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GEOCRES No. 30M5-107

DIST. 4 REGION Central

W.P. No. 125-66-18

CONT. No. 78-104

W. O. No. _____

STR. SITE No. 10-285

HWY. No. 403

LOCATION N/W Ramp Structure
over Ford Drive, QEW/403/
Ford Drive Interchange

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 3

REMARKS: documents to be unfolded
before microfilming

ENGINEERING MATERIALS OFFICE
SOIL MECHANICS SECTION

WP 125-66-18

DIST 4

HWY 403

STR SITE 10-285

N/W Ramp Structure over Ford Drive
QEW/403/Ford Drive Interchange

DISTRIBUTION

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J. Anderson) cover only
G. Sloan

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SAMPLE DISPOSITION NOTICE		
TYPE	DISCARD AFTER	RECOMM. BY
JARS	72 05 20	DDA
TUBES	—	—
ROCK CORES	Around 17 Cent.	DDA

FOUNDATION INVESTIGATION REPORT

For

N/W Ramp Structure over Ford Drive
QEW/403/Ford Drive Interchange
W.P. 125-66-18, Site 10-285
District 4, Hamilton

INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above mentioned project during the period of March 21, 1977 to March 23, 1977. The fieldwork consisted of 4 sampled boreholes advanced using solid stem augers and diamond drilling techniques. The boreholes ranged in depth from 30 to 31 feet below the ground surface. Bedrock was proven by obtaining up to 23 feet of BXL core in each borehole.

SITE DESCRIPTION AND GEOLOGY

The site is located just east of the QEW approximately 900 feet south of the existing QEW Underpass at Ford Drive in the Regional Municipality of Halton, Town of Oakville. The land immediately adjacent to the site slopes gently south to Joshuas Creek located some 500 feet to the south. The land is used for farming and light industry with some unproductive, tree covered land along Joshuas Creek.

Physiographically the site lies on the southern fringe in the region referred to as the South Slope. This region is a strip of land bounded by the Iroquois Plain on the south and the Peel Plain on the north and extends from the Niagara Escarpment to the Trent River. This region is characterized by a shallow till overlying shale of the Queenston and Dundas Formation of the Upper Ordovician age.

SUBSURFACE CONDITIONS

General

Generally, a 5 to 10 foot overburden consisting of clayey silt to silty clay was found immediately above the grey shale bedrock of the Dundas Formation. Detailed descriptions of the various soil and rock types encountered in each borehole are given in the Record of Borehole Sheets. The estimated stratigraphical profile and sections shown on Drawing # 1256618-A are based upon this information.

From ground level downwards, the various soil and rock types encountered are as follows:

Clayey Silt to Silty Clay, Trace of Sand

Immediately below the ground level or a thin 2 foot cover of topsoil, a 5 to 10 foot cohesive stratum consisting of clayey silt to silty clay with traces of sand was encountered. The cohesive stratum is brown in colour except in B.H.'s 5 and 7 where the lower 3 feet of the stratum is grey.

The physical properties of the cohesive deposit as determined by laboratory testing are as follows:

		<u>Range</u>	<u>Average</u>
Natural Moisture Content	(W) $\%$	9 - 21	15
Liquid Limit	(W _L) $\%$	28 - 38	34
Plastic Limit	(W _p) $\%$	16 - 22	19
Plasticity Index	(I _p) $\%$	12 - 18	15

The Atterberg Limits (see Plasticity Chart, Fig. #1) indicate that the cohesive stratum is inorganic and of low to intermediate plasticity.

Two typical grain size distribution curves from this stratum are shown on Fig. #2.

The Standard Penetration Test results generally ranged from 32 to 71 blows/ft. indicating a hard consistency. However, at isolated depths near the surface the 'N' values ranged from 16 to 22 blows/ft. indicating a very stiff consistency at these locations.

Bedrock - Shale

Underlying the cohesive deposit is bedrock which was explored to a maximum depth of 23 feet below the cohesive deposit. The bedrock is grey shale with intermittent layers of shaly limestone and limestone up to 18" thick. The upper 2 to 8 feet of the shale bedrock being moderately weathered. A detailed description of the bedrock is listed on the Record of Borehole Sheets.

The rock quality designation (RQD) classification gives an indication of the quality of the bedrock with respect to the number of fractures and amount of core pieces of 4 or more inches in length expressed as a percentage of the total length of core drilled. The RQD for the rock core varies from 0% to 70%, indicating a rock quality of very poor to fair. The low RQD values are due to the thin horizontal bedding of the fissile shale.

Groundwater

The groundwater level conditions were observed by measuring in the open boreholes after the completion of the investigation. The groundwater levels were found to vary between elevation 418.4 and 423.6 or 3 to 4 feet below the existing ground level. The groundwater levels are shown on the Record of Borehole Sheets as well as on Drawing #1256618-A.

DISCUSSION AND RECOMMENDATIONS

It is proposed to construct a new complex interchange connecting QEW to Hwy 403 Link and to a re-aligned Ford Drive. Two structures will be required to carry QEW detour traffic and ultimately Hwy. 403 W-N Ramp and N-W Ramp, over Ford Drive.

The proposed profile grade of the N-W Ramp at the structure location is about elevation 433 and on a 4% grade increasing to the north. The proposed profile grade of Ford Drive is to be at approximately elevation 407, therefore, requiring a 17 to 24 foot cut at the structure location. Present proposals for the N-W Ramp Structure over Ford Drive, call for a 99 foot single span, three lane bridge with closed type abutments.

Structure Foundations

The closed abutments for the proposed structure can be supported on spread footings located within the sound shale and may be designed for a maximum bearing pressure up to 10 tsf. A minimum earth cover of 4 feet should be provided to the underside of the footings, since the shale is considered susceptible to frost action. To prevent softening of the shale due to weathering at the footing grade, it should be covered with 3 inches of mass concrete immediately after the completion of the excavation.

No dewatering problems are anticipated for the construction of the abutment footings. Any minor seepage or surface runoff into the excavations can be handled by pumping from sumps.

Other Considerations

For estimating the earth pressure on the abutment walls a coefficient of active earth pressure of $K_a = 0.33$ may be used if some movement at the top of the wall is permitted. If no movement at the top of the wall is anticipated, a coefficient of earth pressure at rest $K_o = 0.5$ may be used for design purposes.

To estimate the horizontal resistance to sliding between rough concrete and the shale, a coefficient of friction of 0.55 may be used.

In order to relieve the build up of hydrostatic pressure behind the abutment walls the structure should be backfilled with free draining granular material and provided with weepholes or other types of drainage conduit.

Ford Drive

As mentioned previously, a cut of up to 24 feet deep will be required in the vicinity of the structure in order to reach the new grade of the proposed Ford Drive. This cut will be made through the cohesive stratum and into the shale bedrock. The shale is susceptible to weathering and erosion, therefore, the cuts should be treated as earth cuts and constructed with 2:1 slopes. It is further recommended that the cut slopes be covered with topsoil and sodded according to current MTC standards.

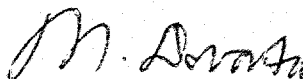
MISCELLANEOUS

The fieldwork for this investigation was carried out under the supervision of Mr. V. Korlu, Project Engineer and Mr. M. MacLean, Project Engineer. The equipment used was owned and operated by Atcost Ltd., Toronto, Ontario.

This report was written by Mr. C.T. Johnson, Project Engineer and reviewed by Mr. M. Devata, Supervising Engineer.



C.T. Johnson
Project Engineer



M. Devata, P. Eng.
Supervising Engineer

CTJ/MD/1f
May, 1977

FOUNDATION REQUEST

In a memorandum dated February 16, 1977, Mr. G.C.E. Burkhardt, Head, Structural Section requested the Soil Mechanics Section to prepare a Foundation Investigation Report for the N-W Ramp structure over Ford Drive.

FIELD AND LABORATORY INVESTIGATION PROCEDURES

A total of four boreholes each accompanied with a dynamic penetration test were put down using a muskeg mounted auger machine equipped with solid stem augers and rock coring equipment.

The locations and elevations of the boreholes were surveyed by personnel from the Central Regional Surveys and Plans Section.

Disturbed soil samples were received by means of a 2 inch O.D. split spoon sampler driven in accordance with the specifications of the Standard Penetration Test. Rock core of the bedrock was obtained by coring with BXL diamond bits.

The samples were visually examined and identified in the field and again in the laboratory. Following this examination, laboratory testing was carried out on selected representative samples of the cohesive stratum to determine the natural moisture content, Atterberg Limits and grain size distribution.

The rock core was examined and logged in detail in the laboratory by Mr. B.K. Glassford, Geologist.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 5

WP 125-66-18 LOCATION Co-ords N 15 803 726; E 953 841 ORIGINATED BY VK
DIST 4 HWY 403 BORING DATE March 22, 1977 COMPILED BY VK
DATUM Geodetic BOREHOLE TYPE Solid Stem Auger, BXL Core & Cone Test CHECKED BY PS

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100	w_p	w	w_L	
422.7	Ground Level														
0.0	Clayey Silt to Silty Clay, Trace of Sand Very Stiff Brown to Hard Grey		1	SS	16	420									
414.7			2	SS	37										
8.0	(Weathered)		3	SS	100	410									
411.7	(Sound)		4	BXL	100% REC										RQD 0%
11.0	Shale Bedrock * (See Below)		5	BXL	100% REC										RQD 0%
			6	BXL	100% REC	400									RQD 70%
			7	BXL	90% REC										RQD 20%
391.7															
31.0	End of Borehole *Intermittent thin beds of shale, shaly limestone & limestone (dark grey colour, fine texture, soft to hard, shale is fissile, thin horizontal bedding) with Limestone seams (light grey, fine texture, hard) from 14'4" to 15'4" 17'3" to 18'6" 21'0" to 21'9" 26'0" to 27'6"														

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 6

WP 125-66-18 LOCATION Co-ords N 15 803 824; E 953 833 ORIGINATED BY VK
DIST 4 HWY 403 BORING DATE March 21, 1977 COMPILED BY VK
DATUM Geodetic BOREHOLE TYPE Solid Stem Auger, BXL Core & Cone Test CHECKED BY AS

SOIL PROFILE			SAMPLES			GROUND WATER	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	VALUES		20	40	60	80	100	w_p	w	w_L	
428.5	Ground Level						SHEAR STRENGTH					WATER CONTENT %			
							O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE					10 20 30			GR SA SI C
0.0	Clayey Silt to Silty Clay, Trace of Sand Occ. cobbles		1	SS	37										
421.3	Hard, Brown		2	SS	113										
7.0	Shale Bedrock * (See below)		3	SS	100.5"	420									
414.0	(Weathered)		4	SS	136.7/11"										
14.5	(Sound)		5	BXL	100% REC	410									
			6	BXL	75% REC										
			7	BXL	100% REC										
			8	BXL	100% REC	400									
398.5	End of Borehole														RQD 15%
30.0	from														
	*Intermittent shale, shaly limestone and shale beds (soft to med. hard, fine texture, shale is fissile, thin horizontal bedding with Limestone seams (med. hard, fine texture, light grey colour, fossiliferous, shale seams present) 21'3" to 24'2" 26'3" to 27'5"														
	Note: Waterlevel not established														

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 7

WP 125-66-18 LOCATION Co-ords N 15 803 726; E 953 787 ORIGINATED BY VK
DIST 4 HWY 403 BORING DATE March 23, 1977 COMPILED BY VK
DATUM Geodetic BOREHOLE TYPE Solid Stem Auger, BXL Core & Cone Test CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w w_p — w — w_L WATER CONTENT % 10 20 30	UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100			
421.4	Ground Level					ELEV								
419.6	Topsoil					420								
1.8	Clayey Silt to Brown Silty Clay, Grey		1	SS	32									0 2 54 44
414.4	Trace of Sand		2	SS	133									
7.0	(Weathered)					410								
8.7	(Sound)		3	BXL	100% REC									
	Shale Bedrock * (See Below)		4	BXL	100% REC									RQD 10%
			5	BXL	100% REC	400								RQD 25%
			6	BXL	100% REC									RQD 35%
			7	BXL	100% REC									RQD 0%
			8	BXL	50% REC									RQD 0%
391.4			9	BXL	100% REC									RQD 0%
30.0	End of Borehole													
	* Intermittent shale, shaly limestone & shale beds (Soft to hard, fine texture, shale is fissile & grey to red grey colour, thin horizontal bedding) with Limestone seams (light grey, soft to hard, fine texture with shale seams present)													
from	9'3" to 9'8" 13'4" to 13'10" 18'4" to 18'8" 19'4" to 20'4" 23'4" to 24'7"													

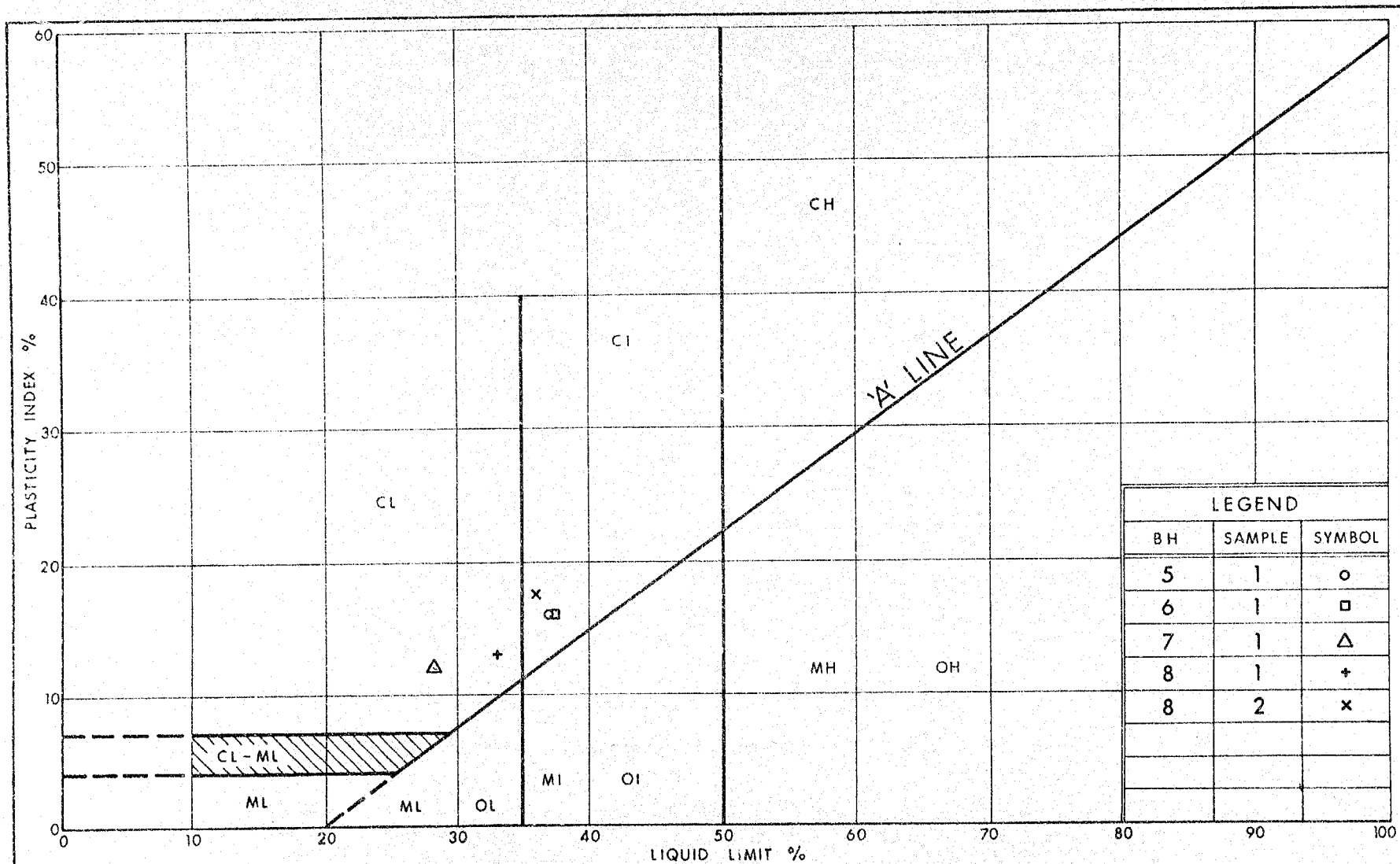
OFFICE REPORT ON SOIL EXPLORATION

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 8

WP 125-66-3 LOCATION Co-ords N 15 803 824, E 953 779 ORIGINATED BY VK
 DIST 4 HWY 403 BORING DATE March 23, 1977 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Solid Stem Auger, BXL Core & Cone Test CHECKED BY R.

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT W_L PLASTIC LIMIT W_P		UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100	WATER CONTENT W		
427.4	Ground Level													
0.0	Clayey Silt to Silty Clay, Trace of Sand		1	SS	21									
417.9	Very Stiff to Hard Brown occ. layers of grey		2	SS	71									0 1 70 29
9.5	Shale Bedrock *		3	SS	156	9"								
412.4	(See Below)		4	SS	150	7"								
15.0	(Weathered Sound)		5	BXL	100%									RQD 0%
			6	BXL	100% REC									RQD 12%
			7	BXL	100% REC									RQD 5%
396.4			8	BXL	100% REC									RQD 4 1/2%
31.0	End of Borehole													
	*Intermittent shale, shaly limestone & shale beds (soft to hard, fine texture, light grey to black colour, shale is fissile, thin horizontal bedding, limestone seams up to 3" thick) with Limestone seams (hard light grey colour, fine texture)													
from	24'8" to 25'6" 29'6" to 31'0"													



Ontario

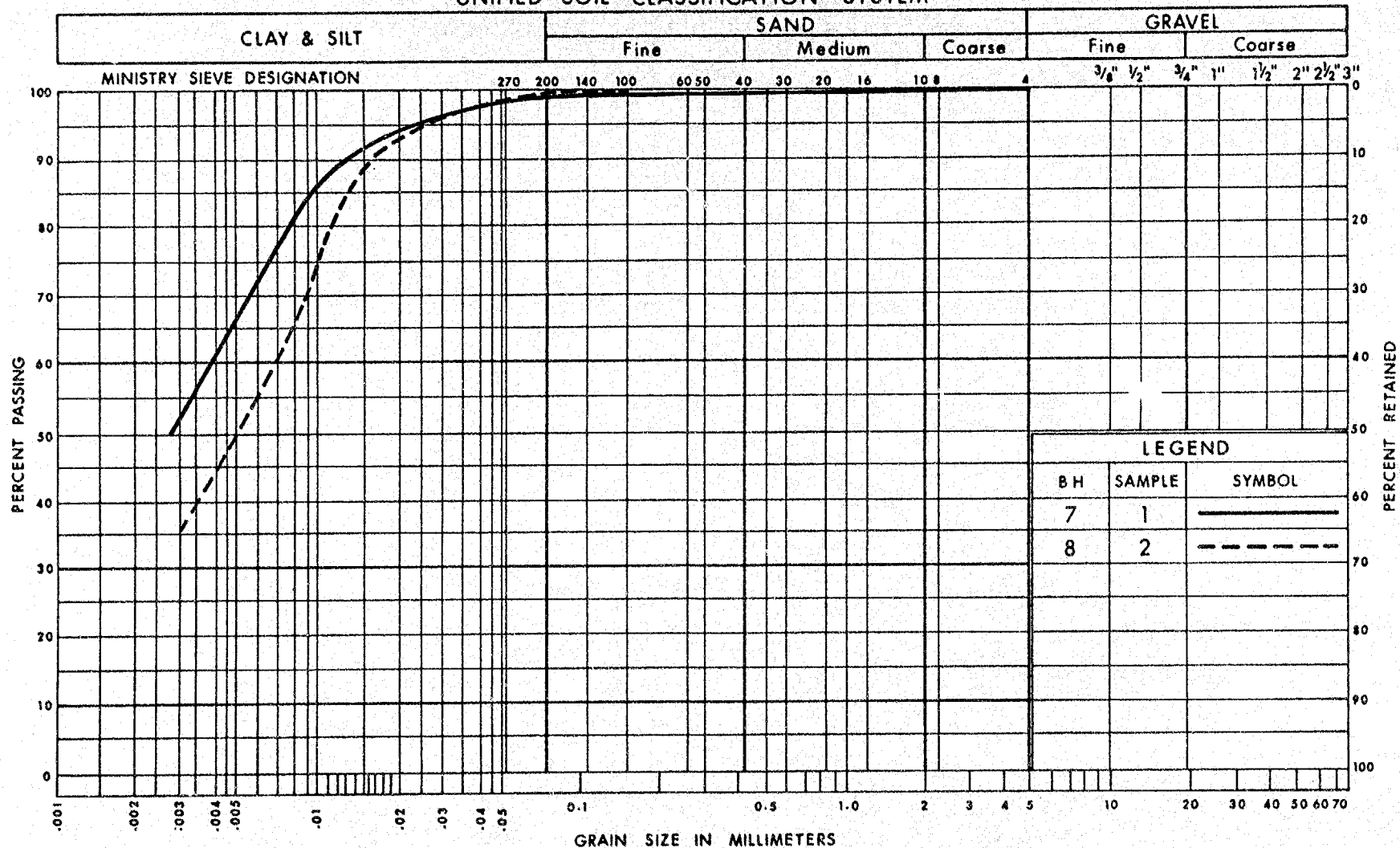
Ministry of
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PLASTICITY CHART CLAYEY SILT TO SILTY CLAY TRACE OF SAND

FIG No 1

W P 125-66-18

UNIFIED SOIL CLASSIFICATION SYSTEM



Ministry of
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Communications
Ontario
ENGINEERING SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
CLAYEY SILT TO SILTY CLAY
TRACE OF SAND

FIG No 2

W P 125-66-18

ABBREVIATIONS & SYMBOLS USED IN THIS REPORT

PENETRATION 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

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
$\bar{\sigma}$	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

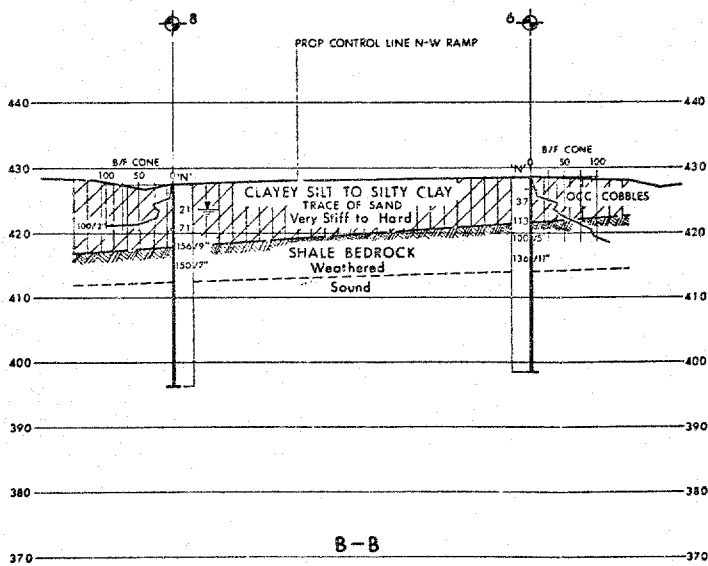
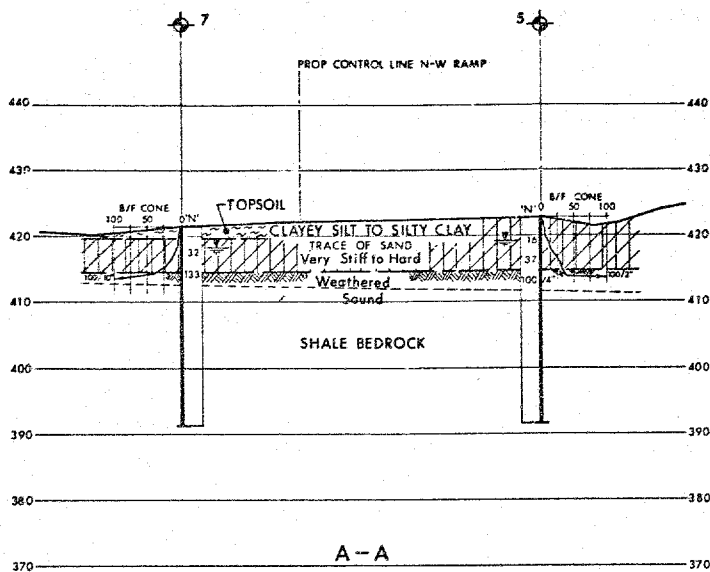
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

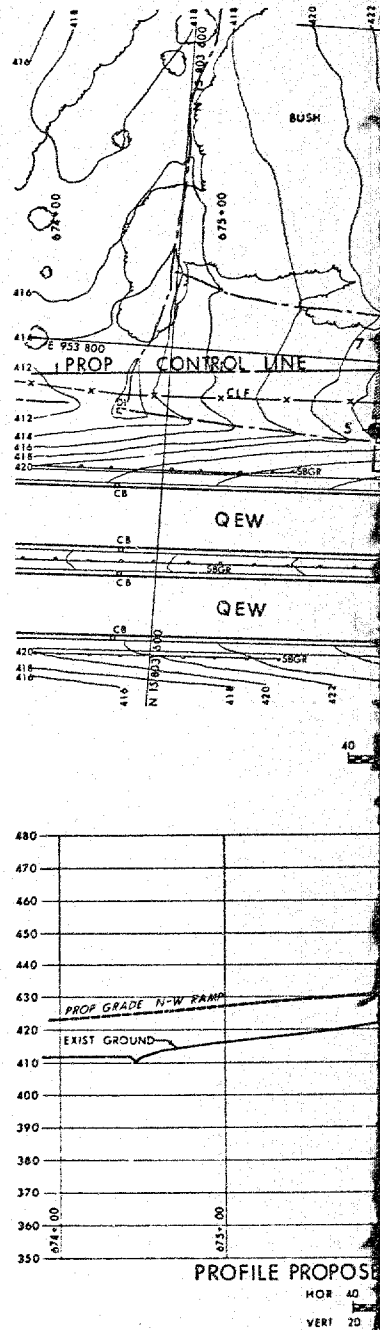
B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

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

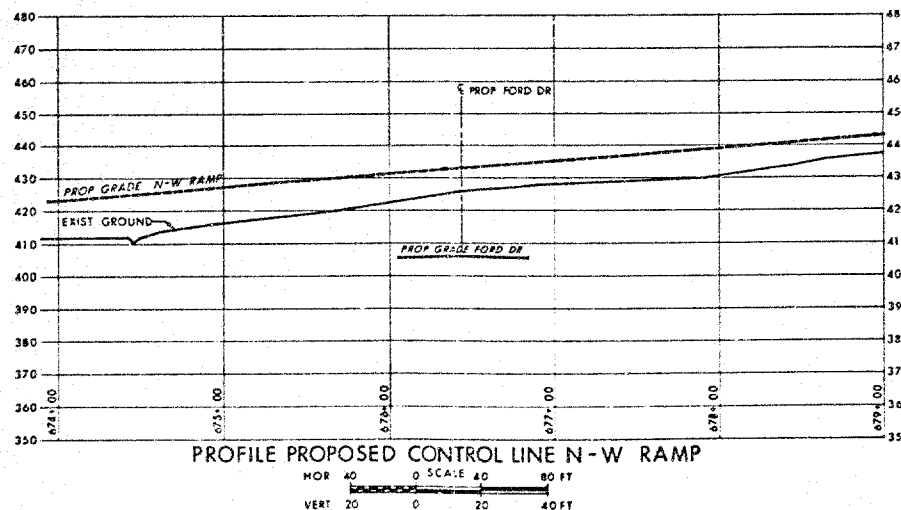
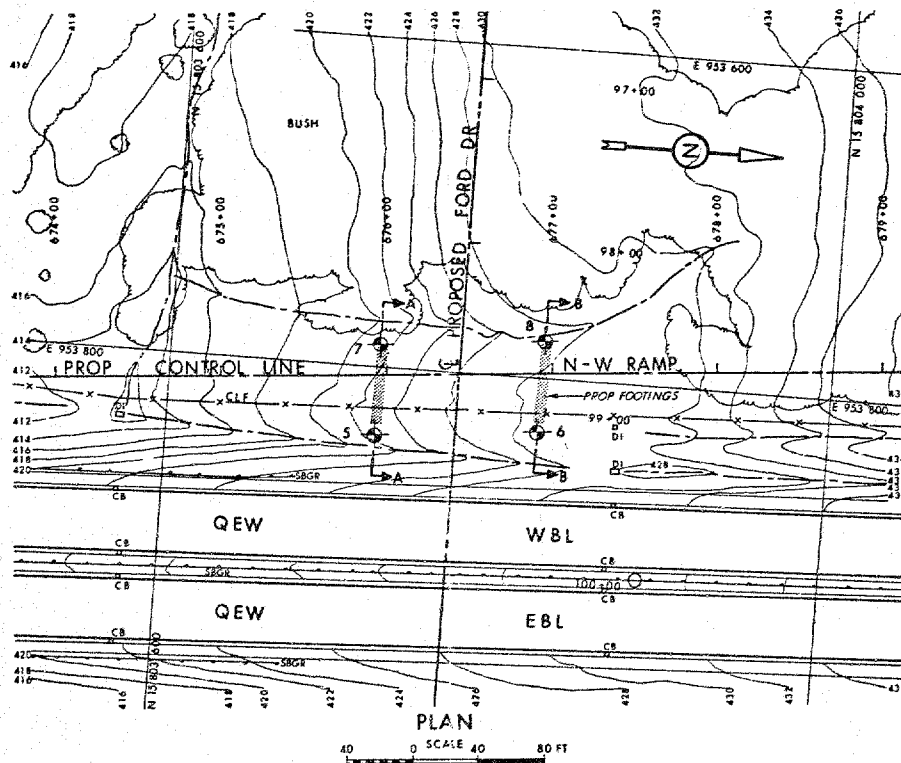


SECTIONS



PROFILE PROPOSE

HOR 40
VERT 20



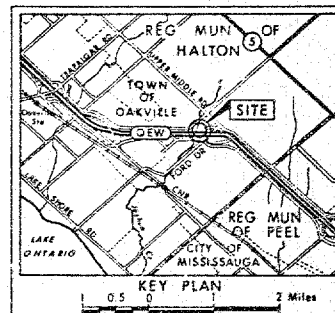
CONT No
WP No 125-66-18



PROPOSED FORD DRIVE

SHEET

BORE HOLE LOCATIONS & SOIL STRATA



LEGEND

- Bore Hole
- ⊕ Dynamic Cone Penetration Test (Cone)
- ⊕ Bore Hole & Cone
- "N" Blows/ft (Std Pen Test 350 ft lbs energy)
- CONE Blows/ft (50" Cone, 350 ft lbs energy)
- W/L at time of investigation March 1977
- W/L for B.H. No 6 not established

No	ELEVATION	CG-ORDINATES	
		NORTH	EAST
5	422.7	15 803 726	953 841
6	428.5	15 803 824	953 833
7	421.4	15 803 726	953 747
8	427.4	15 803 824	953 779

-NOTE-

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

REVISIONS	DATE	BY	DESCRIPTION

PLAN No 403 N-W RAMP DIST 4
S.M.C.T.J. CHECKED DATE May 11, 1977 SITE 10-285
DRAWN B.S. CHECKED DATE May 11, 1977 DWG 1256618-A

REF No B-82-QEW-2, Sept. 1976



Memorandum

To: Mr. C. Mirza
Head, Soil Mechanics Section
West Building

From: R.A. Jeffries
Structural Section
3501 Dufferin Street

Attention:

Date: February 16, 1977

Our File Ref.

In Reply to

Subject: Re: Q.E.W./403/Ford Drive Interchange
Site 24 W.P. 159-75-05
District 4

A new complex interchange connecting Q.E.W. to Highway 403 Link and to a re-aligned Ford Drive is presently scheduled for 1978. Due to the intricate staging that is required for this above-mentioned interchange and the adjacent and interconnected, Q.E.W./Winston Churchill Blvd. Interchange, the detour scheme necessary for the Q.E.W. traffic will require four structures to be constructed as an advance structure contract.

Also as part of this contract, additional structures (possibly twin cell box culverts) will be required to carry the Q.E.W. and associated ramps over Joshua Ck., possibly on a new alignment slightly north of the existing creekbed, this data will be submitted to your office when available.

Two structures will be required to carry Q.E.W. detour traffic, and ultimately Highway 403 W-N Ramp and N-W Ramp, over Ford Drive. Ford Drive will be relocated to the south and will be in cut, crossing under Q.E.W. At present single span structures, 3 lanes wide are proposed to carry Q.E.W. over Ford Dr.

A Third structure will be necessary to carry Highway 403 W-N Ramp over the North Service Rd.

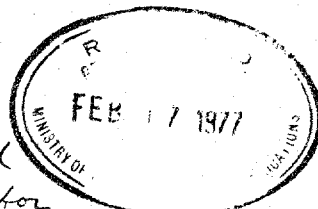
The fourth structure required to complete the detour staging will be Highway 403W-N Ramp over the E-N S Ramp.

Preliminary details of the proposed structure and roadway alignments are indicated on the enclosed plans.

These plans include:

Q.E.W./403/Ford Dr. Interchange sketch plan -- 1 copy
Ford Dr. Underpass at N-W Ramp --- 2 copies
Ford Dr. Underpass at W-N Ramp --- 2 copies
North Service Rd. Underpass at W-N Ramp and E-NS Ramp Underpass at W-N Ramp - 2 copies
Photographs

murty Please advise me when individual W.P.'s and site numbers are received for recording purposes. Also, please tell me if this should be recorded as 'one request or four' and whether you consider this to be adequate to justify field work.



To complete the interchange to the extent shown on the sketch plan (ultimately two addition ramps may be constructed) at least 6 more structures are to be constructed. The Foundation request for these bridges will be submitted at a later date as part of the main Q.E.W./403/Ford Dr. contract.

Could you please prepare a Foundation Investigate Report of sufficient scope to facilitate the design of the proposed structure for each of the four structures.

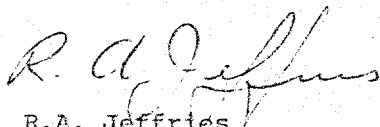
The current schedule calls for a complete Foundation Investigation for the first 4 structures, as follows:

first structure on April 20
second structure on May 4
third structure on May 18
fourth structure on June 1

Individual W.P.'s and Bridge Site No.s will be forwarded to your office as soon as they are assigned.

Should additional clarification and/or details be required, please do not hesitate to call this office.

RAJ:sg
attch:


R.A. Jeffries
Structural Supervisor
for:
G.C.E. Burkhardt
Head, Structural Section

c,c, W. Roters
J. Anderson
R. Fitzgibbon

DOCUMENT IDENTIFICATION

GEOCRES No. 30 H 5 - 107

DIST. 4 REGION CENTRAL

W.P. No. 125-66-78

CONT. No. 78-104

W. O. No. _____

STR. SITE No. 10-285

HWY. No. 403

LOCATION N/W Ramps STRUCTURE

OVER FORD DR. , NEW / 403 / FORD DRIVE

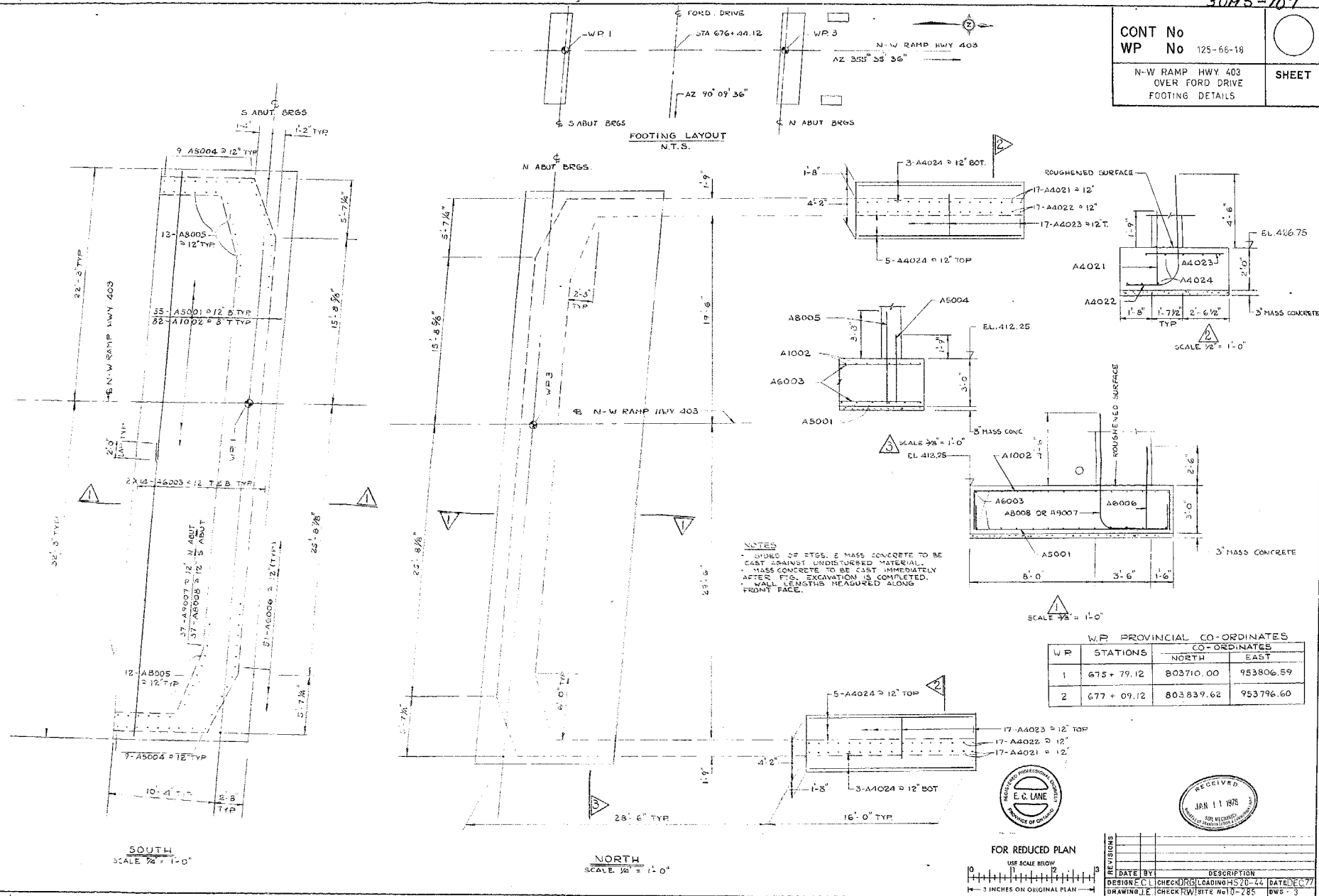
INTERCHANGE

CHECKED BY _____ DATE OF INSPECTION _____ THIS REPORT 3

REMARKS: _____

3045-107

CONT No	WP No
125-66-18	
N-W RAMP HWY 403 OVER FORD DRIVE FOOTING DETAILS	
SHEET	



3045-107

DIST. 4	
CONT No	
WP No	125-56-18
N-W RAMP HWY. 403 OVER FORD DRIVE GENERAL PLAN	
	SHEET

GENERAL NOTES

CLASS OF CONCRETE

DECK, BARRIER WALLS,
ABUTMENTS & WINDWALLS: 4000 P.S.I.
REMAINDER: 3000 P.S.I.

CONCRETE QUANTITIES

ABUTMENTS & WINDWALLS: *
DECK: *
BARRIER WALLS: *
APPROACH SLABS: *
SLOPE PAVING: *
RETAINING WALLS: *

CLEAR COVER TO REIN. STEEL

FOOTINGS & ABUTMENTS: 5"
DECK: 2" TOP, 1" BOTTOM
BARRIER WALLS: 1 1/2" EXCEPT AS NOTED
APPROACH SLABS: 2"

TO ACHIEVE THE MIN. CLEAR COVER OF 2"
SPECIFIED, THE TOP LAYER OF DECK STEEL
SHALL BE PLACED PRIOR TO CONCRETE
WITH A CLEAR COVER OF 2 1/2" ± 1/2"

REINFORCING STEEL GRADE 60

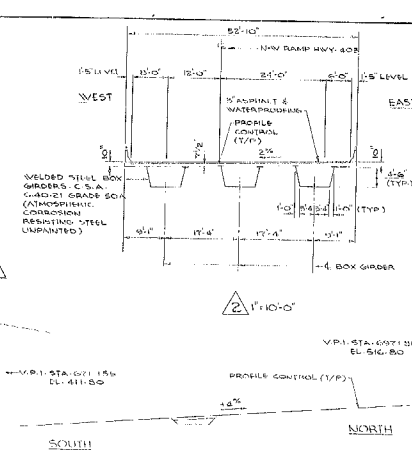
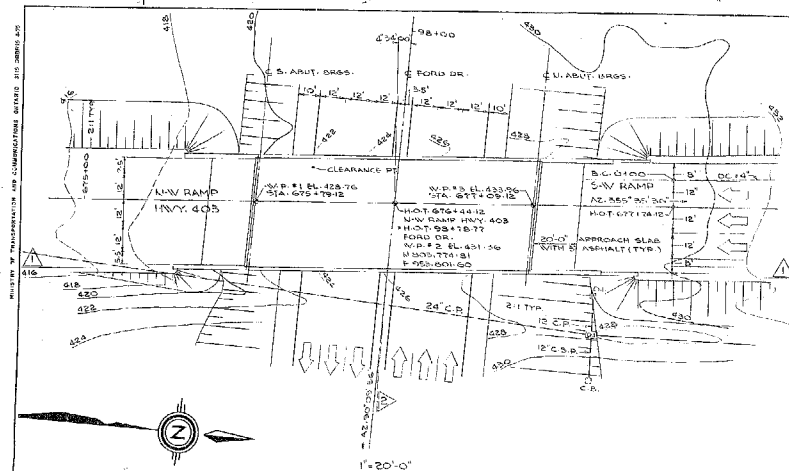
STRUCTURAL STEEL: 100 TON

CONSTRUCTION NOTES

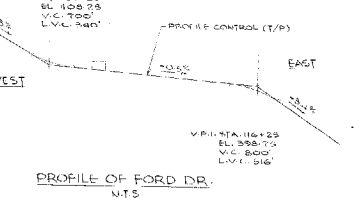
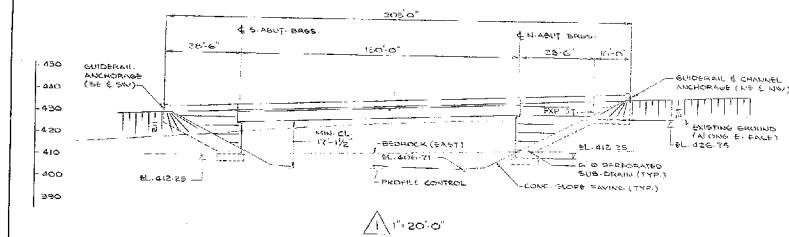
THE CONTRACTOR IS RESPONSIBLE FOR
FINISHING THE BEARING SLATS DEAD
LEVEL TO THE SPECIFIED ELEVATIONS WITH
A TOLERANCE OF ± 1/4".
NO CONCRETE SHALL BE PLACED ABOVE
THE ABUTMENT BEARING SLATS UNTIL
THE CONCRETE IN THE DECK HAS BEEN
PLACED.

LIST OF DRAWINGS

1. GENERAL PLAN
2. BORE HOLE LOCATIONS & SOIL STRATA
3. FOOTING DETAILS
4. SOUTH ABUTMENT
5. N. ABUTMENT & KIT. WALLS
6. STRUCTURAL STEEL
7. DECK REINFORCING
8. DECK LAYOUT & SKEED ELEVATIONS
9. BARRIER WALL
10. STEEL RAILINGS (SINGLE TUBE)
11. 20 FT. APPROACH SLAB
12. DETAILS OF CONC. SLOPE PAVING
13. STANDARD DETAILS I
14. STANDARD DETAILS II
15. STANDARD DETAILS III
16. AS CONSTRUCTED ELEV. & DIM.



PROFILE OF N-W RAMP HWY. 403
N.T.S.



PROFILE OF FORD DR.
N.T.S.

B.M. ELEV. 662.91
BENCHMARK IS LOCATED ON
TOP OF SW BOLT ON E.E. LEG
OF HYDRO TOWER 250 FT. N.
STA. 547+01 Q.E.V.



DATE BY	DESCRIPTION
DATE BY	DESCRIPTION
DATE BY	DESCRIPTION

