

DOCUMENT NO. DATE OF COLLECTION

GEOCRES No. 40516-574/E

DIST. 1 REGION SOUTHWESTERN

W.P. No. 2517-75-01 + 2518-75-01

CONT. No. 77-432

W. O. No. _____

STR. SITE No. _____

HWY. No. _____

LOCATION 2.4 mi E of LAMBTON

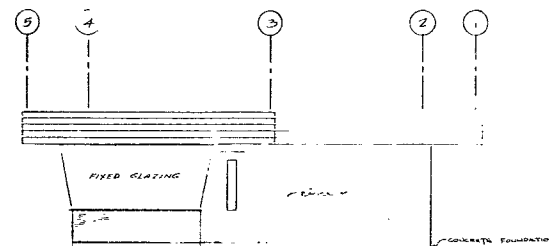
Co. RD. # 26

OVERHEAD SPREADSHEET TO BE INCLUDED WITH THE REPORT. /

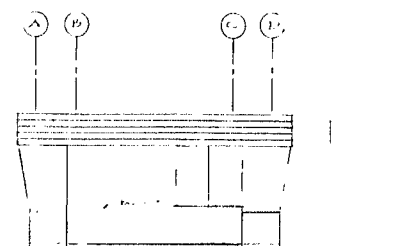
REMARKS: _____

40I16-57A/B

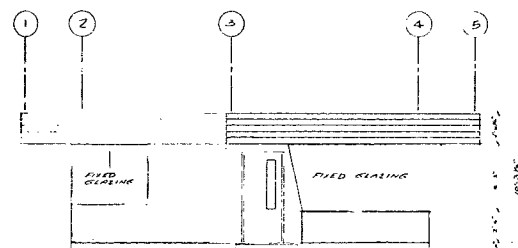
NOTES 55



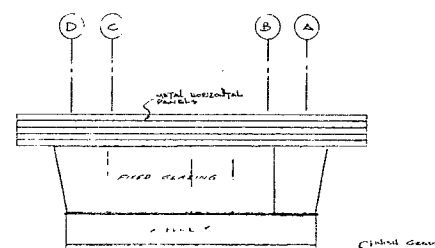
NORTH ELEV



WEST ELEV



SOUTH ELEV



EAST ELEV

BRICK - "GOLDEN BLEND" D918
TUCONTO BRICK CO.
FACIA - METRO BROWN OC 228
SUPPORT - BONE WHITE OC 213
GLAZING - SOLAR GRAY HYPERULITE
DOORS - AC-578 GLIDDEN
DOOR FRAMES - AC-578 GLIDDEN
ALUMINUM WINDOW FRAMING - STATNEY
BRONZE #42 (KAWNEER)
WINDOW SILL - AC-578 GLIDDEN
BASE - NATURAL CONCRETE



1 0 1 2 3 1 2 8
BAR SCALE

DATE		BY	FILE NO.
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO			
SPECIAL SERVICES OFFICE			
PROJECT NO.	STATION	DATE	BY
40I16-57A/B	ELEVATIONS T.15	7/2	
DESIGNED BY	CHECKED BY	DATE	BY
	CARVILLE	1	

ENGINEERING MATERIALS OFFICE
SOIL MECHANICS SECTION

WP 2517-75-01/02 DIST 1
2518-75-01/02

HWY 402 STR SITE N/A

Vehicle Inspection Stations
Located on Hwy. #402
2.4 Miles East of Lambton Co. Rd. #26

DISTRIBUTION

A.P. Watt (2)
J.R. Roy
A. Wittenberg
J.H. Blevins (2)

J.L. Keen
G.A. Wrong
B.J. Giroux
R.S. Pillar

R. Hore

A. Crowley }
J. Anderson } cover only
G. Sloan }
Files ✓

SAMPLE DISPOSITION NOTICE		
TYPE	DISCARD AFTER	RECOMM. BY
JARS	77-05-13	1245
TUBES	77-05-13	1248
ROCK CORES		

GEOCRE5 40J16-57

DATE MAY 13 1977

FOUNDATION INVESTIGATION REPORT

For

Vehicle Inspection Stations
Located on Hwy. #402
2.4 Miles East of Lambton Co. Rd. #26
W.P. 2517-75-01/02 (North Side)
W.P. 2518-75-01/02 (South Side)
District 1, Chatham

INTRODUCTION

This report details the results of our foundation investigation at the above mentioned vehicle inspection station sites. The field investigation was carried out during the period of March 29-April 1, 1977, utilizing a continuous flight auger machine equipped with 3¼ inch I.D. hollow stem augers mounted on a muskeg vehicle.

SITE DESCRIPTION

The sites are located along the near completed Hwy. #402 (on both sides) about 2.4 miles east of Lambton County Road #26.

The area adjacent to the sites is flat and bush covered.

Physiographically, the site is located in the region referred to as the St. Clair Clay Plain.

SUBSURFACE CONDITIONS

General

Generally, uniform subsoil conditions were found to prevail over both site locations. The subsoil consists of a deep deposit (about 117') of cohesive soil with some sand and traces of gravel. Refusal to conventional boring methods was reached at elevation 547±. This level is assumed to be the upper surface of the bedrock.

The results of the field and laboratory tests carried out within the overburden are plotted on the Record of Borehole Sheets attached to the Appendix.

Clayey Silt, Some Sand, Trace of Gravel

The deposit was intersected at both boring locations and extends from immediately below the topsoil to a depth of about 117± feet. At this level, refusal to wash-boring methods was reached.

The material in the deposit consists of clayey silt, some sand, trace of gravel and occasional silty clay layers. A plot of plasticity index versus liquid limit (Fig. 1) shows most of the points to fall within the CL zone. Physical properties of the deposit as determined from laboratory tests are as follows:

	<u>Range</u>
Natural Moisture Content (W) %	14 - 19
Liquid Limit (W_L) %	28 - 33
Plastic Limit (W_p) %	14 - 19
Bulk Density (γ) PCF	125 - 136

Grain size distribution curves are shown in an envelope form and are included in the Appendix of this report (Fig. 2).

Although there are, in general, only minor variations in soil properties with depth, the undrained shear strength shows a somewhat considerable variation. The extreme upper 5-6 foot portion of the stratum has been affected by frost penetration, surface run-off water and the presence of vegetation roots to the extent that the undrained shear strength is much lower than the underlying material. The consistency of this zone may be described as firm to stiff, the shear strength being in the order of 600 PSF.

A highly overconsolidated stratum of about 10 feet in thickness follows the above mentioned zone. The colour is brown due to oxidation and has a hard consistency: 'N' values varied between 30-49 blows per foot. Based on the standard penetration test results only, the undrained shear strength of this desiccated zone is estimated to range from about 3500 PSF to 8000 PSF.

Below the desiccated layer the colour of the soil gradually changes to grey and the consistency ranges randomly from stiff to hard.

Shear strength measurements (field and laboratory) carried out within the overall stratum yielded to the following results:

	<u>Range</u>
Field Vane Test (PSF)	1760 - 2000
Unconfined Compression Test (PSF)	2260 - 5460

As mentioned above, refusal to conventional boring methods was reached at elevation 547±. Based on previous boring experiences carried out approximately 1 mile east of this location, the refusal level can be considered as the upper surface of black shale type bedrock.

Groundwater Conditions

During the drilling operations, frequent checks were made to detect any water bearing zones, but no groundwater was encountered. The absence of groundwater within the depth of the present drilling operations is also confirmed by the 'Groundwater Bulletin #6' (issued by Ontario Water Resources Commission - 1968). According to this bulletin, most of the holes drilled for wells in the same general area were found to be dry or produced some water below depths of over 100 feet. Information obtained from local sources indicates that the water wells in this area are about 140 feet (20-25 feet into bedrock) deep. In general, the volume of water in these wells is low.

DISCUSSION AND RECOMMENDATIONS

Vehicle inspections stations (north and south of Hwy. #402) are proposed at this location. Each of the stations will consist of a scale pit, an adjoining building, together with the necessary ramps and parking areas.

The platforms of the scales will be at elevation 669.5 and elevation 668.8 on the north and south sides of Hwy. #402 respectively. The depth of the scale pits is about 6 feet (elev. 663±).

As described above, the subsoil at the proposed inspection station locations consists of a deep deposit of clayey silt, some sand, trace of gravel and occasional silty clay layers. Apart from the extreme upper portion (about 5 feet) the consistency may be classified as stiff to hard. It is pointed out by the designer that the tolerable differential settlements between the buildings and scales should not exceed 1 inch.

In view of these facts, it is recommended that the buildings and scales be supported on spread footings placed within the hard desiccated zone of the subsoil between elevation 660± and elevation 650±. A safe net pressure of 2.5 TSF may be assumed for design purposes. Using this design load it is estimated that the maximum settlement under footing loadings will not exceed 1 inch. The desiccated zone is susceptible to softening on contact with water, therefore, it is recommended that the base of the footing excavations be protected by a concrete working slab, immediately on exposure. All foundations should be protected against frost action by at least 4 feet of earth cover.

No dewatering problems are anticipated. The topsoil and the surficial zone of the subsoil which contains organic substances should be removed in accordance with the pertinent standards within the construction area.

MISCELLANEOUS

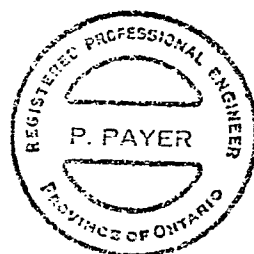
The equipment used for the field investigation was owned and operated by Master Soil Investigation Ltd. The fieldwork was supervised by Mr. P. Payer, who also prepared this report.

P. Payer

P. Payer, P. Eng.
Senior Engineer

K.G. Selby

K.G. Selby, P. Eng.
Supervising Engineer



HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

WP	2518-75-02	LOCATION	Sta. 157+42; 100' RT (E of E.B.L.)	ORIGINATED BY	PP
DIST	1 HWY 402	BORING DATE	March 29 -30, 1977	COMPILED BY	PP
DATUM	Geodetic	BOREHOLE TYPE	Cont. Flight Auger & Washbore	CHECKED BY	

$$\begin{array}{r} 559.8 \\ 105.0 \end{array}$$

Continued

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 1 Continued

WP 2518-75-02 LOCATION Sta. 157+42 100' RT (C of E.B.L.) ORIGINATED BY PP
 DIST 1 HWY 402 BORING DATE March 29-30, 1977 COMPILED BY PP
 DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger & Washbore CHECKED BY _____

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 P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		20	40	60	80	100	w_p	w	w_L		
559.8															
105.0					550										
547.4															
117.4	Refusal Probable Bedrock End of Borehole				540										

20
15
10
5
0 % STRAIN AT FAILURE

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

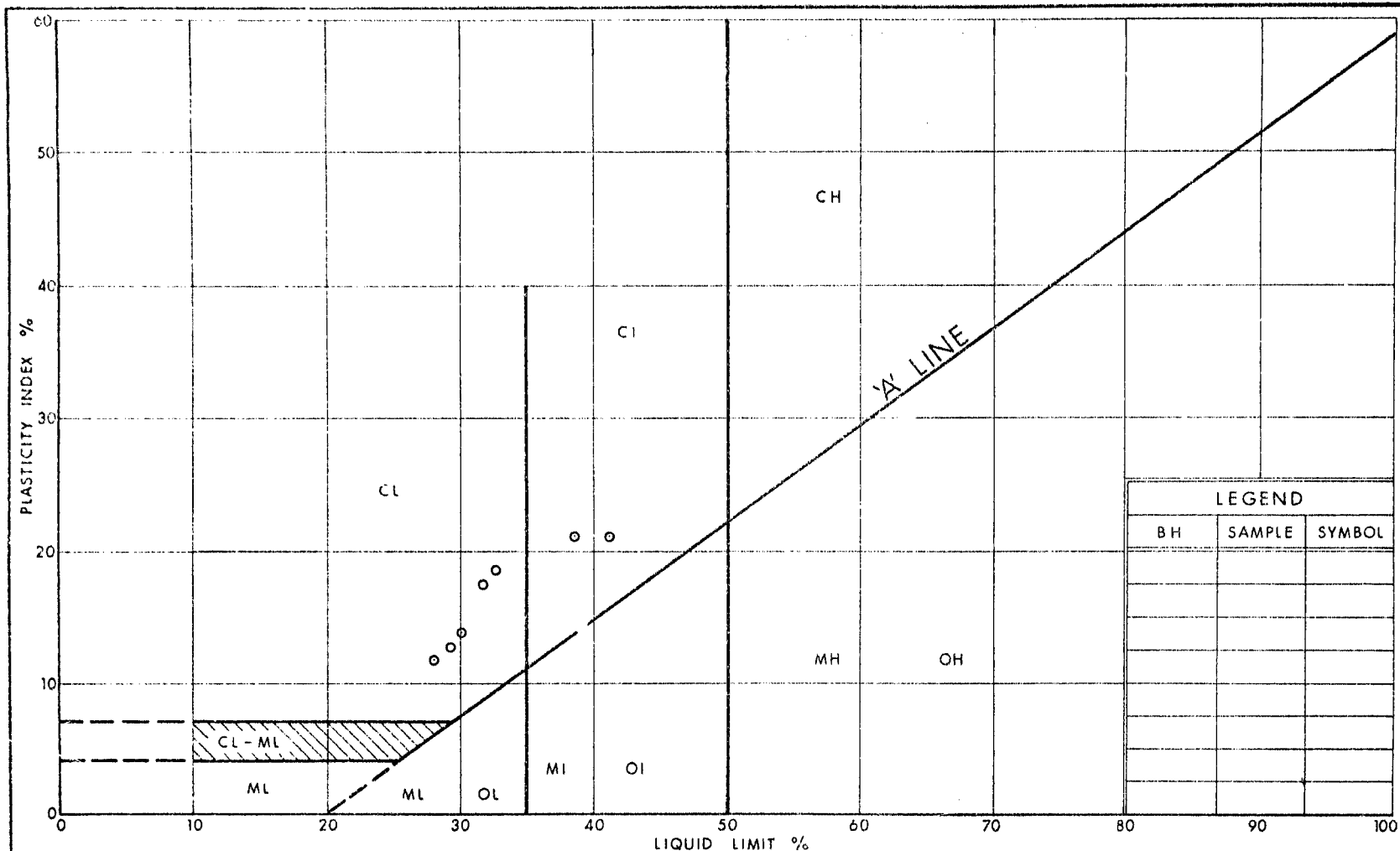
HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 2

WP 2517-75-02 LOCATION Sta. 160+36; 195' LT (E of W.B.L.) ORIGINATED BY PP
 DIST 1 HWY 402 BORING DATE March 31 - April 1, 1977 COMPILED BY PP
 DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger CHECKED BY S.J.

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. PLT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L	
665.0	Ground Level														
0.0	Some Organics		1	SS	17	Borehole Dry									
			2	SS	39										
			3	SS	35										
			4	SS	30										
			5	SS	30										
	Clayey Silt		6	TW	PH										
	Some Sand		7	SS	28										
	Trace of Gravel		8	SS	22										
	Very Stiff to Hard		9	SS	22										
			10	TW	PH										
			11	SS	23										
			12	SS	21										
			13	SS	16										
			14	TW	PH										
592.5			15	TW	PH										
71.5	End of Borehole		16	TW	PH										
						590									

OFFICE REPORT ON SOIL EXPLORATION



Ontario

Ministry of
Transportation and
Communications

PLASTICITY CHART
CLAYEY SILT
SOME SAND TRACE OF GRAVEL

FIG No 1

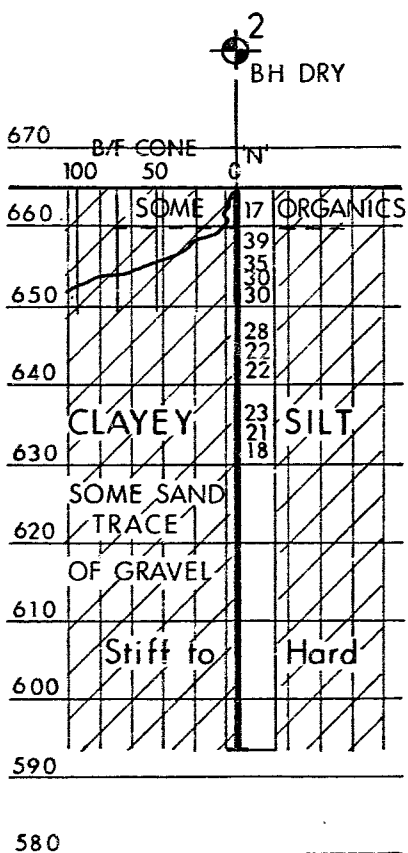
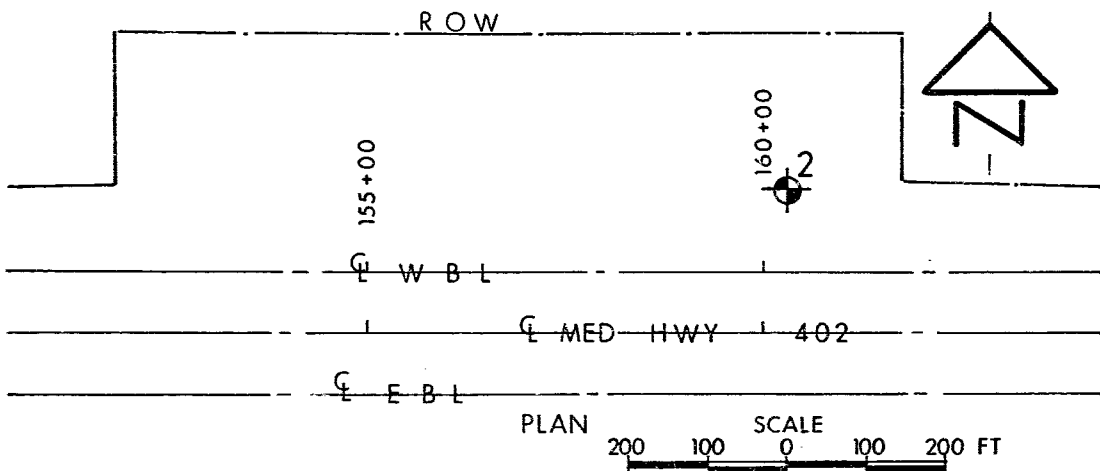
W P 2517-75-01/02

2518-75-01/02

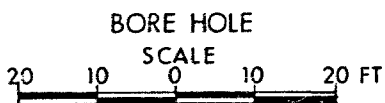
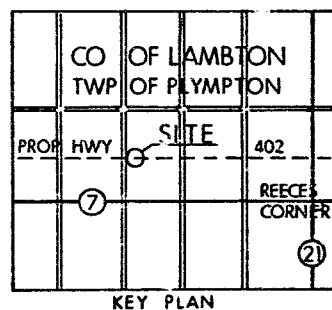


GRAIN SIZE DISTRIBUTION
CLAYEY SILT
SOME SAND TRACES OF GRAVEL (OCC SILTY CLAY LAYERS)

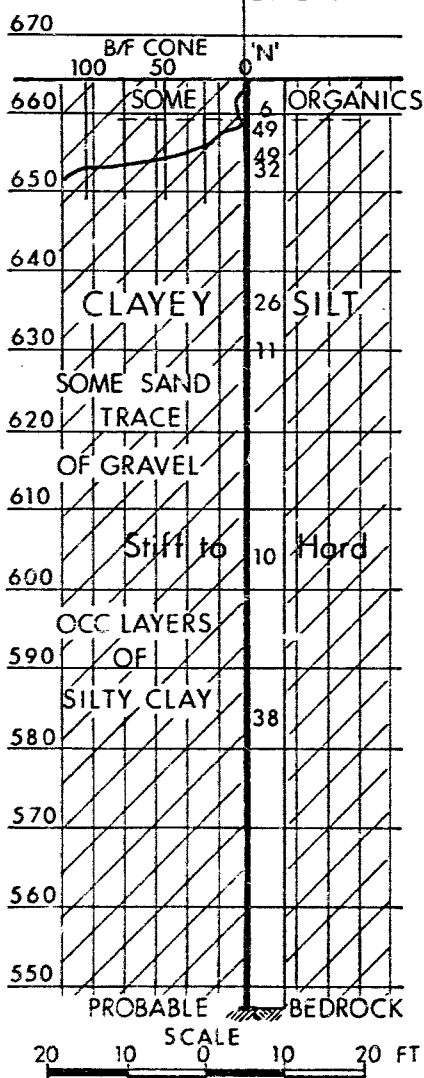
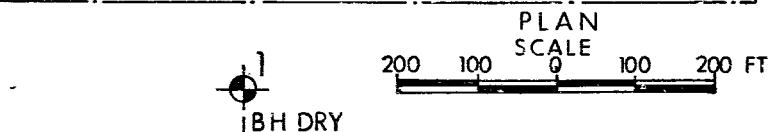
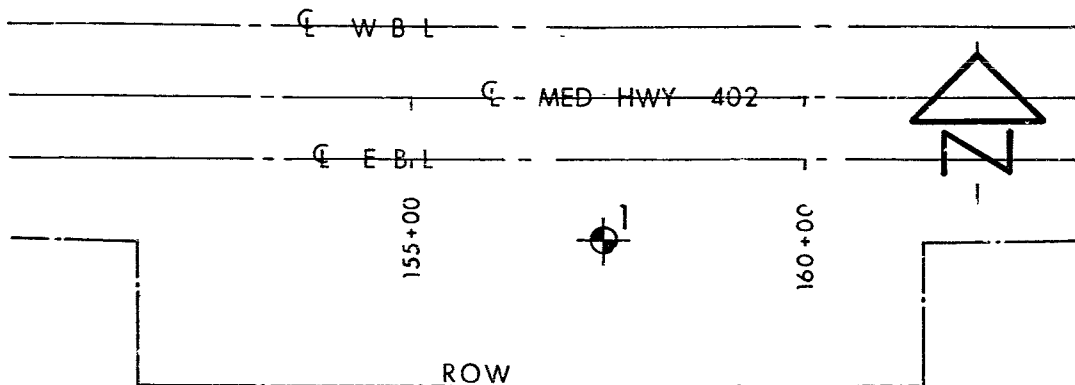
2518-75-01/02



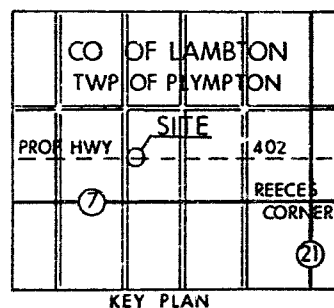
BH	ELEV	STA	OFFSET
2	665.0	160+36	105' LT WBL



VEHICLE INSPECTION STATION
NORTH SIDE OF HWY 402



BH	ELEV	STA	OFFSET
1	664.8	157+42	100' RT EBL



VEHICLE INSPECTION STATION
SOUTH SIDE OF HWY 402

W P 2518-75-01/02



Memorandum

To: Mr. K.G. Selby, Supervising Eng.
Soils Mechanics Section,
West Building, Downsview, Ontario

From: A.P. Watt,
Regional Structural Planning Engineer,
Structural Office, Southwestern Region,
London, Ontario.

Attention:

Date: February 9, 1977.

Our File Ref.

In Reply to

Subject: W.P. 2517-75-01 SD, CB.P
Vehicle Inspection Station
Located on the North Side of Hwy 402
3.0 miles east of Cty Rd 26
W.P. 2517-75-02 Building

#2

W.P. 2518-75-01, CD, CB, &P
Vehicle Inspection Station
Located on the South Side of Hwy 402
3.0 miles east of Cty Rd 26
Hwy 402
District 1, Chatham
W.P. 2518-75-02 Building

#1

Could you kindly have a foundation investigation conducted at the above two locations for Vehicle Inspection Stations.

To aid you in the investigation I have enclosed the tentative Standard Layout for Vehicle Inspection Station Type 1 along with a sample of the Oakville - Vehicle Inspection Station contract drawings 55 to 69.

For the layout of the Vehicle Inspection Station I have enclosed two copies of the Contract Drawings sheet 11, 12 & 13 and two copies of the Chatham District Layout for the Site. You will note that the Vehicle Inspection Station W.P. 2517-75-02 Building located on the North Side of Hwy 402 is at Station 160+4 and the Vehicle Inspection Station W.P. 2518-75-02 Building located on the South Side of Hwy 402 is at Station 157+47.

The Stations given for the buildings locate the scale in the building and the centre line of the Scale Pit.

Mr. B. Feder, Structural Procedures Section, Structural Office, would like to know the bearing value of the soil and the differential settlement predictions in the order of 1/2 inch to 1 inch for the building and scale pit areas.

For the location of the buildings in the field please contact Mr. Roy Summers, Construction Supervisor, Chatham District Office, Telephone Number 512-354-1200. Permission to enter the property was obtained for the Geotechnical Section, Southwestern Region previously.

Please advise me when this investigation can be carried out.

A.P. Watt
A.P. Watt,
Regional Structural Planning Engineer,

C.C. D. Summers
D. Lodge
D. Walton
R. Collins

J. Forster
J. Anderson
A. Crowley
B. McCune





Memorandum

To: Mr. K.G. Selby, Supervising Eng. From: A.P. Watt,
Soils Mechanics Section, Regional Structural Planning Engineer,
West Building, Downsview, Ontario Structural Office, Southwestern Region,
London, Ontario.

Attention: Date: February 9, 1977.

Our File Ref. In Reply to

Subject: W.P. 2517-75-01 GD, GB, P
Vehicle Inspection Station
Located on the North Side of Hwy 402
3.0 miles east of Cty Rd 26
W.P. 2517-75-02 Building .

W.P. 2518-75-01, GD, GB, & P
Vehicle Inspection Station
Located on the South Side of Hwy 402
3.0 miles east of Cty Rd 26
Hwy 402
District 1, Chatham
W.P. 2518-75-02 Building

Would you kindly have a foundation investigation conducted at the above two locations for Vehicle Inspection Stations.

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For the layout of the Vehicle Inspection Station I have enclosed two copies of the Contract Drawing's sheet 11, 12 & 13 and two copies of the Chatham District Layout for the Site. You will note that the Vehicle Inspection Station W.P. 2517-75-02 Building located on the North Side of Hwy 402 is at Station 160+36 and the Vehicle Inspection Station W.P. 2518-75-02 Building located on the South Side of Hwy 402 is at Station 157+42.

The Stations given for the buildings locate the scale in the building and the centre line of the Scale Pit.

Mr. D. Meder, Structural Procedures Section, Structural Office, would like to know the bearing value of the soil and the differential settlement predictions in the order of 1/2 inch to 1 inch for the building and scale pit areas.

For the location of the buildings in the field please contact Mr. Bev Summers, Construction Supervisor, Chatham District Office, Telephone Number 519-354-1400. Permission to enter the property was obtained for the Geotechnical Section, Southwestern Region previously.

Please advise me when this investigation can be carried out

A.P. Watt
A.P. Watt,
Regional Structural Planning Engineer,

c.c. B. Summers ✓
M. Dodge ✓
D. Walton ✓
R. Collins ✓

J. Forster ✓
J. Anderson ✓
A. Crowley ✓
D. McCune ✓

