

MEMORANDUM

TO: Mr. A. M. Tove,
Bridge Engineer,
Bridge Division.

FROM: Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.

Attention: Mr. K.L. Kleinstein DATE: November 4, 1963
Mun. Bridge Liaison Engr.

OUR FILE REF.

IN REPLY TO

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For

Proposed New Bridge at Fifteen-Mile
Creek, Development Road P.E. #683,
District #4, Hamilton

W.J. 63-F-112 ---- W.P. 709-62

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

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

AYL/MdeF
Attach.

cc: Messrs. A. M. Tove (4)
J. P. Howard
J. M. Childs
T. J. Kovich

hlf
K. F. Lo,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

Foundations Office ✓
Gen. Files

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FOUNDATION INVESTIGATION REPORT

For

Proposed New Bridge at Fifteen-Mile
Creek, Development Road P.E. #683,
District #4, Hamilton
W.J. 63-F-112 ---- W.P. 709-62

1. INTRODUCTION:

A request for a foundation investigation at the site of the proposed new bridge at Fifteen Mile Creek was received from the Bridge Location Section verbally, and from C. C. Parker & Parsons, Brinckerhoff, Ltd. in a letter dated August 30, 1963.

A field investigation was subsequently carried out by this Section to determine the subsoil conditions existing at the location of the proposed structure. Presented in this report are the results of this investigation and our recommendations pertaining to the design of the proposed foundations.

2. DESCRIPTION OF THE SITE:

The proposed site is located approx. 4 miles south of Vineland on Development Road P.E. #683. The surrounding area is gently rolling terrain in the immediate vicinity of the site. The vegetation consists of hardwood bush at the east side of the road and cultivated farmland at the west side. At the time of the investigation, the creek was quite dry.

The existing bridge (about 40 years old) is a concrete structure with a steel truss deck, having a 26-ft. long single span.

cont'd. /2 ...

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

Physiographically, the site is located in the region referred to as the Iroquois Plain in the Niagara Fruit Belt.

3. FIELD INVESTIGATION PROCEDURE:

A total of two boreholes and three dynamic cone penetration tests was carried out during the course of the field work. Boring was achieved by means of conventional diamond drilling equipment adapted for soil sampling purposes. During the field work, disturbed and undisturbed samples were obtained. Disturbed samples were obtained by means of a standard split-spoon sampler driven into the soil. The dimensions of the split-spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. Rock core samples were obtained by means of a BX core barrel. Dynamic cone penetration tests were carried out adjacent to each borehole and at one other location. Driving energy to advance the cone was 350 ft.-lbs. per blow. Other samples were obtained by means of 2-inch I.D. Shelby tubes which were pushed into the soil by hand, or occasionally driven into the soil with a 140-lb. hammer delivering 350 foot-lbs. per blow. Insitu vane tests were carried out wherever possible, at elevations 12" below the various sample depths.

The locations and elevations of all boreholes are shown on Drawing No. 63-F-112A which accompanies this report. The elevations were determined from a T.B.M. located on the existing grade at centre line.

The chainage of this T.B.M. is: Sta. 391+75, and the elevation: 575.5'

cont'd. /3 ...

4. LABORATORY TESTS:

Samples were visually examined and classified at the site as well as in the laboratory. Certain tests were carried out in the laboratory for classification and shear strength determination purposes. These tests consisted of Atterberg limits, moisture content, unconfined shear strength and undrained triaxial shear strength determinations. The test results are shown on the Borehole Record sheets which form part of this report.

5. SOIL TYPES AND SOIL CONDITIONS:

5.1) General:

The subsoil at the site consists of about five different deposits, followed by shale bedrock. The boundaries of the different deposits are shown on the accompanying borelog sheets. The estimated stratigraphical profile shown on Drawing No. 63-F-112A, is based upon this information. From ground level downwards, the various soil types are as follows:

5.2) Fill Material:

The fill material was observed in B.H. #1 and consisted of very stiff oxidized silty-clay. It forms part of the existing road embankment. The depth encountered was 10 ft.

5.3) River Alluvium:

The river alluvium was observed in B.H. #3 and consisted of a mixture of clay, silt, sand and gravel, with a depth of 3 ft. B.H. #3 is located adjacent to the creek bed. The consistency of this deposit may be described as soft.

cont'd. /4 ...

5. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

5.4) Clayey Silt:

This material was encountered in both boreholes and consisted of very stiff to firm clayey silt with occasional fine gravel. The depth was found to vary from 17 ft. in B.H. #1 to 23 ft. in B.H. #3.

Generally, good agreement was observed between field vane, unconfined and undrained triaxial shear strength tests. Field vane remolded tests indicated a sensitivity in the order of 1.5 - 2.5. The undrained shear strength varies from a value in excess of 2000 p.s.f. at the surface of the deposit (El. 564.0 - El. 566.5), to about 550 p.s.f. some 14.0' below. From then on, it increases to a value greater than 2000 p.s.f. at its lower boundary.

The average properties of the material are given in the following Table:

	W %	W _L %	W _p %	γ lbs./cu.ft.	Field Vane	Unconfined and Undrained Triaxial
Average	22.8	31.1	18.6	128.8	1316	1474
Minimum Value	20.2	26.0	16.8	126.0	560	572
Maximum Value	25.3	39.0	24.6	132.2	>2000	2360

cont'd. /5 ...

5. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

5.5) Silt to Clayey Silt:

This deposit was observed in B.H. #3 only where it underlies the clayey silt deposit for a depth of 11 ft. The material is predominantly non-cohesive and exhibits slight to pronounced dilatency. Its relative density may be described as very dense, the 'N' values being in the order of 60 - 80 blows per foot. Field moisture contents were found to vary from 22% to 17%. Indications are that the deposit is of glacial origin.

5.6) Glacial Till:

This stratum underlies the clayey silt in B.H. #1 and the silt stratum in B.H. #3. It extends down to the shale bedrock. The deposit consists of very dense clayey-silt with sand and gravel in B.H. #3, and very stiff to hard clayey-silt with traces of fine to medium gravel in B.H. #1. The average 'N' value is 124 blows per foot, which indicates a very high relative density. The thickness of this stratum is 3 ft. in B.H. #3, and 16.5 ft. in B.H. #1.

5.7) Bedrock (Shale):

The grey-coloured shale bedrock was encountered at both boreholes. The surface is approximately horizontal within the limits of the structure site.

6. GROUND WATER CONDITIONS:

The ground water level at the site is estimated to be at or slightly above the prevailing water level in the creek. No artesian water pressures were observed during the investigation.

7. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a new bridge at this site to replace the existing bridge. The new bridge will be constructed on the existing centre line with a span of about 30 ft. It is believed that the present bridge is supported on spread footings. The formation level of these footings is, as yet, not known.

The investigation has revealed the presence of a clayey silt stratum which can provide adequate support for spread footings in its upper layers. It is important, however, to keep the footing level as high as possible in this stratum as the undrained shear strength decreases with depth. Information received from the Bridge Hydrology Section indicates that spread footings should be placed not higher than 6 feet below the stream bed in order to provide adequate protection against scour. Based on the foregoing, it is recommended that the proposed bridge be supported on spread footings founded at or about El. 562.0, in which case, a safe net pressure of 2 t.s.f. may be assumed for design purposes.

Since only a slight increase of 2.5 ft. in grade elevation is proposed, it is believed that settlements of the structure due to the footing pressure and the additional fill, will be of a small order in the range of 1 to 2 inches. Settlements should, in any event, be fairly uniform and differential settlements are anticipated to be negligible.

Dewatering of excavations should not present any major problems as the subsoil is relatively impermeable.

No stability problems are anticipated with regard to the proposed approach fills, provided standard 2:1 slopes are employed.

cont'd. /7 ...

8. SUMMARY:

A foundation investigation at the site of the proposed new bridge at Development Road P.E. #683 and Fifteen Mile Creek is reported.

Subsoil at the site was found to consist of very stiff to firm clayey silt followed by very dense glacial till, followed by bedrock. Depth to bedrock is about 40 ft.

For the proposed structure, a spread footing type foundation is recommended. Details are given in the foregoing section "Discussion and Recommendations".

9. MISCELLANEOUS:

The field work was carried out during the period September 25, 1963 to October 3, 1963. Equipment used was owned and operated by Dominion Soil Investigation Ltd. The supervision of the field work, together with the preparation of this report was carried out by Mr. P. Payer, Project Foundation Engineer, under the supervision of Mr. K. G. Selby, Sr. Foundation Engineer.

October 1963

APPENDIX I.

ABBREVIATIONS USED IN THIS REPORT

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

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	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_i	SENSITIVITY

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

April 7th, 1964.

C.C. Parker & Parsons, Brinckerhoff Ltd.,
Consulting Engineers,
795 Main Street West,
Hamilton, Ontario.

Attention: Mr. J. Disher.

63-F-112

Dear Sir: Re: Vineland Development Rd., WP#708-62,
 20' Span Concrete Culvert over Fifteen
 Mile Creek, DHO Culvert Design Sheet,
 dated January 29th, 1964.

According to information received from the Bridge Office, the existing open type concrete culvert will be strengthened to cope with the additional load which will arise from the proposed grade raise. The reconstruction will also entail a culvert extension.

Please note that the footings of the reconstructed culvert should allow for a maximum permissible bearing pressure of 2 ton per S.F.

Yours truly,

RS/hl

c.c. F. DeVisser,
A. Scernac, ✓
D. Smith,
T.J. Kovich,
Files.

R. Schonfeld
For: R. Schonfeld,
T.J. Kovich,

Mr. A.M. Toye,
Bridge Engineer.

Materials & Research Division.

Attn: W.M. McFarlane

April 13th, 1964.

Vineland Development Road, W.P. #708-62,
Culvert Design Sheet Dated January 29/64,
20' Span Concrete Culvert over Fifteen Mile Creek.

This is in reply to your telephone call this morning informing us that the bearing pressure exerted by the existing footing, resulting from the culvert reconstruction and grade raise, will be 2.35 T.S.F. A maximum bearing pressure of 2 T.S.F. was recommended in our memo to the Consultants, C.C. Parker & Parsons, Brinckerhoff Ltd., dated April 7th, 1964. The recommendation was based on one power auger borehole and, by inference, on the foundation investigation at the bridge site of the Sixteen-Mile Creek 3500' to the south.

If the existing culvert footings are to be retained, it will be advisable to

- 1) allow for extra concrete under the footing at the culvert extensions in the event that, during construction, it is found necessary to deepen the excavation to footings,
- 2) provide for joints between the existing culvert and culvert extensions which will allow for differential settlement.

RS/h1

c.c. G.C. Parker (J. Disher),
A. Stermac,
T.J. Kovich,
File.

R. Schonfeld,
For: T.J. Kovich,
Regional Materials Engineer.

Insp. Rep
 23-64-293
 63-F-115

CONDITION OF CONCRETE IN STRUCTURES

PROJECT 0300

FIFTEEN MILE CK. BR.
 DISTRICT: 4
 HWY. Q.E.W.
 LOG NO. 54W

As Structure
 1/4 Q.E.W./5+E
 (East bound structure)

LOCATION OF TEST AREA AND CONDITION OF CONCRETE UNDER ASPHALT

Test Area	Depth of Asphalt	Bond under Asphalt	Condition of Concrete	Core W.C.
E. East abutment at E of road- way	1 1/4"	Nil	Concrete sound. Light scaling	
F. East abutment at gutter	1 1/2" to 2"	"	Concrete disintegrated 1" deep in top fibres of deck slab. Improve- ment towards the E of roadway.	174
G. West abutment at E of road- way	1 1/4"	"	Concrete sound. Negligible scaling.	
H. West abutment at gutter	1 1/4"	"	Deterioration can be classified as severe scaling (Depth ± 1" - C.A. affected.)	175

General Condition of concrete similar as on east bound structure.

High value of rebound figure was observed on sidewalk and on the slab under asphalt qualifying the concrete above 6,000 psi.

Compressive strength of core W.C. 172 taken from deck is 6390 psi.

CONCLUSION

As eastbound structure.

November 4, 1964

J. Wawrzynski,
Project Engineer.

DEPARTMENT OF HIGHWAYS ONTARIO

BRIDGE INSPECTION REPORT

Sufficiency Rating _____ Index No Lincoln - 23
Old QEW - 54

Highway No QEW District No 4 County)
District) Lincoln

Number & Name of Structure Fifteen Mile Creek Bridge

Type of Structure Steel Beams 2

Inspected by E. Van Beilen Date of Inspection April 196 4

Mileage From _____

ADDENDUM

Wearing surface cracked and breaking in several locations (patched).
Accumulated dirt along curbs and on sidewalks.
Curbs deteriorating in some areas.
Deck cracked and deteriorating in vicinity of catchbasins.
Steel beams rusted in several areas where seepage occurs.
Balance is in good condition.

Recommendations

1. Condition of concrete deck should be investigated by Materials and Research.
2. Remove catchbasins and install proper deck drains.
3. Remove accumulated dirt from deck and sidewalks.
4. Repair curbs.
5. Clean and repaint beams where rusted due to seepage through deck.

DEPARTMENT OF HIGHWAYS
BRIDGE INSPECTION REPORT

Sufficiency Rating _____ Index No Lincoln QEW-5423

Highway No QEW District No 4 County)
District) Lincoln
Number & Name of Structure 15 Mile Creek
Type of Structure Steel Beam
Inspected by A.J. Percy Date of Inspection April 11 196 61
Mileage From Jct. Hwy. #20 & QEW - 23.7 Miles east

ADDENDUM

The catch basins at east end have been repaired but the ones at the west end are in poor condition. They are cracked and spalling badly. They should be repaired.

The deck is in good condition except for some transverse cracks through which there is some leakage.

The wearing surface has been patched in places but otherwise it is in good condition.

The sidewalk curbs are badly spalled in places and should be repaired.

One handrail post has been hit by a vehicle but it is still fairly solid. It should be replaced. The top of one post is badly spalled.

The deck is covered in dirt at the curbs and should be cleaned.

Otherwise the structure appears to be in fairly good condition.

RETURN TO D.H.O.
BRIDGE MAINTENANCE
SECTION

DEPARTMENT OF HIGHWAYS
BRIDGE INSPECTION REPORT

Sufficiency Rating..... Index No.. Lincoln. OEW 5423

Highway No....OEW..... District No.. 4..... County) Lincoln
..... District) Lincoln.....
Number & Name of Structure..... 15 Mile Creek.....
Type of Structure..... Steel rigid frame - dual bridges.....
Inspected by.. A. Wimmer..... Date of Inspection July 1959
Mileage From.....

ADDENDUM

Handrails need painting - no further remarks.

RETURN TO D.H.O.
BRIDGE MAINTENANCE
SECTION

DEPARTMENT OF HIGHWAYS
BRIDGE INSPECTION REPORT

Sufficiency Rating..... Index No. Lincoln... Q.E.W. 5423
County)
Highway No. Q.E.W.... District No. 4..... District).....
Number & Name of Structure 15... Mille Creek Bridge.....
Type of Structure Steel R. Frame. 1 Dual Bridges.....
Inspected by... F. De Visser..... Date of Inspection Feb. 1958
Mileage From.....

ADDENDUM

CRACKS SHOWING IN CONCRETE BENTS AT PLACES OF MAXIMUM SHEAR.
CATCH BASINS ARE LEAKING-HANDRAIL POST STILL BROKEN.

RETURN TO D.H.O.
BRIDGE MAINTENANCE
SECTION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

JOB 63-F-112

LOCATION Sta. 391+51, 20' Lt.

ORIGINATED BY P.P.

W.P. 709-62

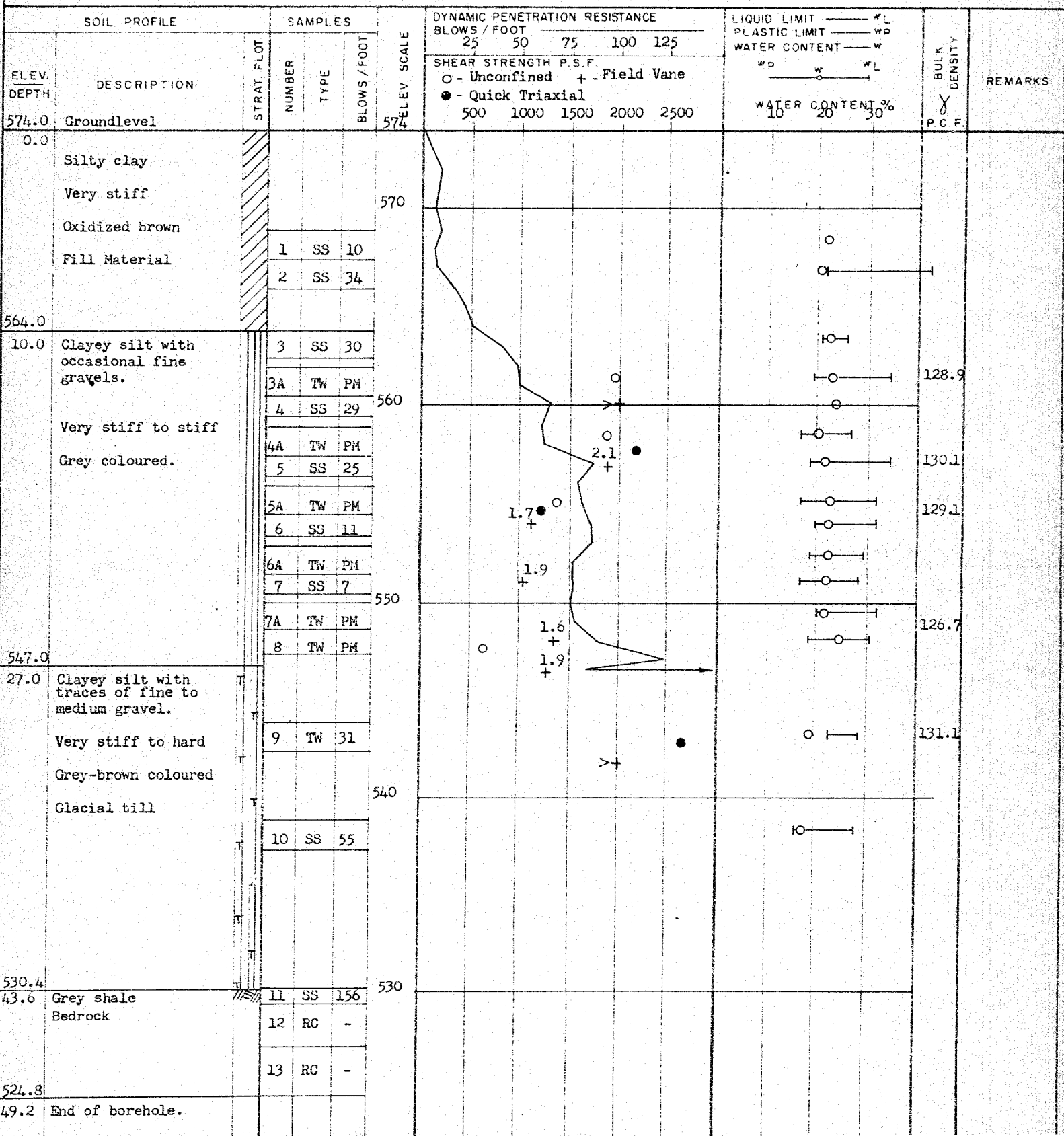
BORING DATE Sept. 25, 26, 27, 30, 1963.

COMPILED BY P.P.

DATUM G.S.C.

BOREHOLE TYPE Washboring - BX & NX Casing.

CHECKED BY H.S.



DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

108 63-F-112

LOCATION Sta. 391+45, 18' Rt.

ORIGINATED BY P.P.

W.D. 709-62

BORING DATE Oct. 1, 1963.

COMPILED BY P.P.

DATUM G.S.C.

SOREHOLE TYPE Washbore - BX & NX Casing

CHECKED BY H.S.

SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— % PLASTIC LIMIT ——— % WATER CONTENT ——— %	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT.	NUMBER	TYPE	BLOWS / FOOT	SHEAR STRENGTH P.S.F.		
574.5	Groundlevel							
0.0	Probably silty clay (Fill Material)							
566.5	8.0 Probably clayey silt with occasional fine gravel.							
557.6	16.9 End of cone test.							
						Refusal		

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 63-F-112

LOCATION Sta. 392+02, 23' Rt.

ORIGINATED BY P.P.

W.D. 709-62

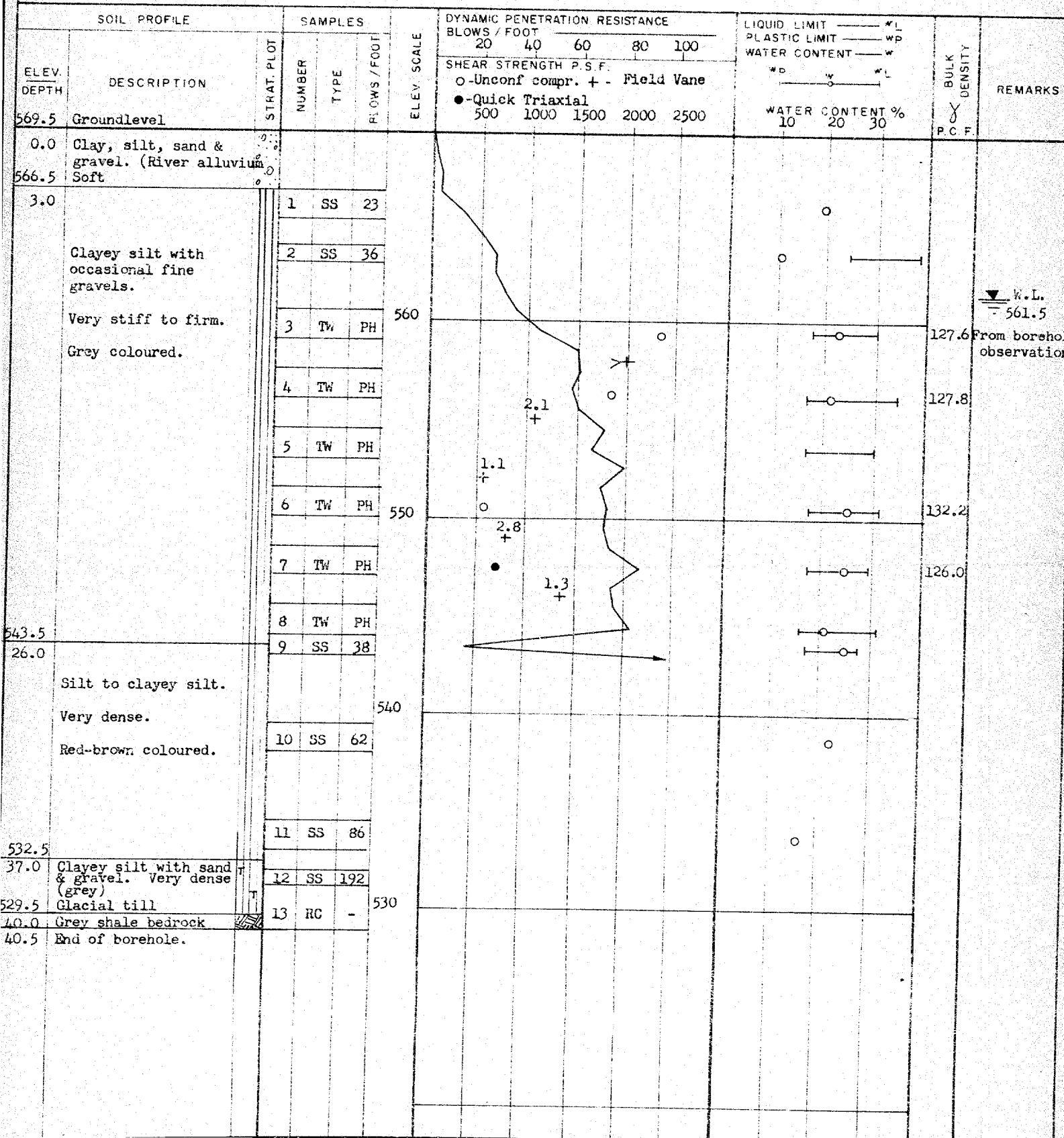
BORING DATE Oct. 1, 2, 3, 1963.

COMPILED BY P.P.

DATUM G.S.C.

BOREHOLE TYPE Washboring - BX & NX Casing.

CHECKED BY H.S.



C. C. PARKER & PARSONS, BRINCKERHOFF LTD.
CONSULTING ENGINEERS
795 MAIN STREET WEST
HAMILTON, ONTARIO
CANADA

August 30, 1963

Mr. A. Stermac
Foundation Engineer
Materials and Research Branch
Department of Highways, Ontario
Parliament Buildings
Toronto, Ontario

Dear Sir:

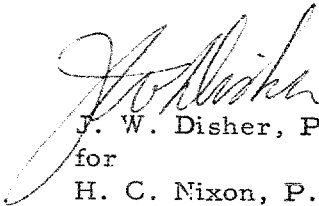
Re: W. P. 709-62 - Fifteen Mile Creek Bridge
Development Road P. E. 683 - District 4 - Hamilton

Enclosed are two copies of the site plan for the above noted structure, on which we have noted proposed locations of borings required for the above structure.

We would appreciate your early completion of these holes in order that we may design the structure. Completion of the design is scheduled for early fall. Mr. R. Schonfeld has the roadway soils investigation under way, and might assist you in locating the site.

Yours very truly,

C. C. Parker & Parsons, Brinckerhoff Limited



J. W. Disher, P. Eng.

for

H. C. Nixon, P. Eng.
Highway Department Manager

JWD:as

Enclosures

cc: Mr. F. Devisser

Bridge Office, D.H.O., Toronto

