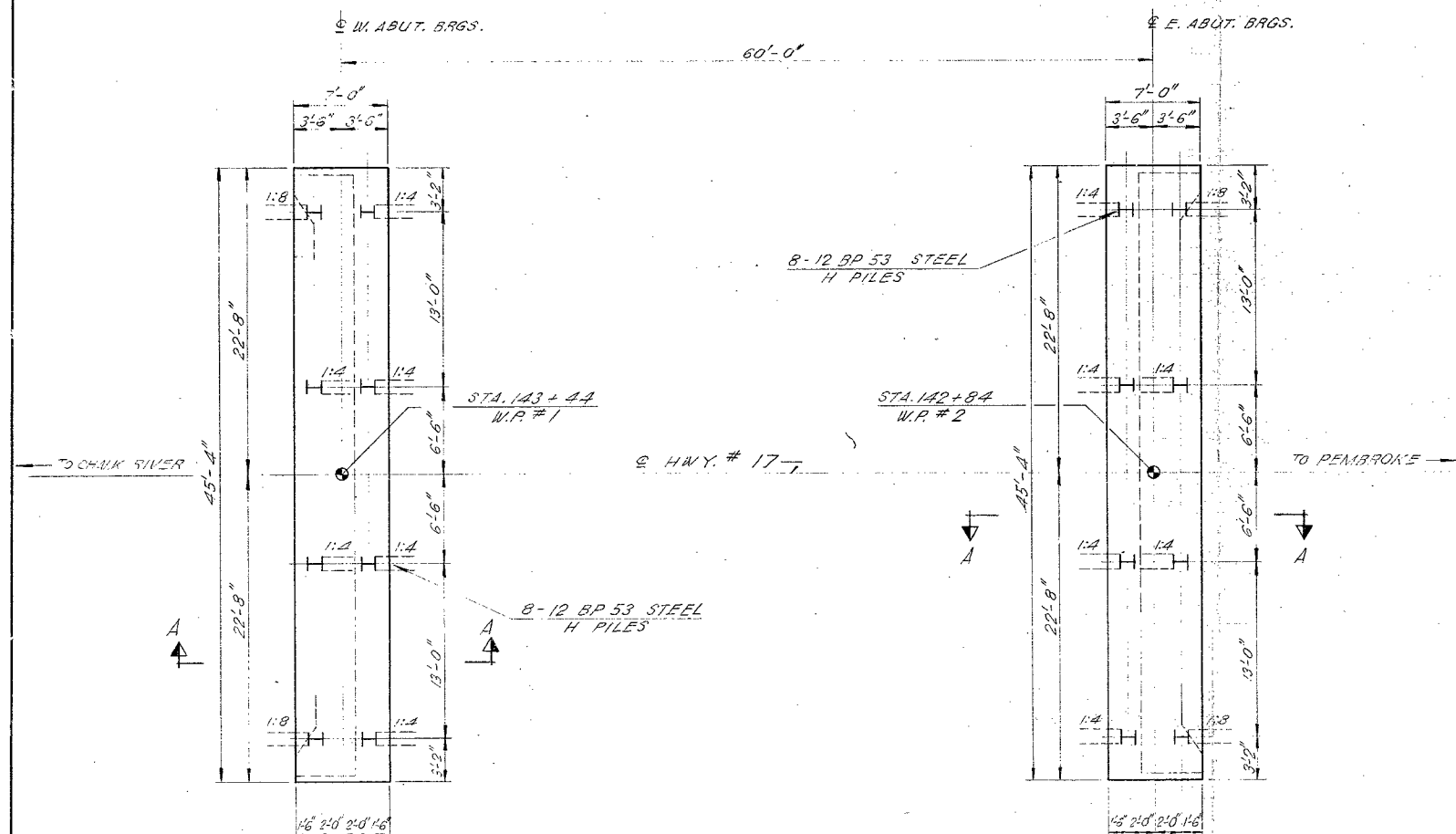
70-11-150

CHALK RIVER BRIDGE

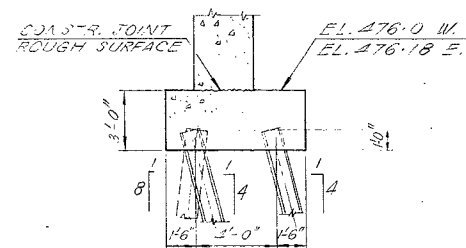
KING'S HIGHWAY No. 17 DIST. No. 13
CO. RENFREW
TWP. OF BUCHANAN LOT 9 CON. 5

GENERAL LAYOUT

APPROVED				SITE No. 29-7		W.P. No. 18-68-0	
BRIDGE ENGINEER				CONTRACT No.			
DESIGN	C. F. F.	CHECK	W.V.				
DRAWING	H.N.	CHECK	C. F. F.	DRAWING No.		D-7044-1	
DATE	11/3/71	LOADING	45 20-44				



FOOTING LAYOUT
SCALE: 3/16" = 1'-0"



SECTION A-A
SCALE: 1/4" = 1'-0"

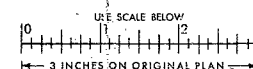
LIST OF 12 BP 53 STEEL H PILES

LOCATION	NO. OF PILES	LENGTH	CUT OFF ELEV'S
W. ABUT.	8	16'	474.0
E. ABUT.	8	16'	474.18

PILES SHALL BE DRIVEN TO BEDROCK AS DIRECTED BY THE ENGINEER.
DESIGN LOAD IS 70T/PILE



FOR REDUCED PLAN



31F-48
GEORES No.

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE OFFICE

78-11-120

CHALK RIVER BRIDGE

KING'S HIGHWAY No. 17 DIST. No. 13
CO. RENEWAL
TWP. BUCHANAN LOT 9 CON. 5

FOOTING LAYOUT

APPROVED	BRIDGE ENGINEER	CONTRACT	NO.
DESIGN C.F.F.	CHECK W.V.		
DRAWING L.S.	CHECK C.F.F.		
DATE AUG. 17	LOADING 140 PD-54	DRAWING No.	D-7044-3