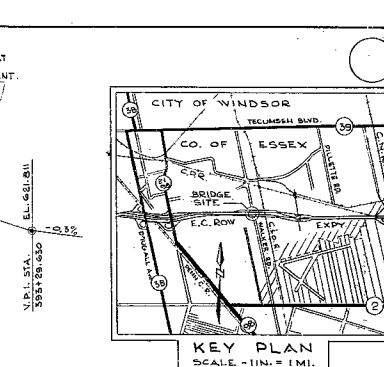
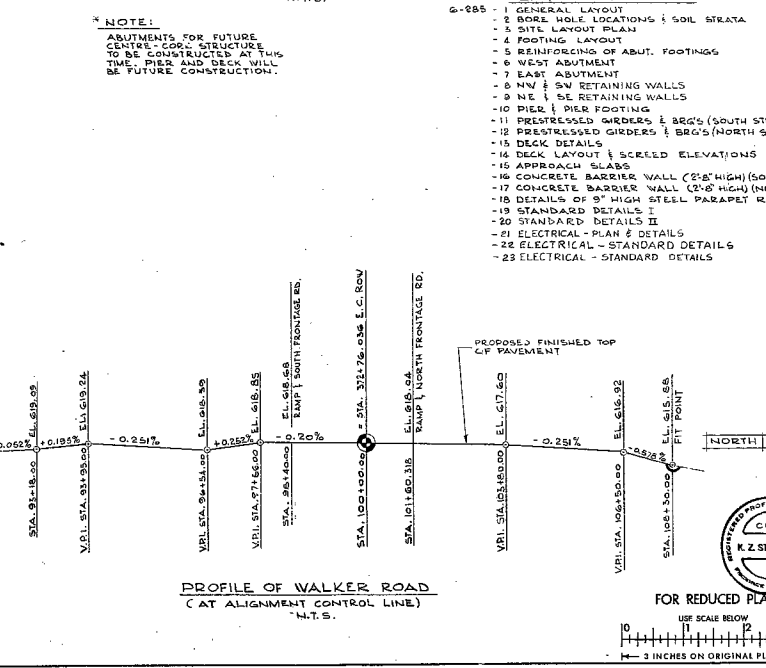
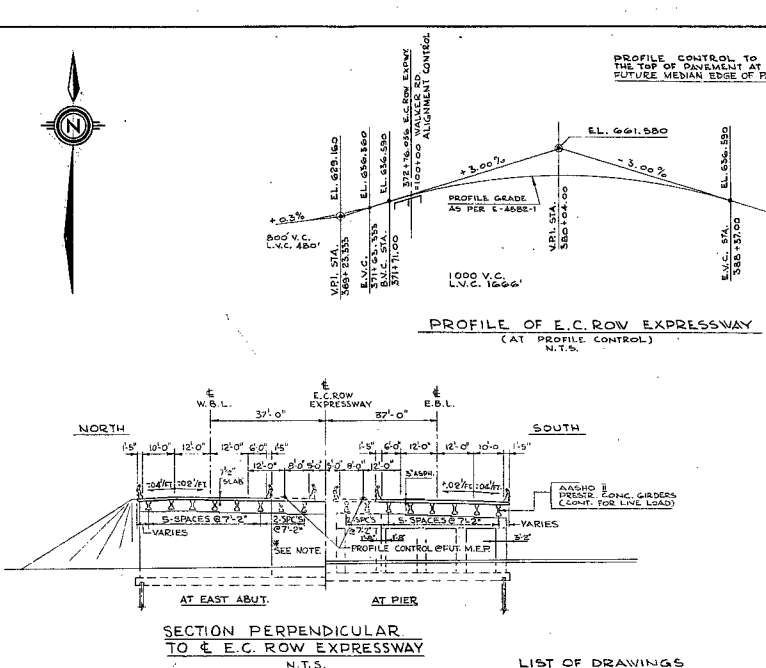
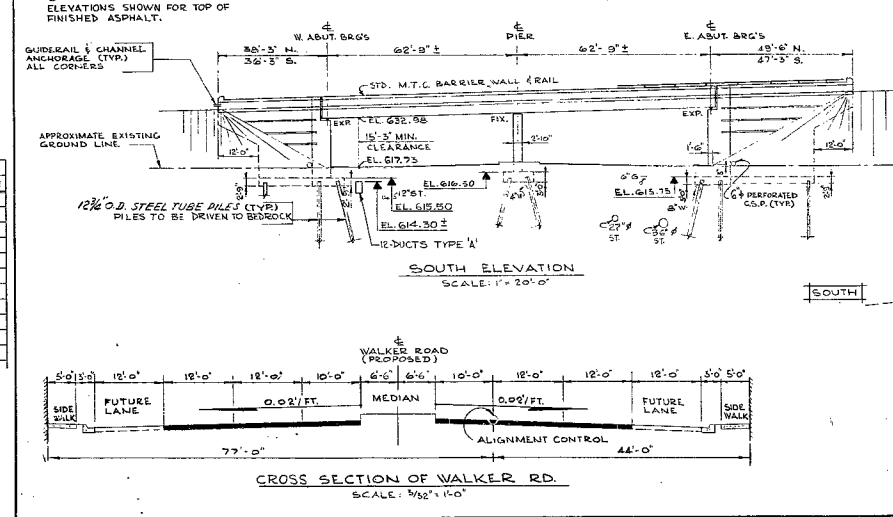
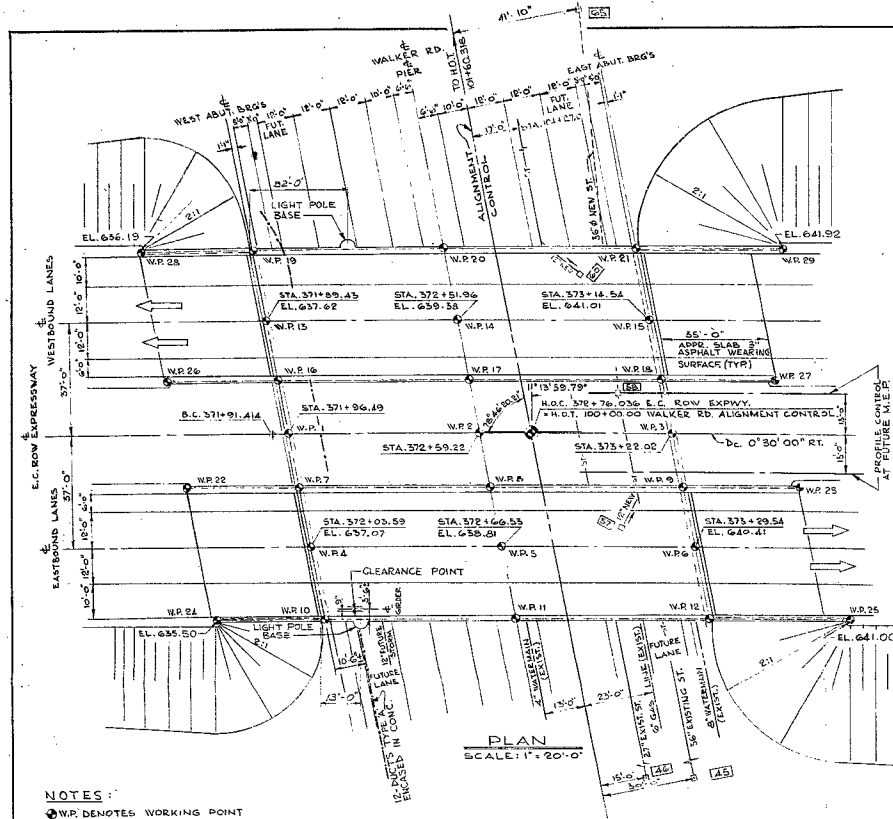


DOCUMENT VERIFICATION & CORRECTION

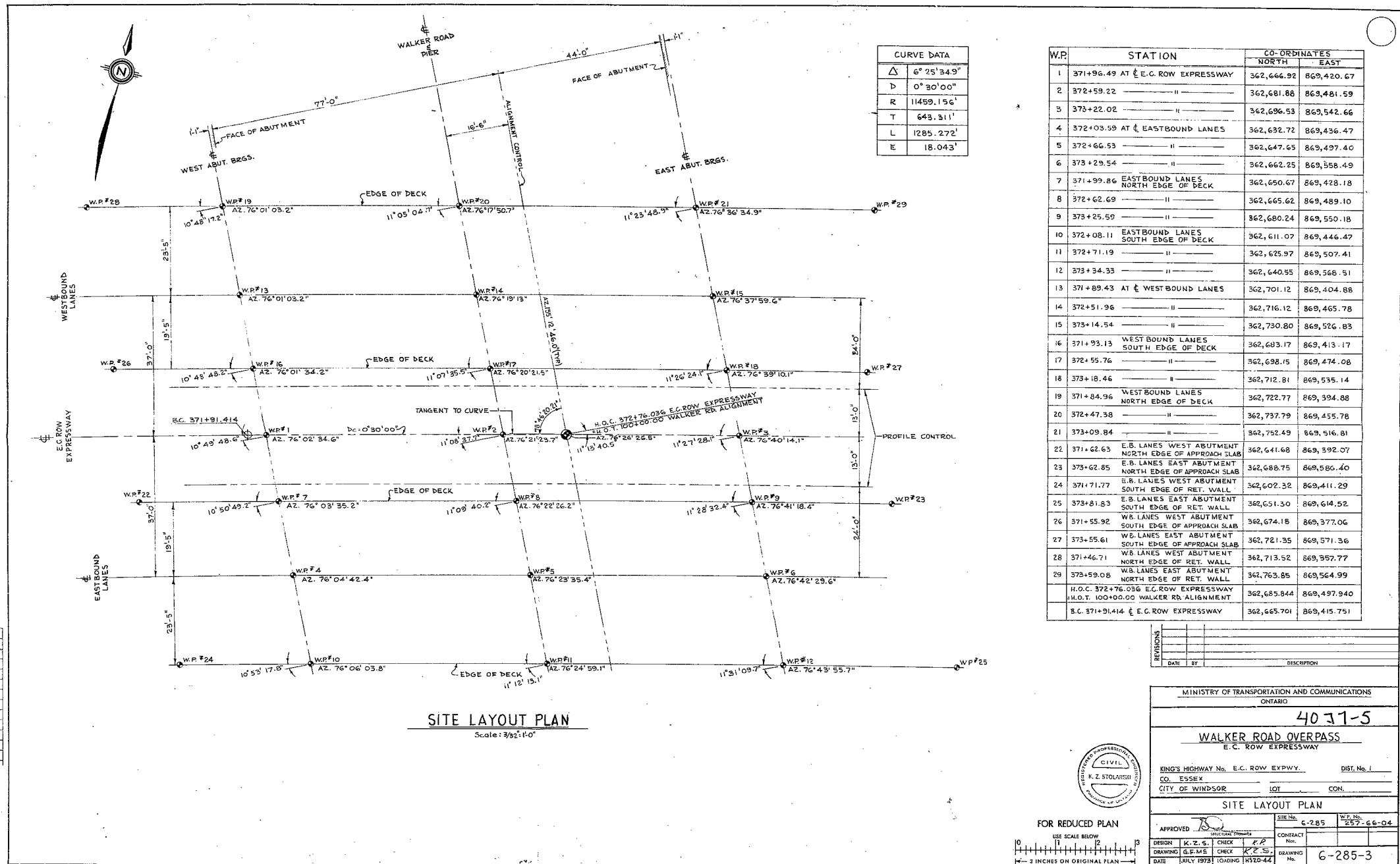
GEOCRES No. 40J7-5  
DIST. 1 REGION SOUTHWESTERN  
W.P. No. 77-43  
CONT. No. \_\_\_\_\_  
W. O. No. \_\_\_\_\_  
STR. SITE No. 6-285  
HWY. No. \_\_\_\_\_  
LOCATION E.C. ROW EXPRESSWAY  
AND WALKER RD. CROSSING  
\_\_\_\_\_  
OVERLAY DRAWING TO BE RELETED AND THE TOPT. 3  
REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

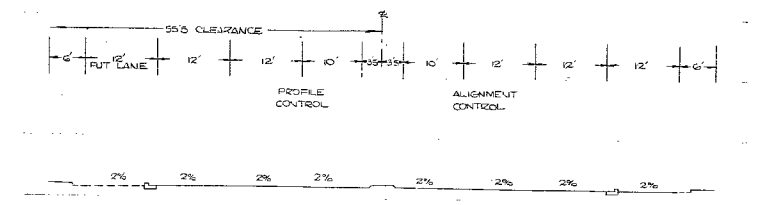
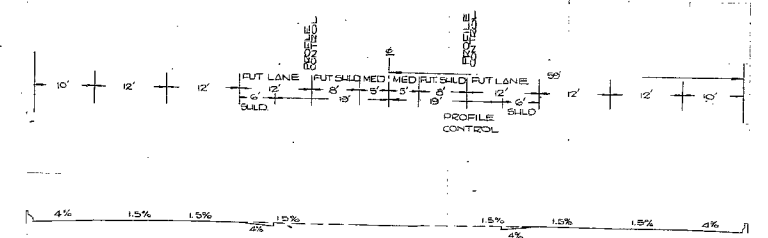
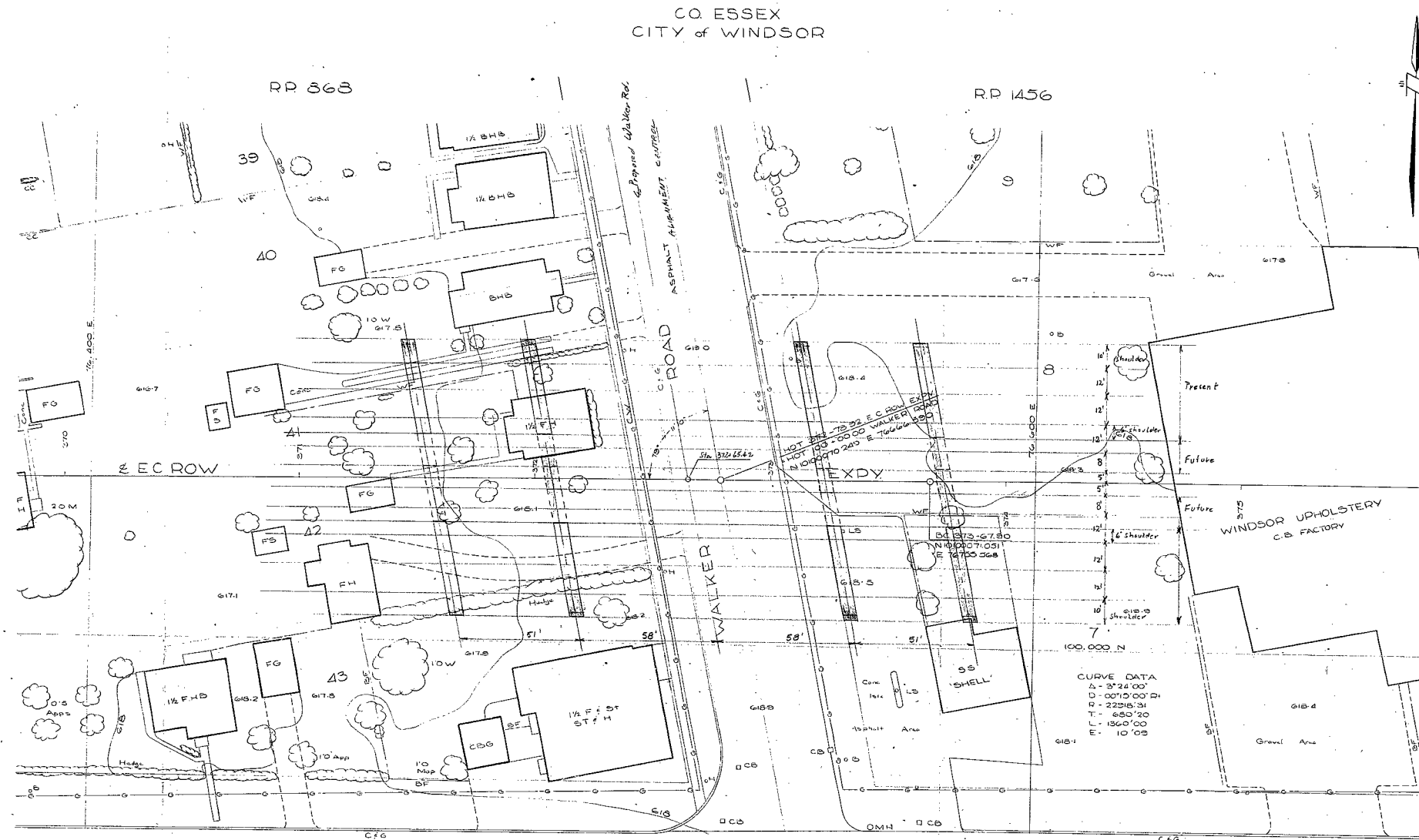


- GENERAL NOTES:**
- CLASS OF CONCRETE**  
 PRECAST MEMBERS 4000 P.S.I.  
 DECK SLAB, DIAPHRAGMS & CURBS 4000 P.S.I.  
 CONCRETE BARRIER WALLS 4000 P.S.I.  
 PIER 4000 P.S.I.  
 APPROACH SLABS 4000 P.S.I.  
 REMAINDER 3000 P.S.I.
  - CLEAR COVER ON REINFORCING STEEL**  
 FOOTINGS & ABUTMENTS 3 1/2"  
 DECK SLAB TOP 1 1/2"  
 CONCRETE BARRIER WALLS 1 1/2"  
 APPROACH SLABS 2"  
 AND/OR AS NOTED ON DRAWINGS.
  - CONSTRUCTION NOTES**  
 THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF 1/8".  
 NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED.
  - CONCRETE QUANTITIES**  
 CONCRETE QUANTITIES ARE LISTED BELOW FOR THE APPROPRIATE CONCRETE LUMP SUM TENDER ITEMS:  
 1. CONCRETE IN PIERS, ABUTS AND RETG. WALLS - 881 cu. yd.  
 2. CONCRETE IN DECK AND DIAPHRAGMS - 289 cu. yd.  
 3. CONCRETE IN BARRIER WALLS - 71 cu. yd.  
 4. CONCRETE IN APPROACH SLABS - 234 cu. yd.

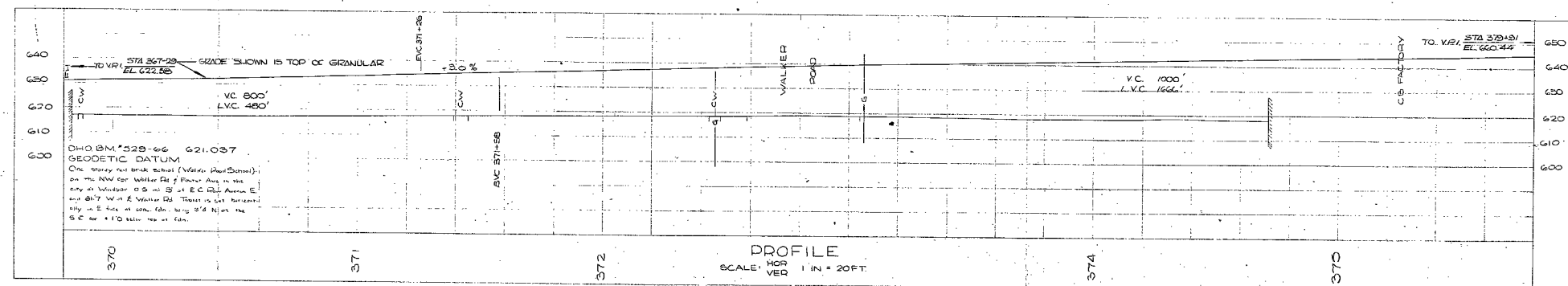
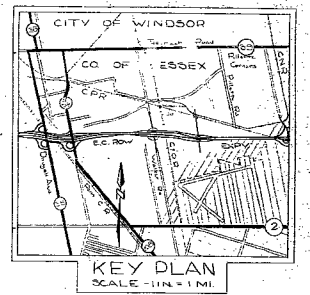
**D.H.O. B.M. # 529-66**  
**ELEV. 621.057**  
**GEODETIC DATUM**  
 ONE STOREY RED BRICK SCHOOL (WALKER ROAD SCHOOL) ON THE NW COR. WALKER RD. & POSTER AVE. IN THE CITY OF WINDSOR, 0.5 MI. S. OF E.C. ROW AVENUE E. AND 817' W. OF WALKER RD. TABLET IS SET HORIZONTALLY IN E. FACE OF CONC. FDN. BEING 3.4' N. OF THE S.E. COR. & 1.0' BELOW TOP OF FDN.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS	
ONTARIO	
<b>40 J7-5</b>	
<b>WALKER ROAD OVERPASS</b>	
E.C. ROW EXPRESSWAY	
KING'S HIGHWAY No. E.C. ROW EXPVY.	DIST. No. 1
CO. ESSEX	
CITY OF WINDSOR	101' CON.
<b>GENERAL LAYOUT</b>	
APPROVED	SITE No. 6-285
DESIGN K.Z.S. CHECK K.Z.S.	CONTRACT No.
DRAWING S.M. CHECK K.Z.S.	DRAWING No.
DATE JULY 73	LOADING 15-20-44
<b>6-285-1</b>	





PROBABLE FOOTING LOCATIONS



71-1113

STR WD 257-66-04 4037-5

DATE	REVISIONS / ADDITIONS	BY	CHK'D

DEPARTMENT OF HIGHWAYS - ONTARIO  
DESIGN BRANCH  
ENGINEERING SURVEYS OFFICE

BRIDGE SITE

PROPOSED CROSSING  
AT  
WALKER ROAD  
AND  
EC ROW EXPY

RD'S 868 & 1456

CITY OF WINDSOR COUNTY OF ESSEX

SCALE	DISTRICT	REGION
AS SHOWN	CHATHAM	SOUTH WESTERN

WO

SURVEY BY

Chief of Party: Photogrammetry

Supervisor: J.M. Thompson

Checked by: G. H. H. H.

Drawn by: J. M. Thompson

Site: 6-285

Drawn by: J. M. Thompson

PLAN E-4882-1

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 40J7-5

DIST. 1 REGION Southwestern

W.P. No. 257-66-04

CONT. No. 77-43

W. O. No. \_\_\_\_\_

STR. SITE No. 6-285

HWY. No. \_\_\_\_\_

LOCATION E.C. Row Expressway  
and Walker Rd. Crossing

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 3

REMARKS: documents to be  
unfolded before microfilming

# FOUNDATION INVESTIGATION REPORT

For  
Proposed E. C. Row Expressway  
and Walker Rd. Crossing  
District #1 - Chatham  
W.O. 71-11113 - W.P. 257-66-04

---

## 1. INTRODUCTION:

A request for a foundation investigation at the crossing of the Proposed E. C. Row Expressway and Walker Rd., was received from Mr. A. P. Watt, Regional Bridge Planning Engineer, in a memorandum dated October 12, 1971.

A preliminary foundation investigation covering this area was carried out in April 1968 (68-11015-3). A more detailed field investigation was subsequently carried out to determine the sub-soil conditions existing at the site.

This report contains the results of both investigations and our recommendations pertaining to the design of the proposed structure foundations and approach embankments.

## 2. DESCRIPTION OF THE SITE:

The site of the proposed overpass structure is situated in the eastern part of the City of Windsor, approximately 1.5 miles North of the existing Hwy.#2 and Walker Road intersection.

The surrounding terrain is flat and built up residential and commercial area.

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

### 3. FIELD AND LABORATORY INVESTIGATION PROCEDURE:

A total of 6 sampled boreholes and 10 dynamic cone penetration tests was carried out during the course of the field work. Boring was achieved by means of bombardier mounted continuous flight auger machines, and conventional diamond drilling equipment adapted for soil sampling purposes. During the field work disturbed samples were obtained by means of a standard split-spoon sampler; the energy used in driving it conformed to the requirements of the Standard Penetration Test. 'Undisturbed' samples were recovered using 2 inch I.D. Shelby tubes which were pushed into the soil hydraulically or by hand. Where possible field vane tests were carried out at elevations generally 12 inches below sample depths.

Dynamic cone penetration tests were carried out adjacent to each borehole, and also at 4 other locations. Driving energy to advance the cone was 350 ft.-lbs. per blow.

The bedrock was proved at one borehole locating using AXT rock coring equipment.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the borings are shown on Drawing No. 71-11113A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected samples to determine the following physical properties:

Atterberg Limited  
Moisture Content  
Grain-Size Distribution  
Undrained Shear Strength  
Bulk Density

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this report.

#### 4. SOIL TYPES AND SOIL CONDITIONS:

##### 4.1) General:

Generally uniform subsoil condition were found to prevail over the site area. The subsoil consisted of a deep deposit of cohesive soil, followed by limestone bedrock. The boundaries between different deposits are shown on the Record of Borehole sheets attached to the Appendix. The estimated stratigraphical profile of Drawing 71-11113A is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows:

##### 4.2) Clayey silt with sand and traces of gravel:

This deposit was intersected in all borings and extends from immediately below the ground surface down to the bedrock surface for a minimum depth of 128 feet. The material in the deposit consists of clayey silt with sand and traces of gravel. A plot of Plasticity Index versus Liquid Limited (Fig.1) shows the great majority of the points to fall within the CL Zone. In some boreholes relatively thin layers of granular soils were found to occur within the main deposit.

A highly overconsolidated zone, due to desiccation and/or weathering, with a thickness ranging from 8 to 14, was found to extend from the upper surface of the stratum. This zone is brown in color due to oxidation and apart from the upper 3 to 5 ft. (frost affected zone) has a very stiff to hard consistency: 'N' Values ranged from 29 to 96 blows per foot. Based on the Standard Penetration Test results only, the undrained shear strength of this desiccated zone is estimated to be in the order of 2500 psf to 10,000 psf. Below the desiccated layers the color of the soil is grey and the consistency ranges somewhat randomly from stiff to hard. For design purposes the following undrained shear strength values are suggested:



From Ground Level - El. 610	2,000
El. 610 - 600	5,000 PSF
El. 600 - 590	2,500 PSF
El. 590 - 570	1,700 PSF
El. 570 - 560	2,000 PSF
El. 560 - 488	1,500 PSF

Physical properties of the overall deposit, as determined from field and laboratory tests, are as follows:

Natural Moisture Content: (%)	11.0 - 29.5
Liquid Limit: (%)	24.5 - 31.5
Plastic Limit: (%)	13.5 - 19.6
Bulk Density: (PCF)	136
Unconfined Shear Strength: (PSF)	1020 - 1560
Field Vane Test: (PSF)	1120 - 2000+
Sensitivity:	1.2 - 2.0
'N' Value: (Blows/Ft.)	9 - 96

Typical Grain-Size distribution curves are included in the Appendix of this report (Fig. 2).

#### 4.3) Limestone Bedrock:

Bedrock at this site was found to consist of generally sound limestone at El. 489. (B.H.#63).

#### 5. GROUNDWATER CONDITIONS:

The following groundwater levels were observed during the field investigation:

B.H. #63	El. 617.1
64	615.8
65	Not Established
66	Not Established
121	Dry
125	Dry
130	Not Established

It is pointed out that the foregoing quoted figures may not represent the true groundwater levels, due to the relatively impermeable nature of the subsoil and the short duration of the field work.

## 6. DISCUSSION AND RECOMMENDATIONS:

### 6.1) General:

It is proposed to build a three-span (51'-116'-51') overpass structure at the crossing of E. C. Row Expressway and Walker Road. The proposed profile grade of E. C. Row Expressway will be approximately 22 feet above the existing Walker Road grade of elevation 618.

As described in the previous paragraphs of this report, the subsoil at the site consists of a deep deposit of clayey silt with sand and traces of gravel, underlain by limestone bedrock. The upper 14 feet of the deposit is a very stiff to hard desiccated surface crust. Below this depth the undrained shear strength of the material decreases. The desiccated surface crust appears to be suitable for spread footing type foundations.

Because of the compressible nature of the subsoil, it is inevitable that consolidation settlements will occur over a long-term period due to the imposed loads of structure and embankment. Past experience, however, indicates that these settlements will be of a minor nature.

### 6.2) Foundations:

#### a) Spread Footings in Original Ground:

The entire structure may be supported on spread footings placed within the very stiff to hard desiccated zone of the subsoil between El. 610. and El. 605. A safe net pressure of 3.5 TSF may be assumed for design purposes.

The existing old foundations at the piers and east abutment locations should be removed.

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 estimated maximum settlement will be in the order of 1.0 and 1.5 inches under the pier footings.

b) Spread Footings on Compacted Fill:

As an alternative, the abutments may be supported on spread footings placed on well compacted, suitable granular material within the approach fills. A safe design load of 2.0 TSF may be assumed. The granular material should consist of G.B.C. Class 'A' and should be fully compacted according to the current Standards. A detailed construction scheme is outlined on Figure 3 of the Appendix.

c) Perched Abutments on Short Piles:

As a second alternative, the abutments may be constructed within the approach fills and supported on short piles driven through the fill and some 10.0 ft. into original ground. In the case of 12-3/4" O.D. and 1/4" thick wall steel tube piles, a safe design load of 25 tons per pile may be used.

It should be pointed out, that this latter proposal is based on experience with similar structures and similar subsoil conditions in the general area.

Regardless of which method is adopted, the structure should be built to accommodate the 2 to 2.5 inches differential settlement between the abutments and piers.

d) End-Bearing Piles:

As another alternative, the abutments and piers may be supported on steel H-piles driven to bedrock. The maximum allowable load for the particular steel sections may be assumed for design purposes.

6.3) Approach Embankments:

The shear strength of the subsoil is such that it will be able to safely support the 22 ft. high approach embankments constructed with 2:1 side slopes. The fill should consist of well compacted acceptable material. Care should be taken to ensure that no bouldery fill is placed within the approaches through which

Piles have to be driven, and it is recommended that this portion of the fill contain no larger grain sizes than 3 inches.

Based on performance of structures and embankments built in the same general area and under somewhat similar subsoil conditions, it is estimated that a maximum settlement of 3 to 4 inches will take place over a long period of time under the fill at the abutment location.

To minimize the effect of differential settlements between the abutments and pier footings, it is recommended that the approach embankments be built in advance of the structure for as long a period as possible. The topsoil and the soft surficial material should be removed in accordance with the pertinent Standards within the construction area.

7.) MISCELLANEOUS:

The field investigations were carried out during the period March 28 to April 1, 1968 and November 15-16, 1971, under the supervision of Mr. A. Prakash and Mr. P. Payer, Project Foundation Engineers.

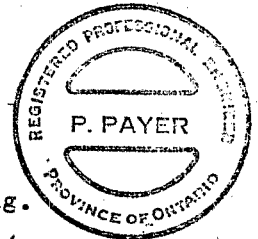
Equipment was owned and operated by Dominion Soil Investigation Limited and Master Soil Investigation Limited.

This report was written by Mr. P. Payer and reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

December 9, 1971

*P. Payer*  
P. Payer, P. Eng.

*K. G. Selby*  
K. G. Selby, P. Eng.



## RECORD OF BOREHOLE No.63 (68-11015-3) FOUNDATION SECTION

JOB 71-11113

LOCATION Co-ords. 100, 124N; 276, 759 E

ORIGINATED BY P.P.

W.P. 257-66-011

BORING DATE March 28 & 29, 1968

COMPILED BY P.P.

DATUM Geodetic

BOREHOLE TYPE Penn Drill & Core Drill

CHECKED BY 

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT ——— $w_L$ PLASTIC LIMIT ——— $w_p$ WATER CONTENT ——— $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	SHEAR STRENGTH P.S.F.					WATER CONTENT %				
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE 500 1000 1500 2000 2500					$w_p$ ——— $w$ ——— $w_L$ 10 20 30				
617.4 0.0	Ground Level														GR. SA. SI. CL.
1	Hard to very stiff		1	SS	17										3 28 43 26
			2	SS	18		610								
			3	SS	62										
			4	SS	49										
			5	SS	26		600								
			6	TW	PH										
			7	TW	PH		590								
			8	TW	PH										
			9	SS	12		580								
			10	TW	PH										
			11	SS	12		570								
			12	TW	PM										
566.4 51.0	Sand seams					560								4 28 40 28	
562.4 55.0			13	TW	PM										



DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 66 (68-11015-3) FOUNDATION SECTION

JOB 71-11113

LOCATION Co-ords. 100, 122 N; 76, 584E

ORIGINATED BY P.P.

W.P. 257-66-04

BORING DATE Apr. 1, 1968

COMPILED BY P.P.

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger

CHECKED BY *SK*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — $w_L$		BULK DENSITY $\gamma$	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FOOT	BLOWS/FOOT	PLASTIC LIMIT — $w_p$	WATER CONTENT — $w$		
618.6	Ground Level										
	Clayey silt with sand Traces of gravel  Hard to very stiff Stiff		1	SS	17						
			2	SS	38						
			3	SS	82						
			4	SS	60						
			5	SS	45						
			6	SS	33						
			7	SS	25						
			8	SS	23						
			9	TW	PM						
			10	TW	PM						
			11	TW	PM						
555.6											
53.0	End of Borehole										

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 121

FOUNDATION SECTION

JOB 71-11113

LOCATION Co-ords. 100, 071N., 76, 761E

ORIGINATED BY P.P.

W.P. 257-66-04

BORING DATE Nov. 15, 1971

COMPILED BY P.P.

DATUM Gendevle

BOREHOLE TYPE Cont. Flight Auger

CHECKED BY

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT — W <sub>L</sub> PLASTIC LIMIT — W <sub>P</sub> WATER CONTENT — W		BULK DENSITY γ	REMARKS			
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80			100	W <sub>P</sub>	W
617.9	Ground Level													
0.0														
	Clayey silt with sand Traces of gravel Stiff to Hard	1	SS	16	610									
		2	SS	16										
		3	SS	30										
		4	SS	42										
		5	SS	65										
		6	SS	56	600									
		7	SS	29										
		8	SS	21										
		9	SS	17										
		10	SS	20										
		11	SS	14	590									
		12	TW	PH										
		13	TW	PH										
		14	TW	PH	580									
		15	TW	PH										
559.4					570									
58.5														
556.4	Sand Seams	16	SS	--	560									
61.5	End of Borehole													
					550									



[illegible]

FOUNDATION SECTION

ORIGINATED BY P.P.

COMPILED BY P.P.

CHECKED BY OK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION	RESISTANCE	LIQUID LIMIT — $w_L$	PLASTIC LIMIT — $w_p$	WATER CONTENT — $w$	BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	20 40 60 80 100	SHEAR STRENGTH P.S.F.	$w_p$ — $w$ — $w_L$	WATER CONTENT %		
617.6	Ground Level								○ UNCONFINED + FIELD VANE				
0.0	Probable clayey silt with sand Trace of Gravel								● QUICK TRIAXIAL x LAB. VANE				
605.6													
12.0	End of Cone Hole												

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 125

FOUNDATION SECTION

JOB 71-11113

LOCATION Co-ords. 100, 067N., 76, 596E

ORIGINATED BY P.P.

W.P. 257-66-04

BORING DATE Nov. 16, 1971

COMPILED BY P.P.

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger

CHECKED BY *AK*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION. RESISTANCE BLOWS / FOOT		LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$		BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	SHEAR STRENGTH P.S.F.		WATER CONTENT %			
							<div><div></div><div></div><div></div><div></div><div></div></div>		<div><div></div><div></div><div></div></div>			
617.8	Ground Level											
0.0	Clayey silt with sand Trace of Gravel		1	SS	6							
	Firm		2	SS	24							
			3	SS	52		610					
	to		4	SS	68							
			5	SS	96							
	Hard		6	SS	63							
			7	SS	48							
			8	SS	23		600					
			9	SS	22							
596.3			10	SS	19							
21.5	End of Borehole				42'							
						590						

B.H. Dry

## RECORD OF BOREHOLE No. 64 (68-11015-3) FOUNDATION SECTION

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

JOB 71-11113

LOCATION Co-ords. 100, 022 N; 76, 549E

ORIGINATED BY P.P.

W.P. 257-66-04

**BORING DATE** March 28 & 29, April 1, 1968

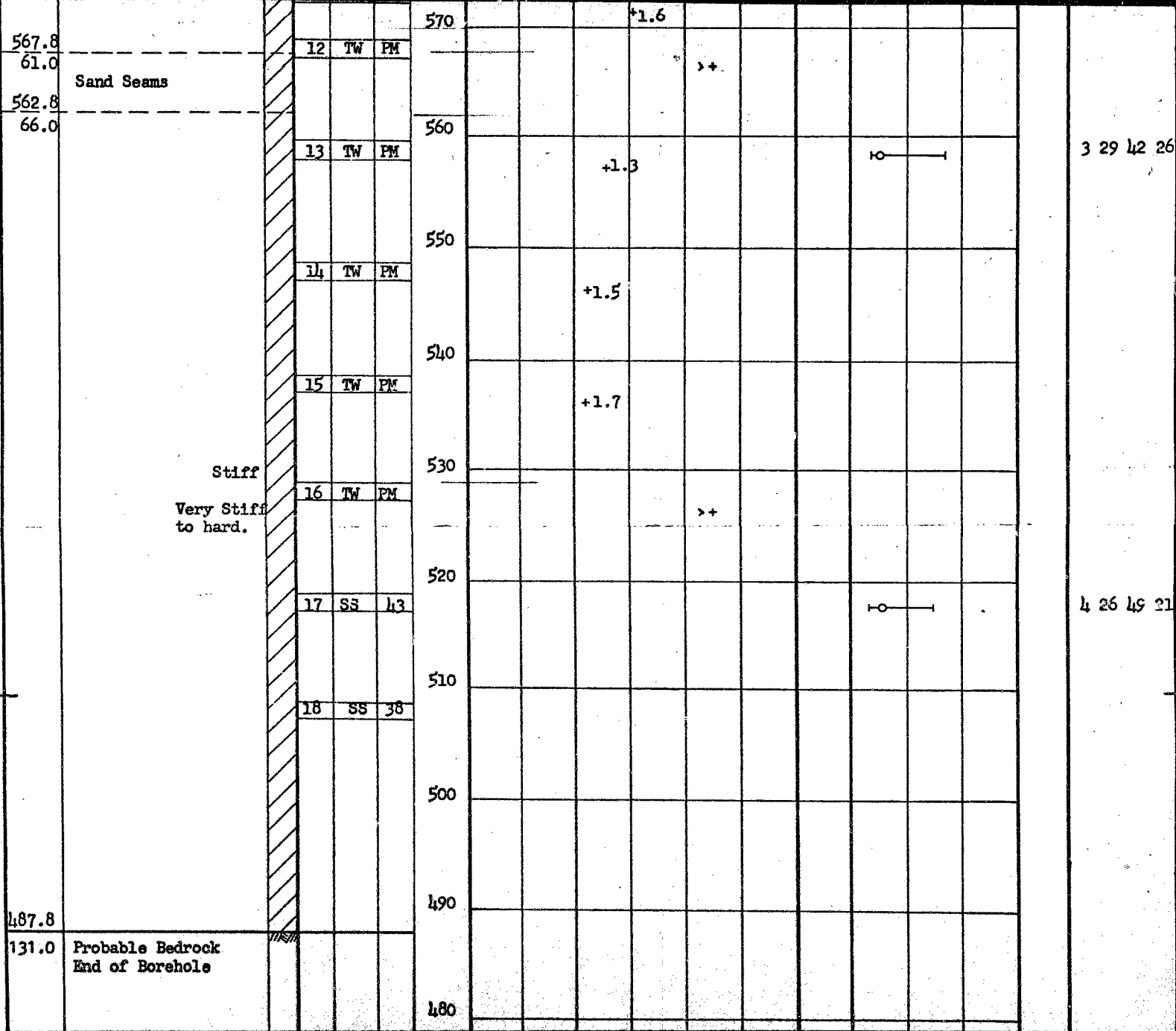
COMPILED BY P.P.

DATUM Geodetic


BOREHOLE TYPE Cont. Flight Auger

CHECKED BY                     

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT — w <sub>L</sub> PLASTIC LIMIT — w <sub>p</sub> WATER CONTENT — w		BULK DENSITY  P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB. VANE	WATER CONTENT % w <sub>p</sub> — w — w <sub>L</sub>		
618.8	Ground Level									
0.0										
			1	SS	13					
			2	SS	20	610				
			3	SS	67					
			4	SS	68					
			5	SS	35	600				
	Hard to Very Stiff		6	SS	19					
			7	SS	18	590				
	Stiff		8	TW	PM					
			9	SS	20	580	+ 2.0			
			10	TW	PM		+ 1.2			
	Clayey silt with sand, traces of gravel		11	SS	16	570	+ 1.3			
			12	TW	PM		+ 1.6			
567.8										
61.0	Sand Seams									
562.8										
66.0			13	TW	PM	560	+ 1.3			



FOUNDATION SECTION

CHECKED BY 

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION. RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— w <sub>L</sub> PLASTIC LIMIT ——— w <sub>p</sub> WATER CONTENT ——— w		REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.	WATER CONTENT %		
							20 40 60 80 100			
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	$w_p \quad w \quad w_L$		
								WATER CONTENT %		
618.3	Ground Level									P.C.F.
0.0	Probable Clayey silt with sand Trace of Gravel					610				GR. SA. SI. CL.
606.3										
12.0	End of Conehole					600				

FOUNDATION SECTION

JOB 71-11113 LOCATION Co-ords. 100, 069N., 76, 545E. ORIGINATED BY P.P.  
W.P. 257-66-04 BORING DATE Nov. 16, 1971 COMPILED BY P.P.  
DATUM Geodetic BOREHOLE TYPE Cone Test Only CHECKED BY JK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION . RESISTANCE		LIQUID LIMIT ——— $w_L$ PLASTIC LIMIT ——— $w_p$ WATER CONTENT ——— $w$		BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.		WATER CONTENT %			
							20 40 60 80 100					
617.7	Ground Level											
0.0	Probable clayey silt with sand Trace of Gravel					610						
604.7												
13.0	End of Conehole					600						

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 130

FOUNDATION SECTION

JOB 71-11113

LOCATION Co-ords. 100, 128N., 76, 532E.

ORIGINATED BY P.P.

W.P. 257-66-04

BORING DATE Nov. 16, 1971

COMPILED BY P.P.

DATUM Geodetic

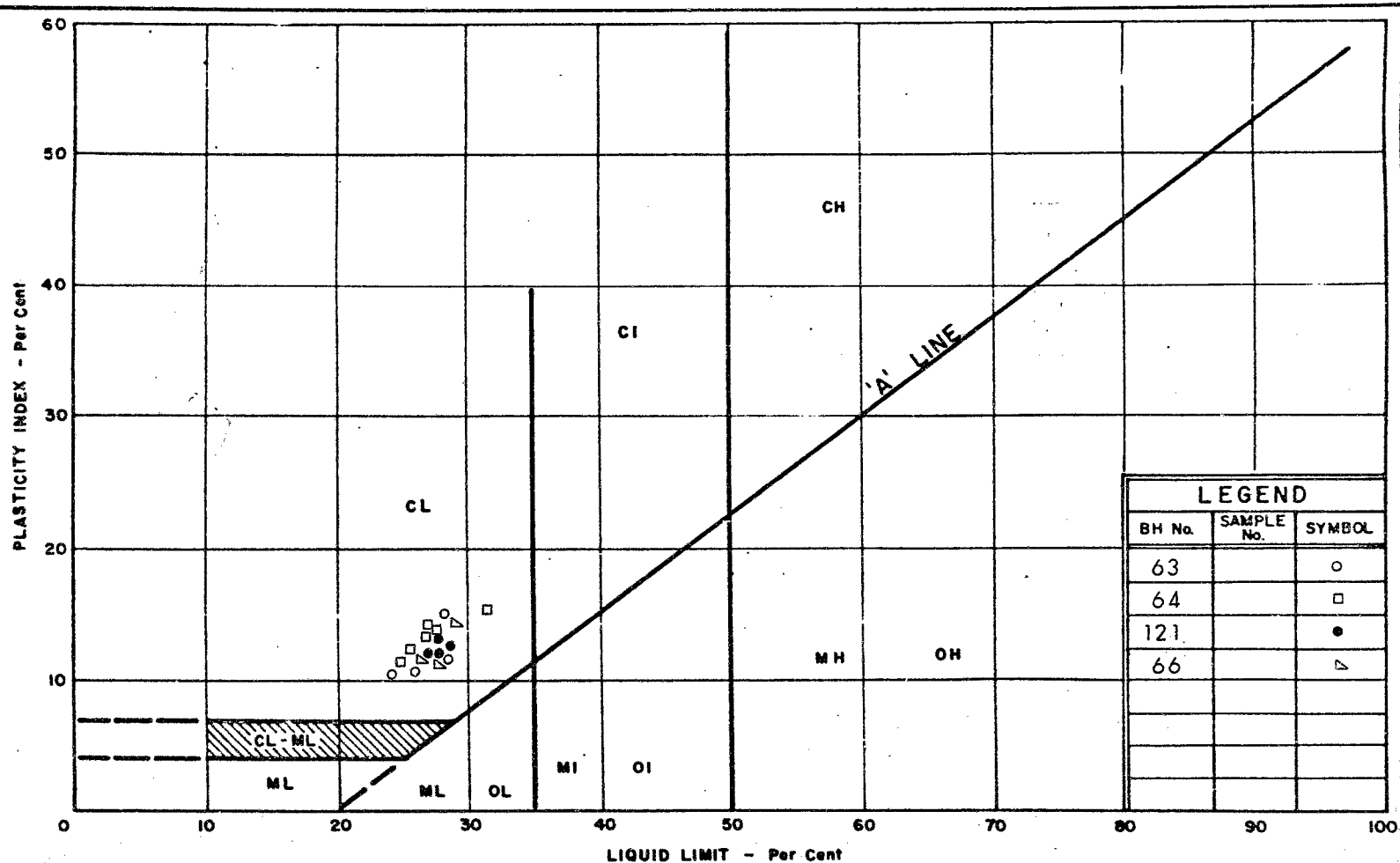
BOREHOLE TYPE Cont. Flight Auger

CHECKED BY *WR*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION. RESISTANCE					LIQUID LIMIT ——— $w_L$			BULK DENSITY $\gamma$	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					PLASTIC LIMIT ——— $w_p$				
							20	40	60	80	100	WATER CONTENT ——— $w$				
SHEAR STRENGTH P.S.F.							$w_p$ ——— $w$ ——— $w_L$			WATER CONTENT %						
							○ UNCONFINED + FIELD VANE			10 20 30			P.C.F.	GR. SA. SI. CL.		
							● QUICK TRIAXIAL x LAB. VANE									
617.3	Ground Level															
0.0	Clayey silt with sand and trace of gravel		1	SS	10	610									W.L. not established	
	Stiff to Hard		2	SS	9											
609.8			3	SS	37											
7.5	End of Borehole															
603.3																
14.0	End of Cone Hole					600										

W.L. not established





LEGEND		
BH No.	SAMPLE No.	SYMBOL
63		○
64		□
121		●
66		△



DEPARTMENT OF HIGHWAYS  
MATERIALS and  
TESTING  
DIVISION

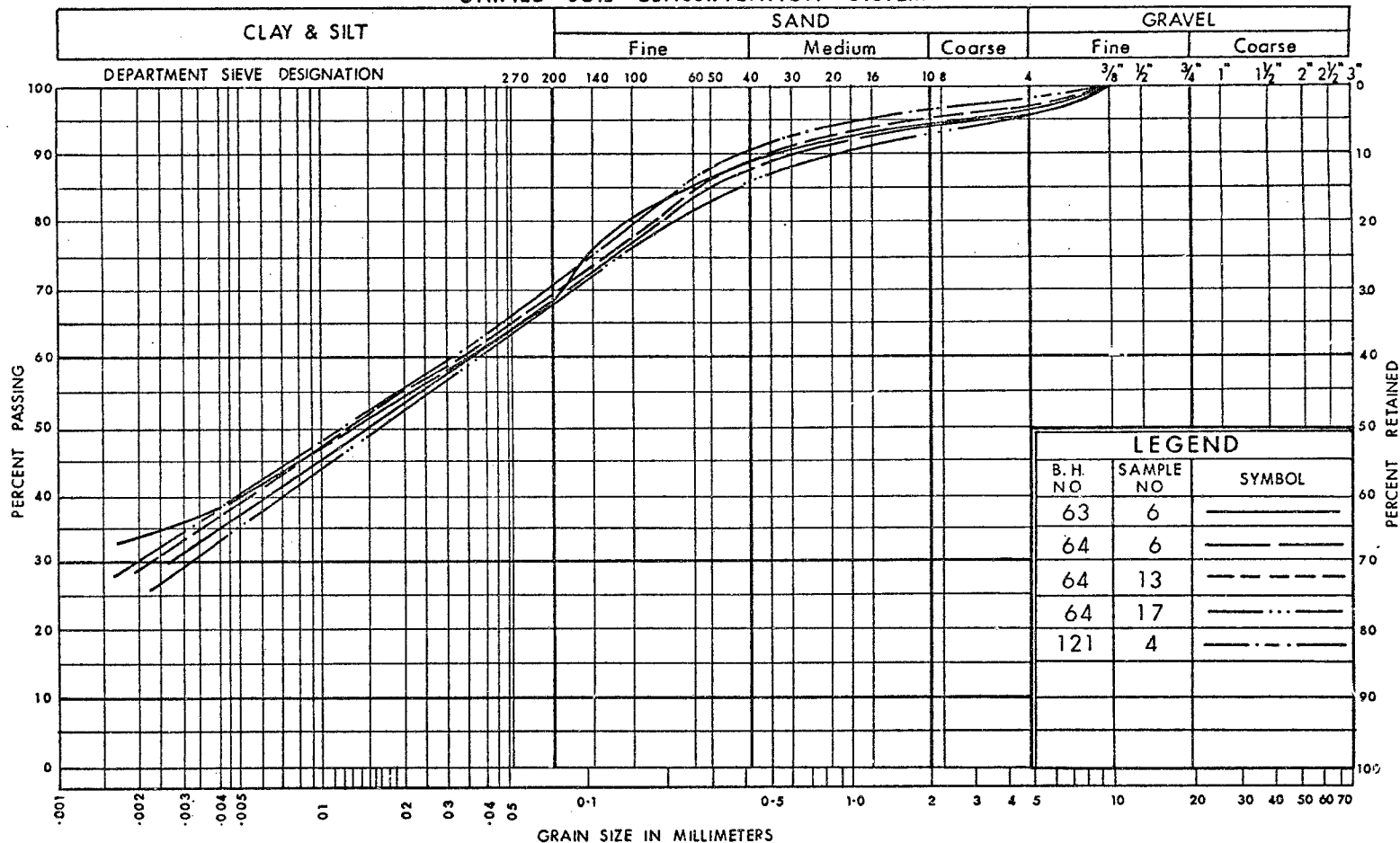
## PLASTICITY CHART CLAYEY SILT

W.P. No. 257-66-04

JOB No. 71-11113

Fig. No. 1

# UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT  
OF  
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES  
BRANCH

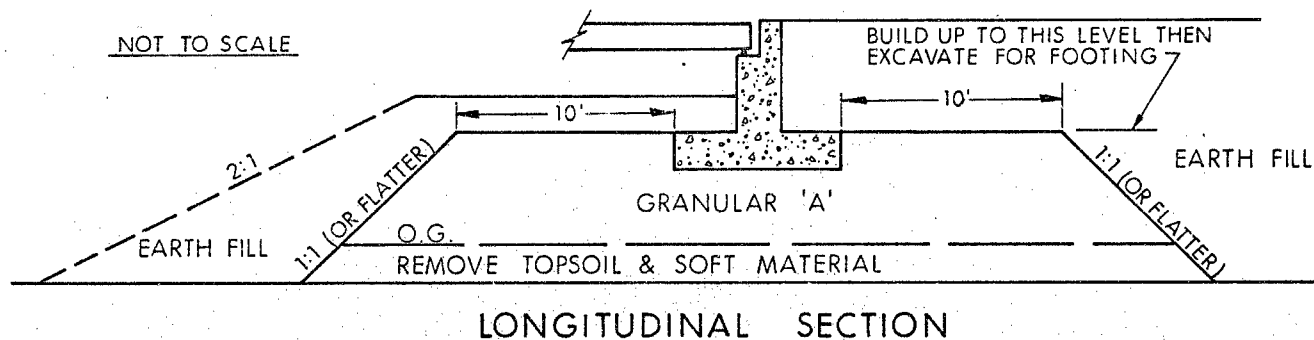
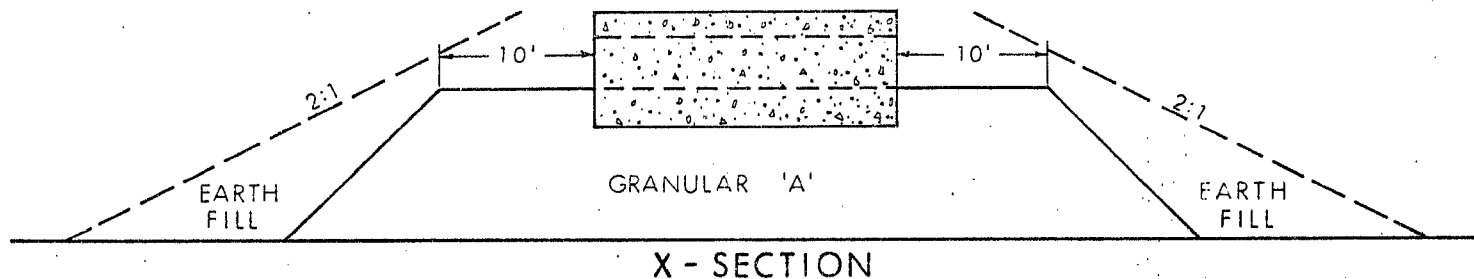
GRAIN SIZE DISTRIBUTION  
CLAYEY SILT

W.P. No. 257-66-04

JOB No. 71-11113

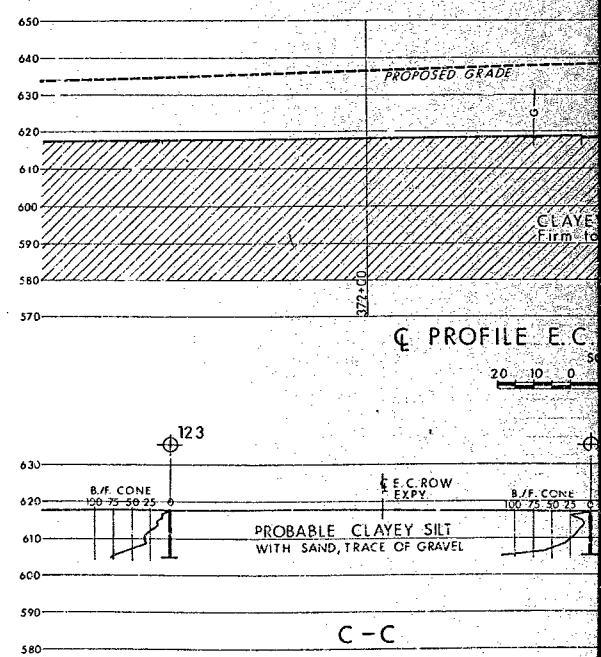
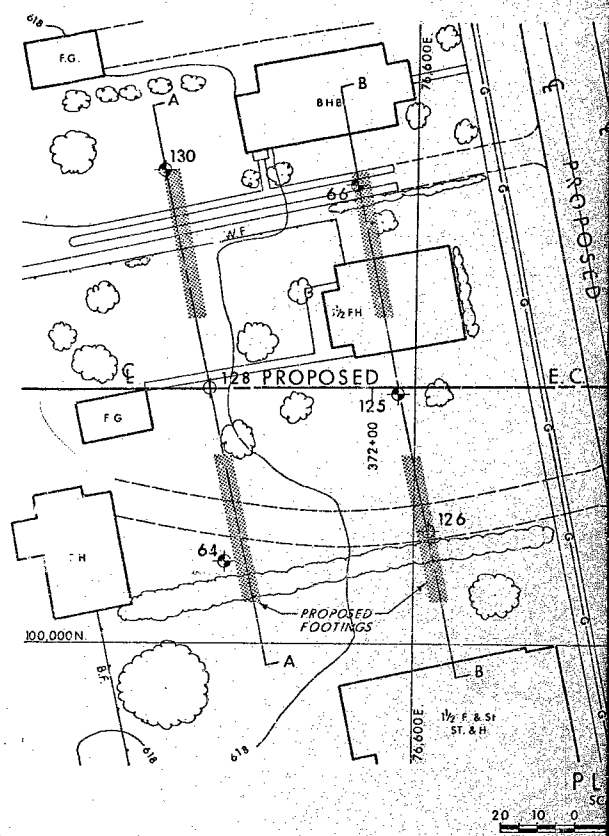
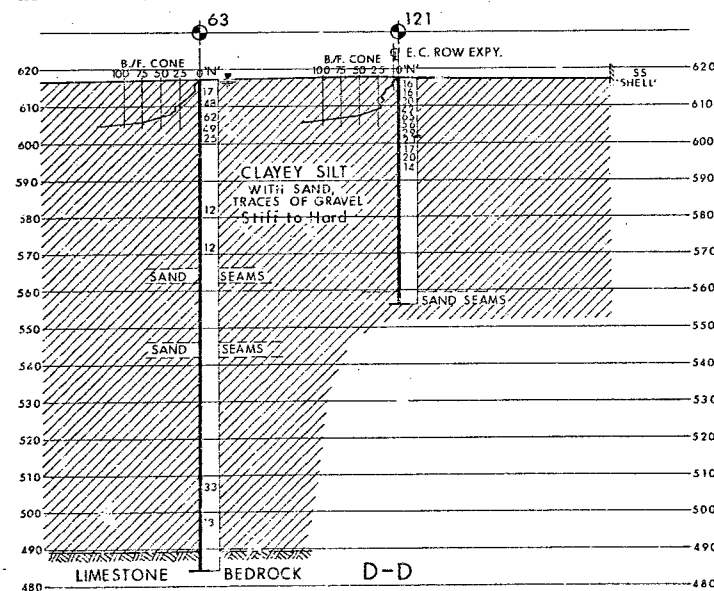
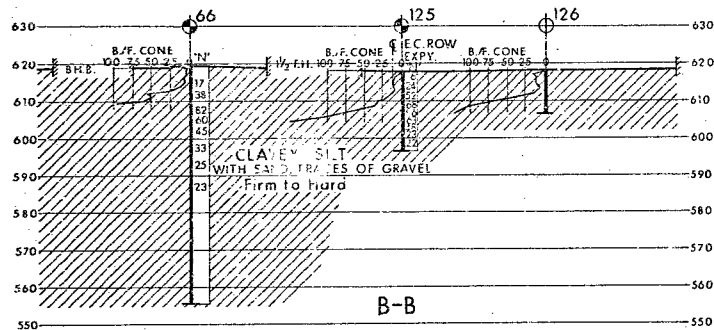
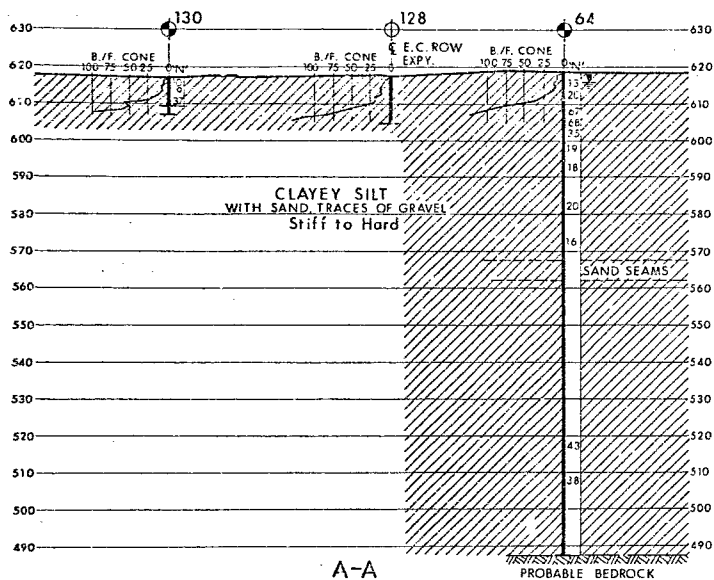
Fig. No. 2

# ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE

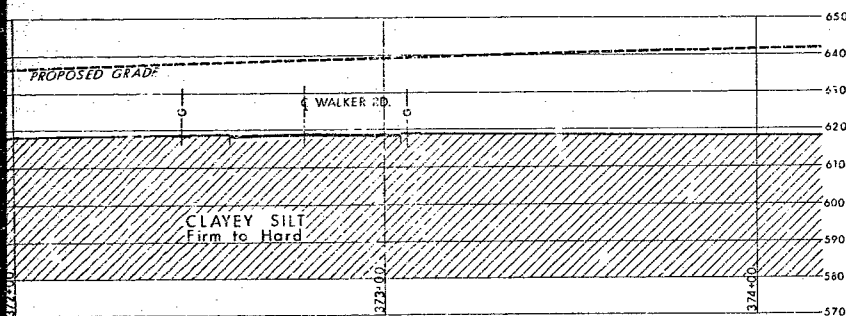
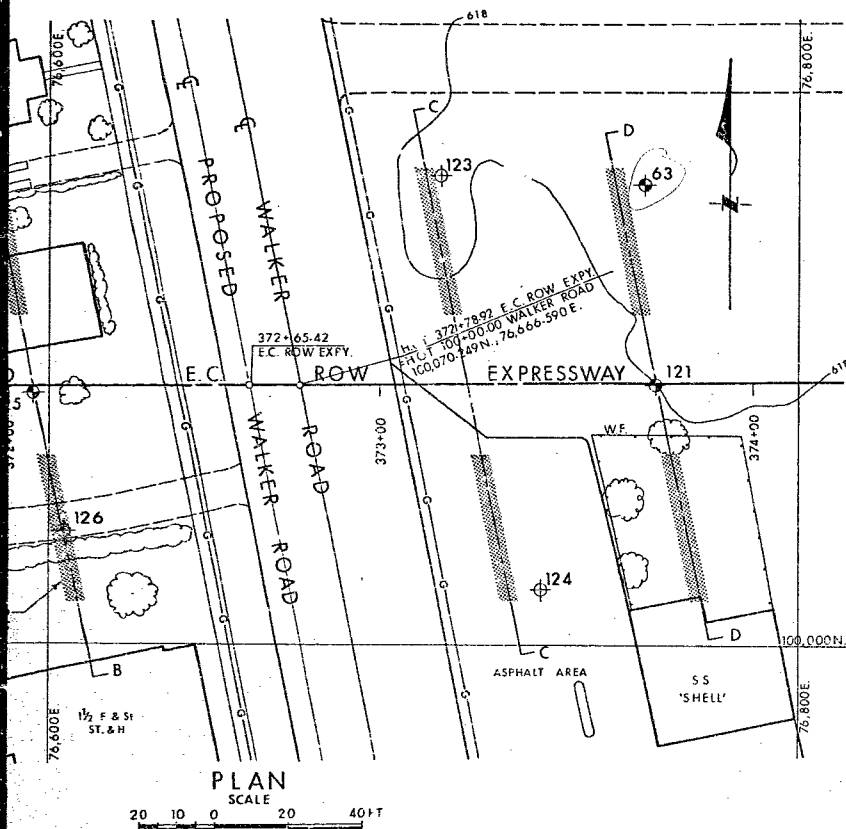


## NOTES

- 1 - REMOVE TOPSOIL &/OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'
- 2 - PLACE 'GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT D.T.C. STANDARDS.
- 3 - EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING.

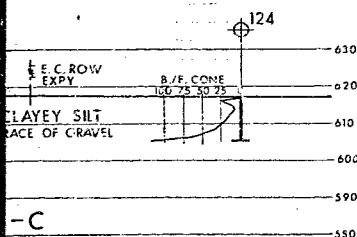


CORD  
DATE

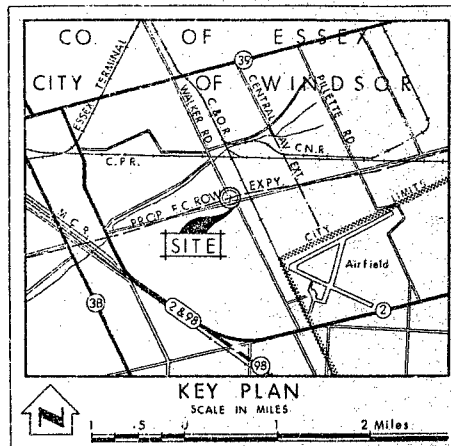


PROFILE E.C. ROW EXPRESSWAY

SCALE  
40 FT.



SECTIONS  
SCALE  
40 FT.



LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation in Boreholes 63 & 64, March & April 1968. Boreholes 121 & 125 Dry Nov. 1971. Water Level not established in remaining Boreholes.		
NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
63	617.4	100,124	76,759
64	618.8	100,022	76,549
66	618.6	100,122	76,584
121	617.9	100,071	76,761
123	617.5	100,126	76,705
124	617.6	100,015	76,732
125	617.8	100,067	76,596
126	618.3	100,030	76,604
128	617.7	100,069	76,545
130	617.3	100,128	76,532

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

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS  
DESIGN SERVICES BRANCH - FOUNDATION OFFICE

## WALKER ROAD

HIGHWAY NO. E.C. ROW EXPRESSWAY DIST. NO. 1  
CO. ESSEX City of WINDSOR  
TWP. R.P. 868 & 1456

## BORE HOLE LOCATIONS & SOIL STRATA

SUBNO. P.P.	CHECKED <input checked="" type="checkbox"/>	W.P. NO. 257-66-04	DRAWING NO.
DRAWN <input checked="" type="checkbox"/>	CHECKED <input checked="" type="checkbox"/>	JOB NO. 71-11113	71-11113A
DATE Dec. 12, 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <input checked="" type="checkbox"/>	CONF. NO.		

REF. NO. E-4882-1

## FOUNDATION INVESTIGATION REPORT

For

Walker Road Overpass  
E.C. Row Expressway, District 1, Chatham  
W.P. 257-66-04

---

### INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above mentioned project. Fieldwork was done during the periods March 28 to April 1, 1968 and November 15, to November 16, 1971, utilizing a continuous flight auger machine equipped with 4 inch O.D. solid augers. Bedrock was proved by recovering AXT size (1 9/32 inch dia.) rock core samples. Since the fieldwork for this investigation was carried out the foundations for the bridge structure have been constructed and changes to the topography have, therefore, occurred. Subsoil conditions as described in this report are those which prevailed prior to this construction.

### SITE DESCRIPTION

The site of the proposed overpass structure is situated in the eastern part of the City of Windsor, approximately 1.5 miles north of the existing Hwy. #2 and Walker Road intersection.

The surrounding terrain is flat and built up residential and commercial area.

All footings for the abutments, piers, and retaining walls have been constructed to top of footing level and backfilled to the approximate level of original ground under a previous contract, Contract 76-75.

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

### SUBSURFACE CONDITIONS

#### General

Borings carried out at this structure site indicate generally uniform subsoil conditions. The subsoil consists of a deep deposit of hard to stiff cohesive soil overlying limestone bedrock. Boundaries between different deposits are shown on the Record of Borehole Sheets which are contained in the Appendix to

this report. The locations and elevations of the borings are shown on Drawing No. 6-285-2 of the Contract Drawing. Estimated stratigraphical profiles are shown also. A description of the soil types encountered in the borings is as follows.

#### Clayey Silt With Sand and Traces of Gravel

This deposit was intersected in all borings and extends from immediately below the surficial topsoil to the bedrock for an average depth of about 130 feet. The material in the deposit is classified as clayey silt with sand and traces of gravel. Occasional layers of sand ranging from about 3 to 5 feet in thickness are contained within the main deposit in the zone between 50 and 90 foot depths (elev. 570 - elev. 530). A plot of Plasticity Index versus Liquid Limit test results from samples recovered from the main deposit show most of the points to fall within the CL zone of the Plasticity Chart (see Fig. 1).

A highly overconsolidated zone due mainly to desiccation exists in the upper portion of the deposit having a thickness ranging from about 8 to 14 feet. The surface of this zone is generally some 3 to 5 feet below the ground surface and is clearly indicated by the plots of dynamic cone penetration tests. Standard Penetration Test 'N' values measured within the desiccated material ranged from about 30 to 100 blows/ft. indicating a very stiff to hard consistency with undrained shear strengths ranging from about 2500 to 10,000 p.s.f.

Natural moisture content ranges from 11 to 14%.

Above the desiccated zone the material has a consistency assessed as stiff to very stiff. This is based on 'N' values ranging from 13 to 17 blows/ft. which indicate undrained shear strengths of from 1500 to 2500 p.s.f. The natural moisture content is about 12%.

Below the desiccated zone the consistency of the deposit varies somewhat randomly from stiff to hard. This assessment is based on a number of field vane and laboratory unconfined compression tests, the results of which are summarized below, together with other physical properties determined from field and laboratory tests.

Natural Moisture Content	14 - 15%
Liquid Limit	24 - 30%
Plastic Limit	12 - 14%
Bulk Density	136 p.c.f.
Unconfined Shear Strength	1020 - 1560 p.s.f.

Field Vane Shear Strength	1120 -> 2000 p.s.f.
Sensitivity (Based on Field Vane Tests)	1.2 - 2.0
'N' Values	9 - 43 blows/ft.

Typical grain size distribution curves are shown on Fig. 2 of the Appendix.

For design purposes the following average values of undrained shear strength are recommended.

Ground Level to Elev. 610	2000 p.s.f.
Elev. 610 - Elev. 600	5000 p.s.f.
Elev. 600 - Elev. 590	2500 p.s.f.
Elev. 590 - Elev. 570	1700 p.s.f.
Elev. 570 - Elev. 560	2000 p.s.f.
Elev. 560 - Elev. 488	1500 p.s.f.


#### Bedrock

Bedrock was found to consist of generally sound limestone at approximate elevation 489.0

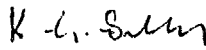
#### Groundwater

Out of the 7 boreholes drilled, groundwater was observed only in 2 of these at depths of about 2 to 3 feet below the ground surface, and in these 2 holes wash-water was used for drilling purposes.

Because of the impermeable nature of the subsoil a considerable time is required for water levels to stabilize and the fact that no water was observed in some of the holes merely means that insufficient time had elapsed. For design and construction purposes it should be assumed that the groundwater level at this site is probably about 4 feet below the ground surface.

  
P. Payer, P. Eng.  
Senior Engineer



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



## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 63

WP 257-66-04

LOCATION Co-ords. 100,124 N; 276,755 E.

ORIGINATED BY PP

DIST 1 HWY F.C. Row

BORING DATE March 28 &amp; 29, 1968

COMPILED BY PP

DAFUM Geodetic

BOREHOLE TYPE Penn Drill &amp; Core Drill &amp; Cone Test

CHECKED BY

SOIL PROFILE		SAMPLES		GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT - $w_L$ PLASTIC LIMIT - $w_p$ WATER CONTENT - $w$			UNIFORMITY COEFFICIENT $C_u$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE					$w_p$	$w$	$w_L$		
617.4	Ground Level												
0.0			1	SS	17								
			2	SS	48								
			3	SS	62								
			4	SS	49								
	Hard to very stiff		5	SS	26								
			6	TW	PH								
			7	TW	PH								
	Stiff		8	TW	PH								
			9	SS	12								
	Clayey silt with sand		10	TW	PH								
	Traces of gravel		11	SS	12								
	Stiff		12	TW	PH								
	Very Stiff		13	TW	PH								
566.4			14	TW	PH								
51.0	Sand Seams		15	TW	PH								
562.4			16	TW	PH								
55.0			17	TW	PH								
547.4			18	TW	PH								
70.0	Sand Seams		19	TW	PH								
542.4			20	TW	PH								
75.0			21	TW	PH								
513.4	Continued		22	TW	PH								

104.0

20  
15  $\phi$  5 % STRAIN AT FAILURE  
10

## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 63 cont

WP 257-66-04

LOCATION Co-ords. 100,124 N; 276,759 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row

BORING DATE March 28 &amp; 29, 1968

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Penn Drill &amp; Core Drill &amp; Cone Test

CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT $w_L$			REMARKS
ELEV DEPTH	DESCRIPTION	STRAT FLS	NUMBER	TYPE		20	40	60	80	100	PLASTIC LIMIT $w_p$	WATER CONTENT $w$	WATER CONTENT %	
513.4														
104.0			18	SS	33									
			19	SS	18									
489.2														
128.2	Limestone		20	RC										
484.2	Bedrock			AXT	95%									
133.2														

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 64

WP 257-66-04

LOCATION Co-ords. 100,022 N; 76,549 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row Expwy.

BORING DATE March 28 &amp; 29, April 1, 1968

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cent. Flight Auger &amp; Cone Test

CHECKED BY

SOIL PROFILE			SAMPLES		GROUND WATER	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT Y	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		20	40	60	80	100	$w_p$	$w$		
618.8	Ground Level			'N' VALUES	ELEV	400	800	1200	1600	2000	10	20	30	GR SA SI CL
0.0			1	SS	13									
			2	SS	20									
			3	SS	67									
			4	SS	68									
			5	SS	35									
	Hard to Very Stiff		6	SS	19									4 28 34 34
			7	SS	18									
	Stiff		8	TW	PM									
			9	SS	20									
			10	TW	PM									3 28 35 34
	Clayey silt with sand, traces of gravel		11	SS	16									
			12	TW	PM									
567.8														
51.0														
562.8	Sand seams													
56.0			13	TW	PM									3 29 42 26
			14	TW	PM									
			15	TW	PM									
	Stiff		16	TW	PM									
	Very stiff to hard		17	SS	43									4 26 49 21
514.8	Continued													
104.0														

20  
15  $\diamond$  5 % STRAIN AT FAILURE  
10

## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE No 64 cont

WP 257-66-04

LOCATION Co-ords. 100,022 N; 76,549 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row

BORING DATE March 28 &amp; 29, April 1, 1968

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger &amp; Cone Test

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 $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
514.8																
104.0			18	SS	38	510										
						500										
						490										
487.8																
131.0	Probable Bedrock End of Borehole															

20  
15  $\phi$  5 % STRAIN AT FAILURE  
10

## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 66

WP 257-66-04

LOCATION Co-ords. 100,122 N; 76,584 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row

BORING DATE April 1, 1968

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger &amp; Cone Test

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 $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
618.6	Ground Level															GR SA SI CL
0.0			1	SS	17											
			2	SS	38	610										
			3	SS	82											
			4	SS	60											
	Clayey silt with sand		5	SS	45	600										
	Traces of gravel		6	SS	33											
			7	SS	25	590										
	Hard to very stiff		8	SS	23											
	Stiff		9	TW	PM	580										
			10	TW	PM											
						570										
565.6			11	TW	PM											
53.0	End of Borehole Water Level not established															

20  
15  $\diamond$  5 % STRAIN AT FAILURE  
10

## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE No 121

WP 257-66-04

LOCATION Co-ords. 100,071 N; 76,761 E.

ORIGINATED BY PP

DIST. 1 HWY E.C. ROW  
Expy.

BORING DATE Nov. 15, 1971

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger &amp; Cone Test

CHECKED BY 10

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT		LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$	REMARKS	
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	N' VALUES		SHEAR STRENGTH PSF							WATER CONTENT %
617.9	Ground Level													
0.0	Clayey silt with sand Traces of gravel  Stiff to hard		1	SS	16									
			2	SS	16									
			3	SS	30									
			4	SS	42									
			5	SS	65									
			6	SS	56									
			7	SS	29									
			8	SS	21									
			9	SS	17									
			10	SS	20									
			11	SS	14									
			12	TW	PH									
			13	TW	PH									
			14	TW	PH									
			15	TW	PH									
559.4				16	SS	-								
58.5														
556.4	Sand Seams													
61.5	End of Borehole Water Level not established													

20  
15  $\diamond$  5 % STRAIN AT FAILURE  
10

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 123

WP 257-66-04

LOCATION Co-ords. 100,126 N; 76,705 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row  
Expiry:


BORING DATE Nov. 16, 1971

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cone Test Only

CHECKED BY *LS*

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$		UNIT WEIGHT Y	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		N' VALUES	20	40	60	80	100	WATER CONTENT % $w_p$ $w$ $w_L$		
617.5	Ground Level													
0.0	Probable clayey silt with sand  Trace of gravel.													
603.5														
14.0	End of Cone Test													

20  
15  
10  
5  
0 % STRAIN AT FAILURE

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 124

WP 257-66-04

LOCATION Co-ords. 100,015 N; 76,732 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row  
Expy.

BORING DATE Nov. 16, 1971

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cone Test Only

CHECKED BY

SOIL PROFILE		STRAT. PLOT	SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
617.6	Ground Level															
0.0	Probable clayey silt with sand  Trace of gravel					610										
605.6																
12.0	End of Cone Test					600										

20  
15  $\diamond$  5 % STRAIN AT FAILURE  
10



## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE No 125

WP 257-66-04 LOCATION Co-ords. 100,067 N; 76,596 E. ORIGINATED BY PP  
 DIST 1 HWY E.C. Row BORING DATE Nov. 16, 1971 COMPILED BY PP  
 DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger & Cone Test CHECKED BY PP

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH □ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_P$ WATER CONTENT $w$ $w_p$ $w$ $w_L$ WATER CONTENT % 10 20 30	UNIT WEIGHT $\gamma$	REMARKS
ELFV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE					
617.8	Ground Level								
0.0	Clayey silt with sand. Trace of gravel.		1	SS	6				
			2	SS	24				
			3	SS	52				
			4	SS	68				
	Firm		5	SS	96				
	to		6	SS	63				
	Hard		7	SS	48				
			8	SS	23				
596.3			9	SS	22				
21.5	End of Borehole		10	SS	19				

20  
15 0.5  
10  
% STRAIN AT FAILURE

## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 126

WP 257-66-04 LOCATION Co-ords. 100,030 N; 76,604 E. ORIGINATED BY TP  
 DIST 1 HWY E.C. Row BORING DATE Nov. 16, 1971 COMPILED BY PP  
 DATUM Geodetic BOREHOLE TYPE Cone Test Only CHECKED BY 13

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT		LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$		UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE		N VALUES	0 40 60 80 100	0 100	$w_p$ $w$ $w_L$		
618.3	Ground Level										
0.0	Probable clayey silt with sand. Trace of gravel.										
606.3											
12.0	End of Cone Test										

20  
15  $\diamond$  5 % STRAIN AT FAILURE  
10

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 128

WP 257-66-04

LOCATION Co-ords. 100,069 N; 76,543 E.

ORIGINATED BY PP

DIST 1 HWY E.C. Row Expy.

BORING DATE Nov. 16, 1971

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cone Test Only

CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$ $w_p$ — $w$ — $w_L$ WATER CONTENT %	UNIT WEIGHT Y	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE					
617.7	Ground Level								
0.0	Probable clayey silt with Trace of gravel								
604.7									
13.0	End of Cone Test								

20  
15  
10  
5  
0 % STRAIN AT FAILURE

## HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

## RECORD OF BOREHOLE No 130

WP 257-66-04

LOCATION Co-ords. 100,128 N; 76,532 E.

ORIGINATED BY PP

DIST 1 HWY Ex. Row

BORING DATE Nov. 16, 1971

COMPILED BY PP

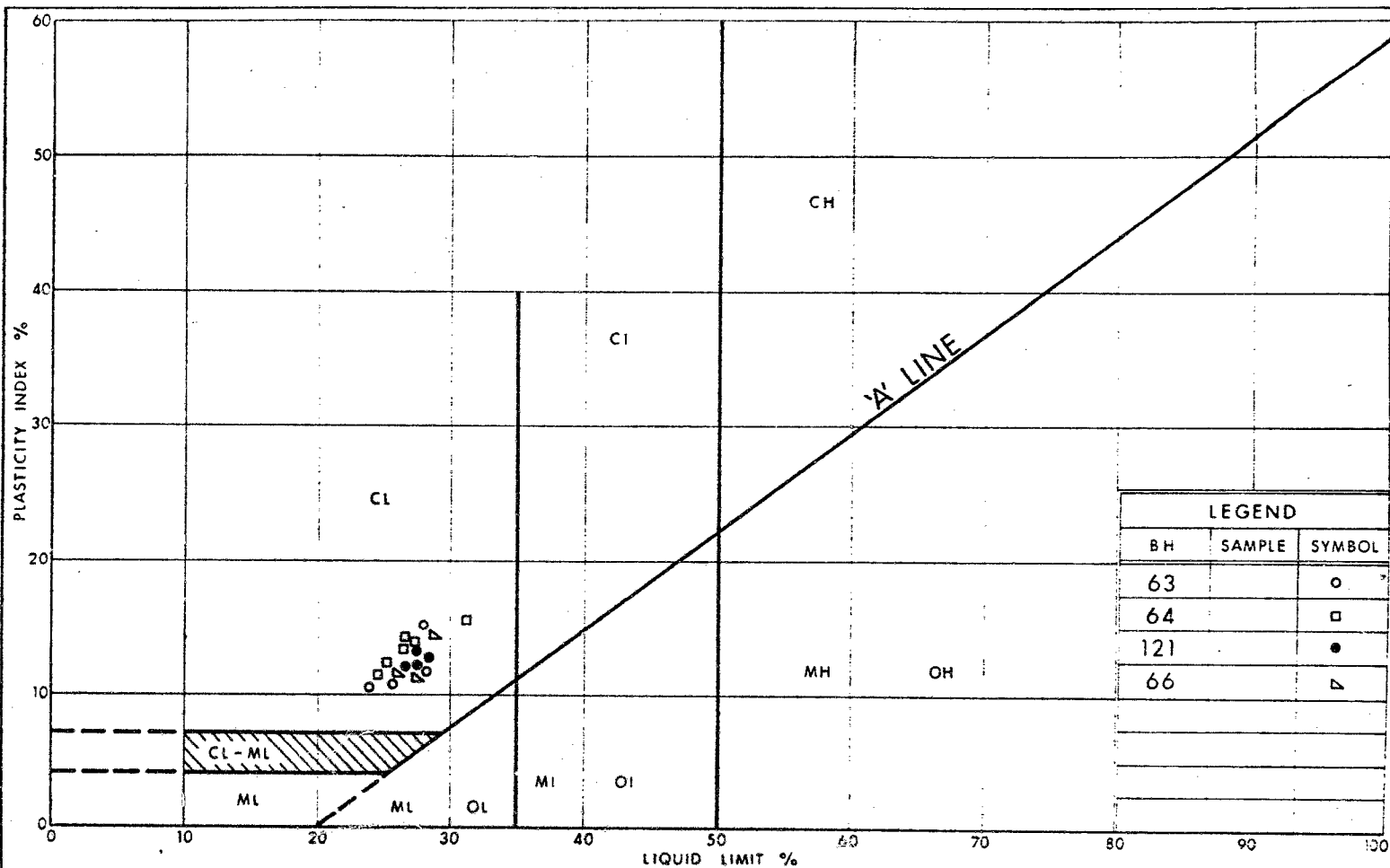
DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger &amp; Cone Test

CHECKED BY PP

SOIL PROFILE		SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$ $w_p$ — $w$ — $w_L$ WATER CONTENT % 10 20 30	UNIT WEIGHT Y	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE					
617.3	Ground Level								
0.0	Clayey silt with sand and trace of gravel. Stiff to hard.		1	SS	10				
			2	SS	9				
609.8			3	SS	37				
7.5	End of Borehole								
603.3									
14.0	End of Cone Test								

20  
15  
10  
5  
0 % STRAIN AT FAILURE

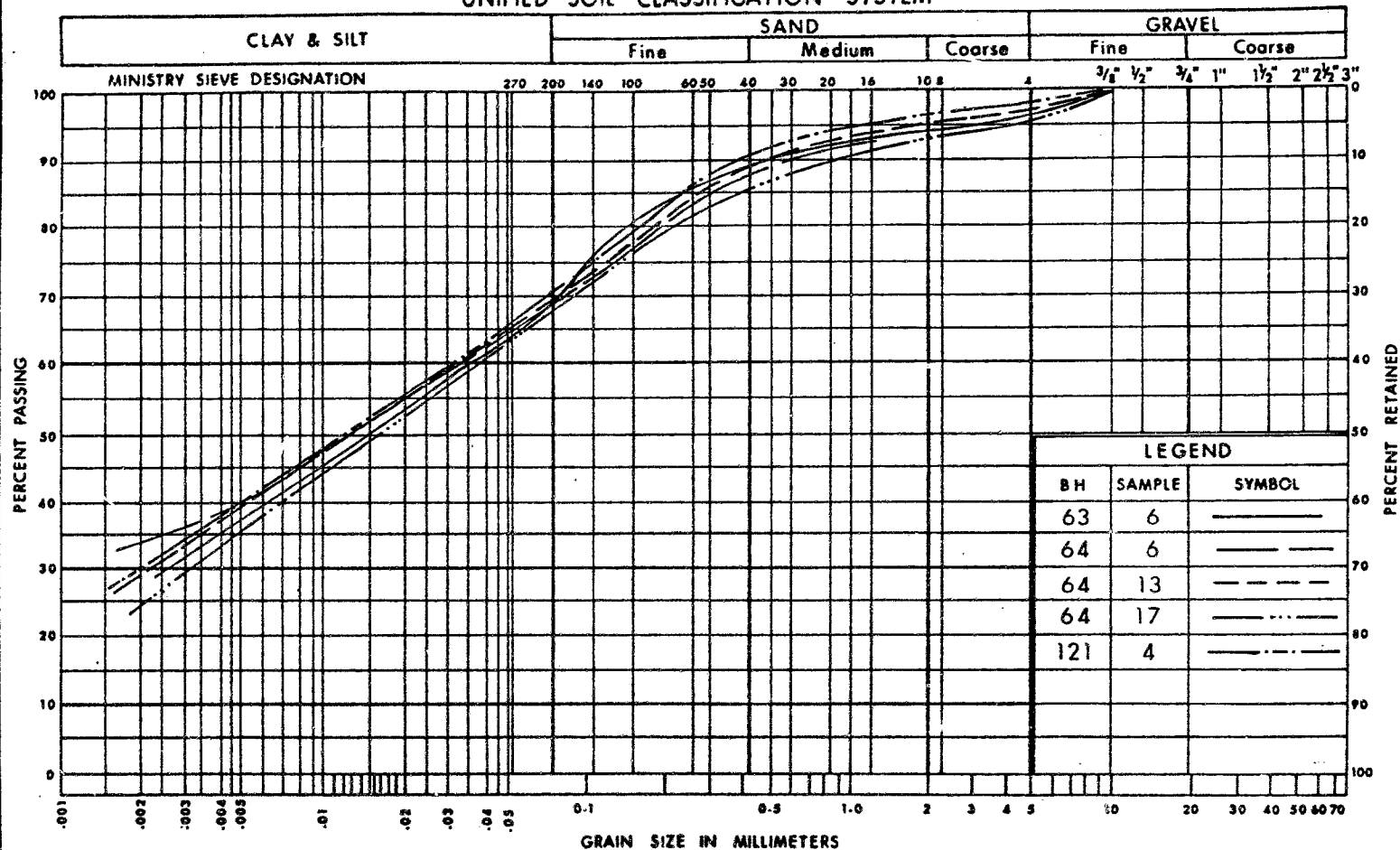


Ministry of  
Transportation and  
Communications

PLASTICITY CHART  
CLAYEY SILT

FIG No 1  
W P 257-66-04

## UNIFIED SOIL CLASSIFICATION SYSTEM



Ministry of  
Transportation and  
Communications

GRAIN SIZE DISTRIBUTION  
CLAYEY SILT

FIG No 2

W P 257-66-04

*Mr. K. Selby*

*1228*

Meeting of  
Structural Review Committee

Time: 9:30 a.m., March 3rd, 1977  
Place: Boardroom "B", West Building.

Attending: Messrs. A. E. McKim - Construction Branch  
K. Luczka - Construction Branch  
M. Stoyanoff - Structural Office  
J. Keen - Structural Office  
K. Selby - Soil Mechanics Section  
F. Gormek - Structural Maintenance

Projects Reviewed: (a) Walker Road Overpass,  
Site 6-285, W.P. 257-66-04.  
(b) C. & O. Railway O'Head (E.B.L., W.B.L.)  
Site 6-292 - A and - B, W.P. 257-66-05.  
(c) C. & O. Railway O'Head N. Frontage Road,  
Site 6-291, W.P. 257-66-06.  
(d) C. & O. Railway O'Head S. Frontage Road,  
Site 6-293, W.P. 257-66-07.

In the absence of Mr. McFarlane, Mr. Keen made a summary presentation for all the structures, including Mr. McFarlane's projects, pointing out the design features and related pertinent data.

The following items were discussed.

Walker Road Overpass (W.P. 257-66-04)

Foundations

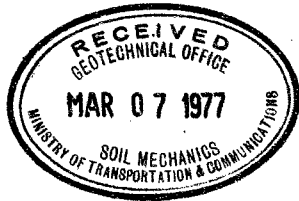
The footings for the bridge were constructed and backfilled under contract 76-75. The work to be done under this contract with regard to the footings was reviewed to ensure that all items were covered by the contract documents.

Structure

- (a) The design of the prestressed beams is to be adjusted to reflect the use of stabilized strand, and the actual transfer strength, to the nearest 100 psi, is to be shown on the drawings.
- (b) The standard for the expansion joint assembly shall indicate alternative classes of joint assembly which are permitted.
- (c) The deck is to be machine finished.
- (d) The proposed special provisions for maintenance of traffic during construction and operational constraints were reviewed by the Committee and found to require some adjustment of terminology and content.

This is to be resolved by the Structural Contract Section in conjunction with the Region.

..... 2



- (e) The reference to Form 905 against the tender item Concrete in Piers, Abutments and Retaining Walls is to be deleted.

C. & O. Railway Overhead Structures (W.P. 257-66-05, -06, and -07)

Foundations

The piling requirements were reviewed, taking into consideration the results of the piling operation for Walker Road. It was concluded that for the C. & O. structures special driving shoes are not required and that a flat plate would be satisfactory. The standard for the driving shoe is to be adjusted to call for flat plate type I shoe. It was noted that the requirements for the pile driving equipment have been shown on the contract drawings and conform to the recommendations of the Soil Mechanics Section.

Structures

- (a) The design of the prestressed beams is to be adjusted to reflect the use of stabilized strand, and the actual transfer strength, to the nearest 100 psi, is to be shown on the drawings.
- (b) The latest standards for the guiderail and channel anchors have been included in the drawings and do not conflict with the old standard for the barrier wall.
- (c) The deck is to be machine finished.

No other items were brought up and the meeting adjourned at 11:45 a.m.

MS/im

  
M. Stoyanoff,  
Structural Contract Engineer.

copies to:

J. B. Wilkes  
E. J. Orr  
R. A. Dorton  
C. S. Grebski  
A. P. Watt  
W. Lin  
A. Radkowski  
K. Bassi  
W. McFarlane  
All attending meeting.





Memorandum

W.P. 257-66-04

To: Mr. A. Hittenberg,  
Regional Manager,  
Systems Design,  
London Regional Office.

From: Structural Office,  
West Building,  
Downsview, Ontario.

Attention:

Date: February 10, 1975.

Our File Ref.

In Reply to

Subject:

W.P. 257-66-04, Site 6-285  
Walker Road Underpass  
E.C. Row Expwy. District #1

Please revise the special provision "Drive Steel  
Tube Piles" to read as follows:

"At the contract price for the above tender item,  
the Contractor shall also include the work for  
pre-drilling holes for the steel tube piles as  
shown on the contract drawings, supplying,  
installing and removing any temporary casing  
which may be required to ensure the stability  
of the holes and backfill the space around the  
piles as shown on the contract drawings and as  
described herein.

After pre-drilling the holes and installing temporary  
casing, if required, the piles shall be placed in  
the holes. The temporary casing, if installed,  
shall then be removed. The spaces around the piles  
shall then be filled with dry sand which shall be  
heaped around the pile circumference at ground  
level, and replenished, if necessary, as driving  
proceeds in order to ensure that all voids are  
properly filled."

H. Goltay,  
Structural Contract  
Specifications Engineer.

ME/ac

c.c. J. Keen  
J. Wear  
D.P. Collins  
B. Giroux  
A.E. McKim  
K. Selby ✓  
A. Watt



Mr. W. Katarynczuk,  
District Construction Engineer,  
Chatham.

Construction office,  
Third Floor, Central Bldg.,

February 13, 1975.

Walker Road Overpass W.P. 257-66-04, Site 6-285,  
C. & O. Rlwy. Overheads W.P. 257-66-05, Site 6-292 A & B,  
" " " " -06, Site 6-291,  
E.C. Row Expwy, District 1 - -07, Site 6-293.

This will confirm discussions and points agreed upon during our recent meeting in the Structural Design office.

Walker Road Overpass - There will be no need to pre-auger back row of piles in abutment footings as it was decided to re-locate all public utilities that are within 12 ft. of these piles.

Since the auger holes for the front row of piles are required to be larger than the diameter of the piles, the voids around the piles should be filled in the following sequence:

1. Auger the hole for the pile to a depth shown on the plan.
2. Drop pile in the hole.
3. Fill void with dry sand and heap the sand around the pile at the ground level.
4. Drive piles, placing more sand around the pile as the sand fills the void during driving.

C. & O. Railway Overheads - No appreciable heave at the railway tracks is anticipated during driving of piles.

The 21" storm sewer in the vicinity of east abutment is to be replaced with reinforced sewer and therefore no problems are foreseen during driving as piles are more than 12 ft. away.

The 30" C.S.P. might be relocated to avoid excavation in proximity of the railway tracks. If this cannot be done, the plans will be revised to show the track protection for the pipe excavation and the construction sequence so that the pipe will be placed after the piles are driven.

K. Luczka,  
Bridge Construction Engineer.

KL/JC

c.c. C.S. Grebski  
K.G. Selby ✓



Mr. C. Grebski,  
Structural Design Engineer,  
Structural Design Section,  
West Bldg., Downsview

Soil Mechanics Section,  
Geotechnical Office,  
West Bldg., Downsview.

August 27th, 1974.

J. Keen

W.P.'s 257-66-03,04,05,06,07,09,21  
E.C. Row Expy., Windsor,  
District #1 (Chatham)

Following is a summary of the main points of our discussion on August 22, 1974 regarding piled foundations for the abovementioned projects.

1. For the C. & O. Rwy. structures a cost estimate of spread footings versus piled foundations indicates a much smaller saving in favour of spread footings than previously anticipated. This is partly due to the fact that as a result of the recent pile tests we are able to reduce the number of piles required by about 25%. In view of this and other (mainly settlement) considerations it was decided to adopt the piled foundation design.
2. A restriction on the use of pile driving hammers delivering more than 30,000 ft.lbs. per blow when the pile tips are within 3 ft. of bedrock, to be incorporated in the contract, requires that the bedrock surface be defined accurately at locations where piles are to be driven. To achieve this it will be necessary for the Soil Mechanics Section to carry out additional borings at all of the structure sites. In order to meet the present design schedule this drilling work should be completed and reported on by the end of October 1974.

*K.G. Selby*

K.G. Selby  
Supervising Engineer

KGS/rgb

c.c. A. Watt  
J. Anderson

Files  
Documents

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. Rutka  
Manager  
Geotechnical Office  
West Bldg., Downsview

FROM: Structural Planning Office  
Southwestern Region

ATTENTION: Mr. K. G. Selby  
Supervising Foundations Engineer

DATE: April 2, 1974

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 257-66-04, Bridge Site 6-285  
Walker Road Overpass  
E. C. Row Expressway  
Windsor  
District 1, Chatham

Enclosed please find the following details 1 to 4 which are partial prints of drawings prepared by M. M. Dillon, Consulting Engineers, for the City of Windsor Utilities Commission.

These details show the location and size of a new concrete duct bank in the vicinity of the west abutment of the above noted structure. In addition, an extract from drawing 6-285-4, prepared by the M.T.C. Structural Office, showing the proposed pile layout the same abutment is enclosed.

It is proposed to construct this duct bank in the immediate future and it will be in service by the time construction of the new structure commences.

Would you please assess, what, if any, effect this duct bank is likely to have on the construction of the Walker Road Structure, in particular, if any special precautions would be recommended for installation of the pile foundations of the west abutment.

It is understood the duct bank will carry 3 to 4 live 30 kv cables while our structure is being built. The balance of the ducts are provided for future use.

The 12" diameter storm sewer shown close to the proposed duct bank, detail 1 enclosed, is to be relocated by Systems Design so that there will no longer be any conflict between it and the duct bank.

Would you kindly return the enclosed drawings with your comments and/or recommendations.

*Bryan McKenna*  
B. J. McKenna  
Structural Planning Engineer

BJMcK:sz  
Enc.

cc T. A. Hickey  
J. L. Keen

