

G.I.F-30 SEPT. 1976

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31C-122

DIST. 7 REGION CENTRAL

W.P. No. 967-607967-67-08

CONT. No. 75-122

W. O. No. 73-11045

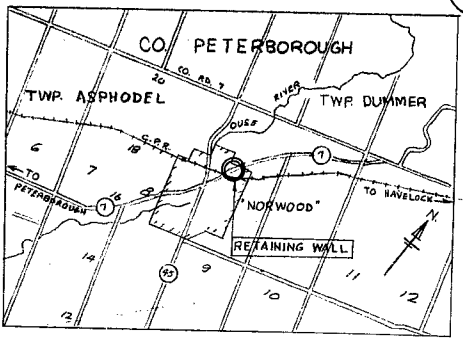
STR. SITE No. _____

HWY. No. 7

LOCATION RET. WALL AT NORWOOD

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

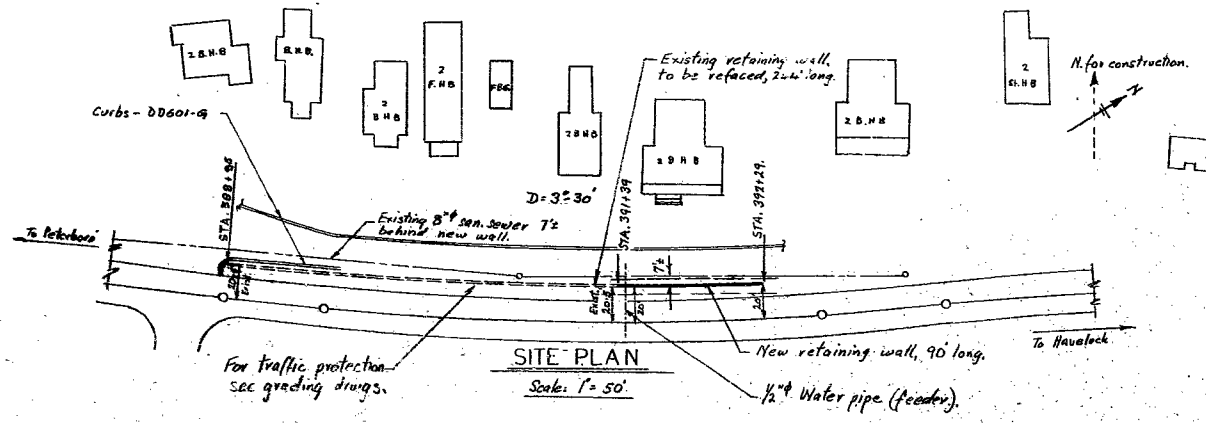
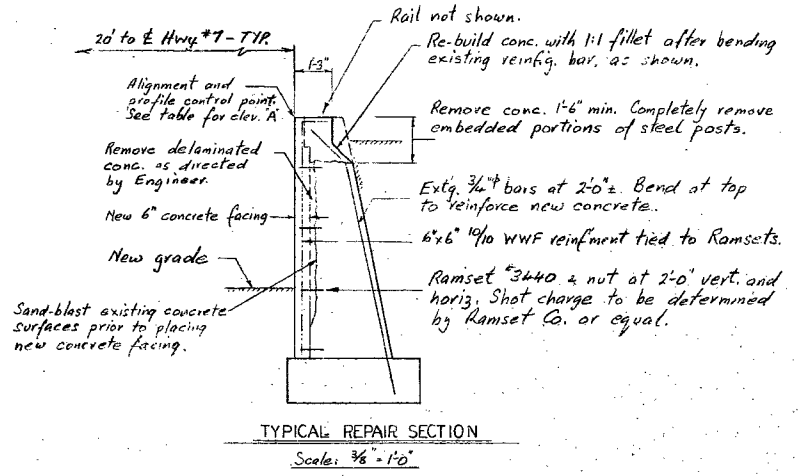
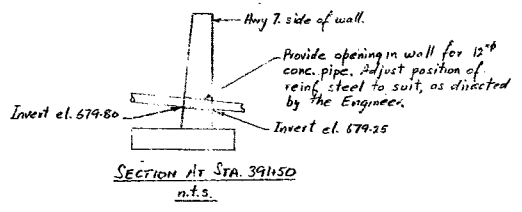
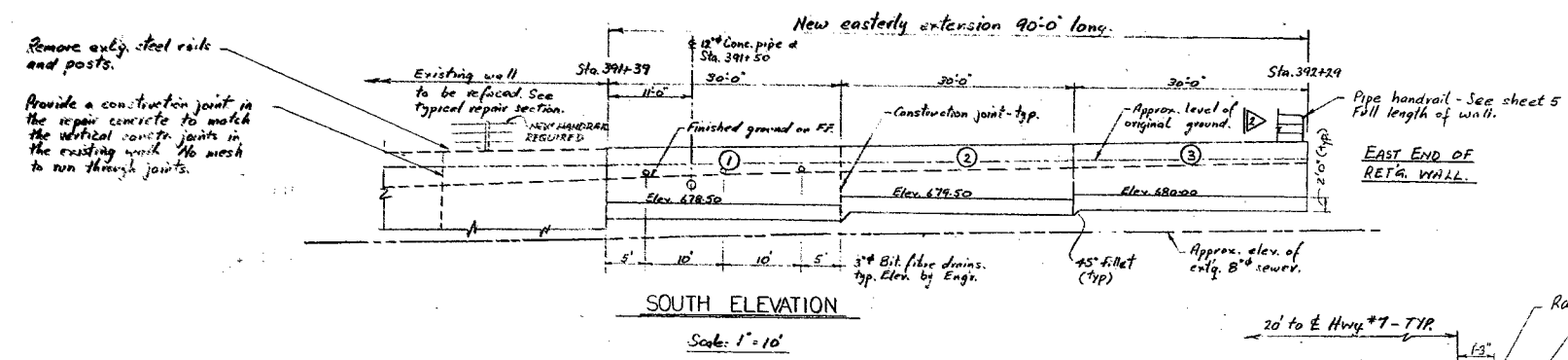
REMARKS: Documents to be unfolded
before microfilmed



KEY PLAN
SCALE: 1 in. = 1 mi.

- NOTES:
1. Class of concrete: 3000 p.s.i.
 2. Clear cover to reinforcing steel: 3"
 3. For construction details, see construction table
 4. For granular backfill detail, see standard SD4-58.
 5. Backfill both sides of wall simultaneously.

FF = Front Face and BF = Back Face



- List of Drawings:
- 1 Elevation
 - 2 Bore Hole Locations & Soil Strata
 - 3 Construction Table
 - 4 Miscellaneous Details
 - 5 Pipe Handrail Type 1



FOR REDUCED PLAN

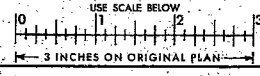


Table of Elevations.		
Station	Elevation A	
388+96	671.70	
389+00	672.00	
389+50	676.90	
390+00	681.00	
390+50	683.70	
391+00	685.00	

See drawing -3 for elevations of new wall.
Top of wall to be on a smooth curve.

31C-122
GEOGRAPHIC No.

REVISIONS	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO			
C.O.N.T. 75-122			
RETAINING WALL AT NORWOOD			
KING'S HIGHWAY No. 7		DIST. No. 7	
CO. PETERBOROUGH		CON. 9	
TWP. ASPHODEL		LOT 18	
ELEVATION			
APPROVED		CONTRACT No. 75-122	
DESIGN		W.P. No. 907-67-8	
DRAWING		SITE No. 26	
DATE Feb 74		SHEET 1	

MEMORANDUM

31C-122

TO: Mr. G. C. E. Burkhardt, (3)
Regional Structural Planning Eng.,
Central Region,
3501 Dufferin St., Downsview.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: August 2, 1973.

OUR FILE REF.

IN REPLY TO **AUG 28 1973**

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
Proposed Retaining Wall
On Hwy. 7
At Norwood
District No. 7 (Port Hope)
W.O. 73-11045 - W.P. 907-67-08
CONT. 75-122

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

We believe that the factual data and recommendations contained therein will prove adequate for your design requirements. Should additional information be required, please do not hesitate to contact our Office.

AGS/ao
Atch.

c.c. E. J. Orr
B. R. Davis
A. Rutka
R. S. Pillar
D. P. Collins
B. J. Giroux
C. Mirza
G. A. Wrong
B. A. Singh

A. G. Stermac
A. G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

Foundations Files
Documents

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 - 7.2) Foundations.
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FOUNDATION INVESTIGATION REPORT
For

Proposed Retaining Wall

On Hwy. 7

At Norwood

District No. 7 (Port Hope) 8

W.O. 73-11045 - W.P. 907-67-08

1. INTRODUCTION:

A request for a foundation investigation on Hwy. 7 at Norwood was received from Mr. G. C. E. Burkhardt, Regional Structural Planning Engineer, in a memo dated May 22, 1973.

Subsequently, a field investigation was carried out by the Foundations Office to determine the subsoil conditions at this location. This report contains the results of that investigation and our recommendations concerning the design of the proposed retaining wall foundations.

2. SITE CONDITIONS:

The site is located on Hwy. 7 at Norwood. The terrain in the immediate vicinity of the proposed retaining wall is hilly. This site is located in the Peterborough Drumlin Field Physiographic Region of Southern Ontario. The subsoil is non-cohesive and underlain by limestone. It is expected that the subsoil at this location forms part of an esker that passes through this area.

3. FIELD AND LABORATORY WORK:

The field work consisted of 4 sampled boreholes. The boreholes were advanced by continuous flight augers and wash-boring equipment. Disturbed samples were obtained using a 2-inch O.D. split spoon sampler driven according to the specifications for the Standard Penetration Test. A rock core sample was obtained at the bottom of one borehole using AXT rock coring equipment.

The locations and elevations of the boreholes are marked on Drawing #73-11045A accompanying this report.

Samples were examined visually in the field and again in the laboratory. Tests were performed on selected samples to determine the following physical properties:

- (1) Natural Moisture Content
- (2) Grain-Size Distribution

The results of field and laboratory tests are given on the Record of Borehole sheets and Figures 1 and 2 which are contained in the Appendix of this report.

4. SUBSOIL CONDITIONS:

4.1) General:

The subsoil at this location consists of sand and gravel deposits underlain by limestone bedrock. The subsoil strata are described from ground level downwards as follows:

4.2) Sand to Gravelly Sand:

This 18 to 25-foot-thick stratum consists of loose to very dense sand and some gravel to gravelly sand, with a trace of silt, and occasional cobbles. The Standard Penetration 'N' values vary from 6 to over 100 blows per foot with an average value of 47 blows per foot.

A grain-size distribution envelope is given on Figure 1 in the Appendix of this report for this stratum. Average values of the various grain sizes are as follows:

Gravel	29%
Sand	56%
Silt & Clay	15%

The natural moisture content of this stratum varies from 2 to 9% with an average value of 4%.

4.3) Gravel with Sand:

This stratum was not penetrated by all boreholes. In Borehole No. 1, where bedrock was encountered immediately below this stratum the total thickness was 11.5 feet. At other locations the penetration of this stratum was less than 10 feet in magnitude.

This stratum consists of very dense gravel with sand, some silt, and occasional cobbles. The Standard Penetration 'N' values are greater than 100 blows per foot. The natural moisture content is about 6%.

The grain-size distribution for two samples taken from this stratum are shown on Figure 2 in the Appendix of this report. The approximate average grain-size distribution is as follows:

Gravel	55%
Sand	35%
Silt & Clay	10%

5. BEDROCK CONDITIONS:

A rock core sample was examined by Mr. K. Ingham, Geologist, whose report is as follows:

<u>Hole No. 1</u>	Bedrock at 640.3
27 - 30	Limestone; mixture of gravel and boulders.
30 - 34	Limestone; thin to medium bedded, generally fine grained with occasional medium grained beds, minor thin shale seams.

6. GROUNDWATER CONDITIONS:

The groundwater level at the time of our investigation was below the following elevations:

<u>Borehole No.</u>	<u>Elevation (ft.)</u>
1	654
2	660
3	666
4	663

7. DISCUSSION & RECOMMENDATIONS:

7.1) General:

It is proposed to replace the existing retaining wall with a new wall 5 feet to the north. The top of the proposed retaining wall will be from 3 to 10 feet above the grade of Hwy.7. The subsoil consists of non-cohesive material. Bedrock was encountered at one location.

7.2) Foundations:

Because an adequate bearing capacity may be achieved at shallow depths, it is recommended that the retaining wall be founded on a spread footing. Since an 8-inch-diameter sanitary sewer was placed approximately 3 feet north of the proposed retaining wall earlier this year, it is recommended that the proposed footing be placed at or below the invert level of this sewer. Elevations of the sewer invert are as follows:

<u>Location</u>	<u>Elevation (ft.)</u>
Sta. 388+15	653.32
Sta. 390+80	672.50
Sta. 393+20	675.15

If a concrete cantilever or concrete gravity retaining wall is constructed, a spread footing should be placed at the following elevations in order to provide a minimum cover of 5 feet for frost protection, in order to place the footing below the sewer invert elevation, and in order to ensure that there will be no dewatering problems:

<u>Location</u>	<u>Elevation (ft.)</u>
Sta. 388+95	658.0
Sta. 390+80	671.5
Sta. 392+35	673.0

At intermediate locations the footing may be stepped in an appropriate manner.

The maximum allowable bearing pressure for design purposes is 2.5 t.s.f. For computations of sliding resistance a coefficient of friction of 0.5 may be assumed between the footing and the subsoil.

The backfill to the retaining wall should conform to the appropriate Ministry standard. The coefficient of active earth pressure can be assumed to be 0.33.

As an alternative it may be possible to employ a bin wall at this location. Assuming that the bottom of the wall is placed 2 to 3 feet below the surface of the highway, the allowable bearing pressure is 1 t.s.f. For computations of sliding resistance a coefficient of friction of 0.7 may be assumed between the bottom of the bin wall and the subsoil.

A bin wall should be placed according to the appropriate Ministry standard. The coefficient of active earth pressure can be assumed to be 0.33.

8. MISCELLANEOUS:

The field work was carried out during the period of June 27 to July 4, 1973, under the supervision of Mr. E. A. Wood, Project Foundations Engineer. The equipment was owned and operated by Master Soil Investigations Limited.

This report was written by Mr. E. A. Wood and reviewed by Mr. K. G. Selby, Supervising Foundations Engineer.

E A Wood

E. A. Wood, P. Eng.

K. G. Selby

K. G. Selby, P. Eng.

EAW/ao
July 31, 1973.

APPENDIX I

RECORD OF BOREHOLE №1

JOB 73-11045

LOCATION Sta. 389 + 13, 24' Lt. of C

ORIGINATED BY E.W.

W.P. 907-67-03

BORING DATE June 28, 1973

COMPILED BY E.W.

DATUM Geodetic

BOREHOLE TYPE Continuous Flight Auger and Washboring

CHECKED BY S.R.

[illegible]

15 $\frac{20}{10}$ 5 % STRAIN AT FAILURE

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 2

JOB 73-11045

LOCATION Sta. 390 + 13, 24' Lt. of C

ORIGINATED BY E.W.

W.P. 907-67-03/8

BORING DATE June 29, 1973

COMPILED BY E.W.

DATUM GEODETIC

BOREHOLE TYPE CONTINUOUS FLIGHT AUGER AND WASHBORING

CHECKED BY S.E.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w w_p — w — w_L			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			WATER CONTENT % 5 10 15				
680.6	GROUND LEVEL					680								
	Sand, with gravel, trace to some silt, compact to very dense		1	SS	24	670								37 53 10
			2	SS	45									
			3	SS	34									
			4	SS	43									
			5	SS	81									
660.6			6	SS	100	660								33 45 22
20.2	Gravel, with sand, some silt, occasional cobbles, very dense		7	RC	85%									EL. 65' 0"
			8	RC	5%									
651.6			9	RC	20%									
29.0	END OF BOREHOLE					650								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 3

JOB 73-11045

LOCATION Sta. 391 + 13, 24' Lt. of C

ORIGINATED BY E.W.

W.P. 907-67-028

BORING DATE July 3, 1973

COMPILED BY E.W.

DATUM GEODETIC

BOREHOLE TYPE CONTINUOUS FLIGHT AUGER

CHECKED BY S.R.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT w_L			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT			PLASTIC LIMIT w_p				
							SHEAR STRENGTH P.S.F.			WATER CONTENT w				
683.0	GROUND LEVEL													
	Sand, some to with gravel and silt, compact to very dense	24.0	1	SS	17	680								16 56 28
			2	SS	17									
			3	SS	60									35 52 13
			4	SS	100/6"	670								
			5	SS	100/6"									35 49 16
659.0	Frequent Cobbles												EL. 665.0	
24.0	END OF BOREHOLE													
						650								

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 4

JOB 73-11045

LOCATION Sta. 392 + 25, 24' Lt. of E

ORIGINATED BY E.W.

W.P. 907-67-038

BORING DATE July 4, 1973

COMPILED BY E.W.

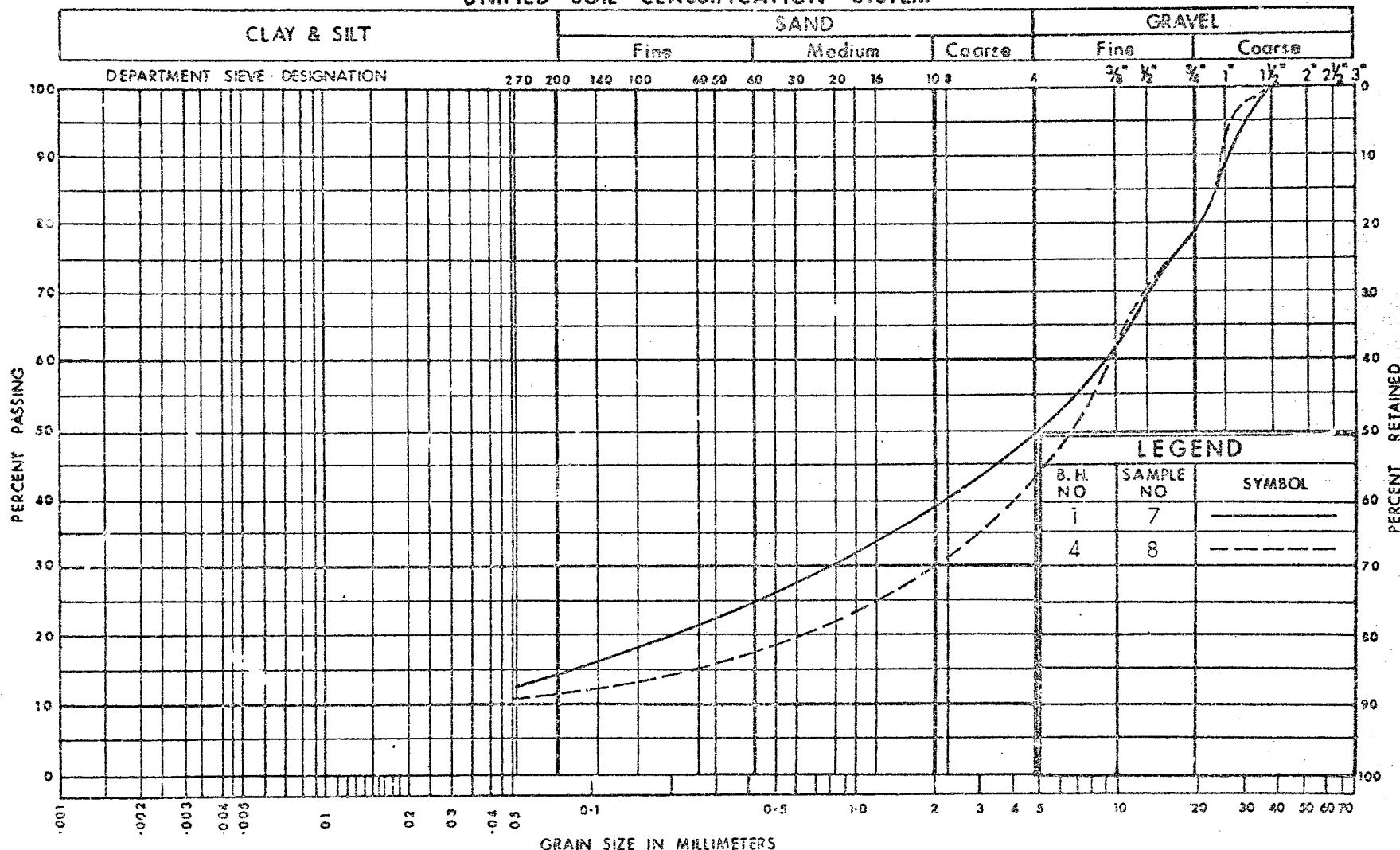
DATUM GEODETIC

BOREHOLE TYPE CONTINUOUS FLIGHT AUGER AND WASHBORING

CHECKED BY S.R.

SOIL PROFILE.			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F.				W_P W W_L				
							O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE				WATER CONTENT % 5 10 15				
684.9	GROUND LEVEL													P.C.F.	GR.SA.SI.CL.
0.0	Occasional Cobbles					680									33 55 12
	Sand, trace to with gravel, trace to some silt, compact to very dense		1	SS	69										0 91 9
			2	SS	47										
			3	SS	27										
			4	SS	48	670									
			5	SS	100	3"									
			6	SS	84										39 46 15
659.9	Frequent Cobbles					660									EL. 662.0
25.0	Gravel, with sand some silt, very dense		7	SS	100	2"									
653.4			8	SS	100										57 32 11
31.5						650									

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS

DESIGN SERVICES
BRANCH

GRAIN SIZE DISTRIBUTION
GRAVEL
WITH SAND

W.P. No. 907-67-08
JOD No. 73-11045
FIG. 2

ABBREVIATIONS & SYMBOLS USED IN THIS REPORTPENETRATION RESISTANCE

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

TERMS TO BE USED IN DESCRIBING SOILS:-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC.

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.T.	SLOTTED TUBE SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE

P.H. SAMPLE ADVANCED HYDRAULICALLY

P.M. SAMPLE ADVANCED MANUALLY

SOIL TESTS

U	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V.	FIELD VANE
CIU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

ABBREVIATIONS & SYMBOLS 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
w_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_t	SENSITIVITY

IN TERMS OF
EFFECTIVE STRESS
 $\tau_f = c' + \sigma' \tan \phi'$

IN TERMS OF
TOTAL STRESS
 $\tau_f = c_u + \sigma \tan \phi$

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF σ
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF σ 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

73-11045

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
West Building.

FROM: G. C. E. Burkhardt,
Structural Planning Office,
3501 Dufferin Street.

ATTENTION:

DATE: May 22, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: Retaining Wall at Norwood,
W.P. 907-67-08,
Highway #7, District #7, Port Hope.

Attached, please find copies of drawing 235/7 sheet 1 and 2, showing the arrangement of a new (coloured in red) and existing retaining walls (coloured in green). As can be seen the new wall is located approximately 5 feet north of the existing one and will vary in height from 3 to 10 feet, above the grade of Highway #7. The site is easily accessible by wheeled vehicles.

Although the undersigned was advised that there are no utilities north of the existing wall, this should be checked again, as the required foreman was not available at the time of investigation. For your information 3 photos of this particular site are included.

The finished Foundation Report should reach this office by August 15, 1973.

WWK:lc
Attach.

W. W. Kulmatickas
W. W. Kulmatickas,
STRUCTURAL PLANNING ENGINEER,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

c.c. R. Fitzgibbon
J. Anderson

MDD. AUG 15, 1973 ✓

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
West Building.

FROM: G. C. E. Burkhardt,
Structural Planning Office,
3501 Dufferin Street.

ATTENTION:

DATE: June 15, 1973.

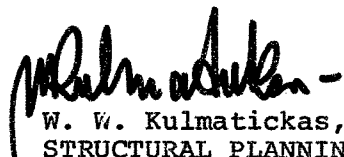
OUR FILE REF.

IN REPLY TO

SUBJECT: Retaining Wall at Norwood,
W.P. 907-67-03,
Highway #7, District #7.

In our request to carry out a foundation investigation at the above mentioned stie and dated May 23, 1973 we indicated the W.P. number as ~~98-67-03~~⁹⁷⁻⁶⁷⁻⁰³ which should read 907-67-0⁸. Would you kindly correct this number on our letter and your work schedule.

WWK:lc


W. W. Kulmatickas,
STRUCTURAL PLANNING ENGINEER,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. K. Selby,
Sup. Foundation Engineer.

FROM: K. W. Ingham

ATTENTION:

DATE: July 10, 1973

OUR FILE REF.

IN REPLY TO

SUBJECT:

Foundation Investigation 73-11045;✓
Highway No. 7 at Norwood

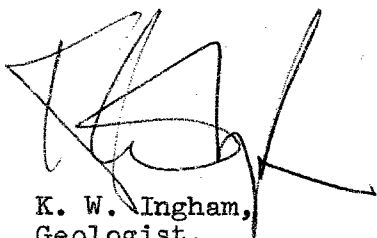
A brief description is given below for 1 borehole drilled to bedrock at this site, together with the appropriate bedrock elevation.

Hole No. 1

Bedrock at 640.3

27 - 30	Limestone; mixture of gravel and boulders.
30 - 34	Limestone; thin to medium bedded, generally fine grained with occasional medium grained beds, minor thin shale seams.

KWI:nr


K. W. Ingham,
Geologist.

Design Services Branch,
1201 Wilson Avenue,
Downsview, Ontario.
M3M 1J9

Telephone: 248-3282.

July 20, 1973.

Master Soil Investigation,
104 Kenhar Drive,
Weston, Ontario.
M9L 1N4

Dear Sirs:

This letter confirms our request of June 25, 1973,
for the supply of C.M.E. Drilling Machine together with
all necessary equipment, as specified under the terms of
our Contract Agreement, at Norwood on June 27, 1973.

Mobilization will be from Toronto.

Our Project Number is W.O. 73-11045.

Yours truly,

A. G. Selby

KGS/ao

C.C. W. W. Fry
(Attn: Mrs. M. Porter)

For K. G. Selby,
Supervising Foundations Engineer.
For: A. G. Stermas,
Principal Foundations Engineer.

Foundations Files
Documents

Jan 15774

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

Altman
TO: Mr. A. Rutka
Mgr. Geotechnical Office
West Bldg.

FROM: Structural Office
West Bldg.

ATTENTION:

DATE: February 18th, 1974

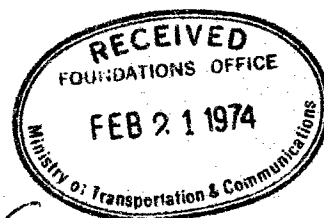
OUR FILE REF.

IN REPLY TO

SUBJECT: Retaining Wall at Norwood
W.P. 907-67-8, Site 26
Hwy. 7, District 7

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.



C.S. Grebski

C.S. Grebski
Structural Design Engineer

CSG:AMF

Attached

c.c. Foundation Office

