

4057-14

DIST. NO. 1		SHEET
CONT No		
WP No 125-65-00-		
MOISON CREEK BRIDGE 1.7 MI. S.E. OF BELLE RIVER E. LIMITS GENERAL LAYOUT		

NOTES:

CLASS OF CONCRETE
FOOTINGS & APPROACH SLABS - 3000 P.S.I.
REMAINDER - 4000 P.S.I.
CLEAR COVER TO REINFORCING STEEL
FOOTINGS & ABUTMENTS - 3"
DECK - 2" TOP; 1 1/2" BOT.
OR AS NOTED ON THE DRAWINGS.
REINFORCING STEEL GRADE
ALL STEEL - 50 K.S.I.

CONSTRUCTION NOTES

FALSEWORK SUPPORTING WINGWALLS SHALL NOT BE REMOVED UNTIL CONCRETE IN THE DECK SLAB HAS ATTAINED A MINIMUM STRENGTH OF 3000 P.S.I.
BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS KEEPING THE HEIGHTS OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATIONS BE GREATER THAN 2 FEET.
FALSEWORK SUPPORTING THE DECK SHALL NOT BE REMOVED UNTIL AFTER THE BACKFILL HAS BEEN PLACED BEHIND THE ABUTMENTS, TO AT LEAST EL. 584.00.

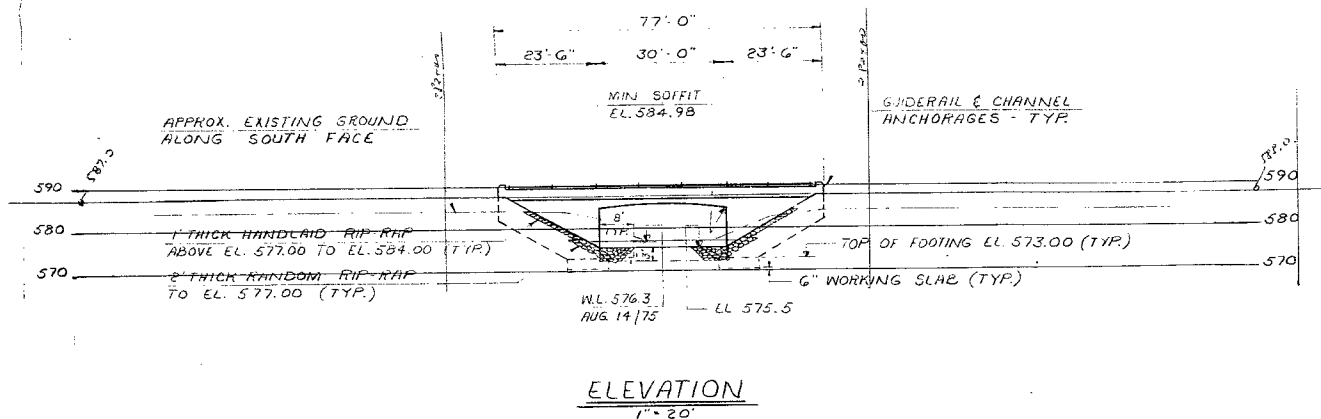
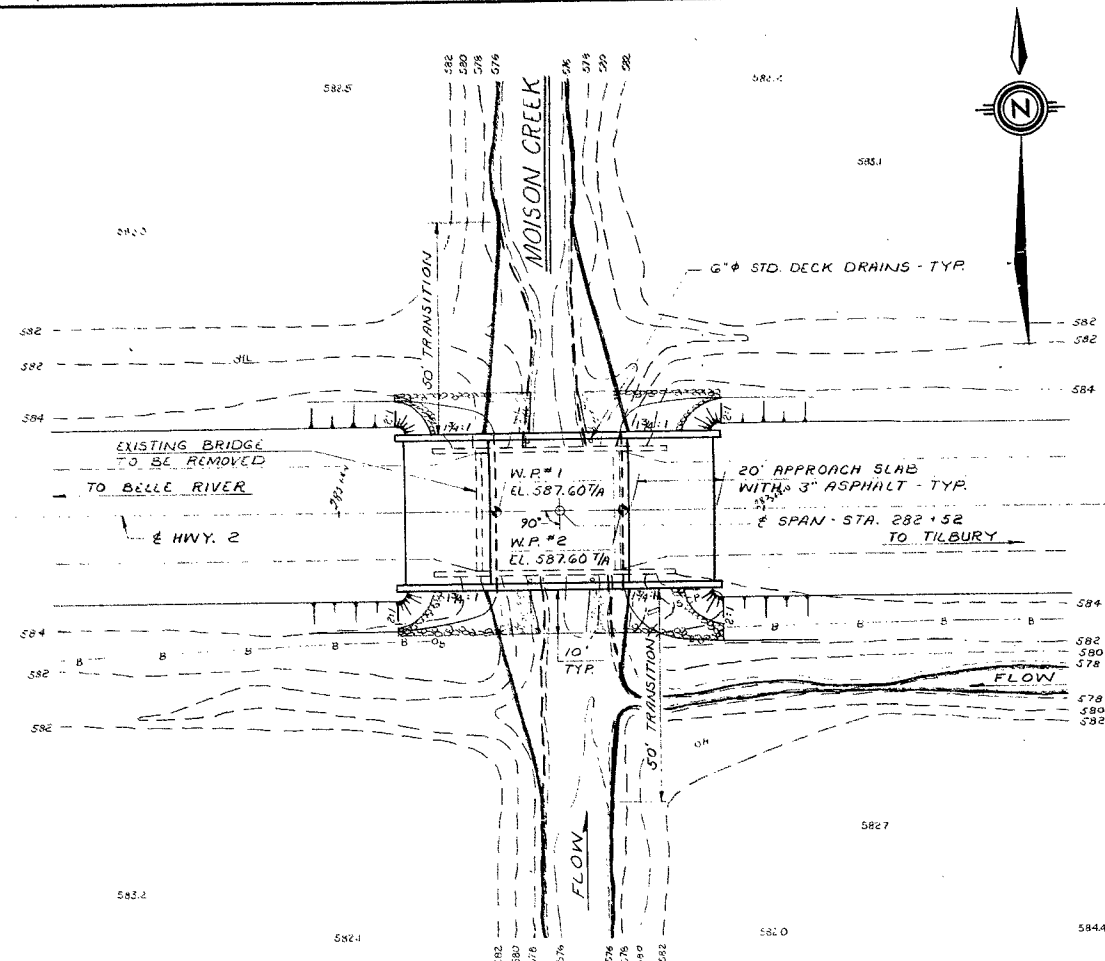
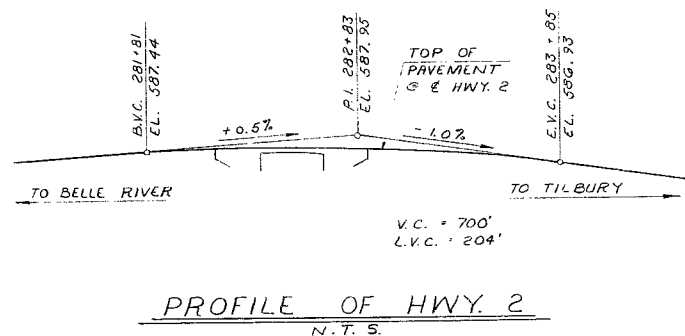
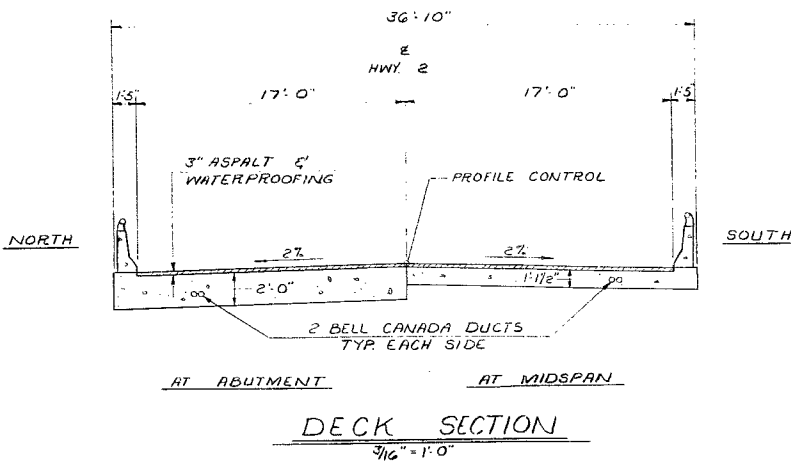
SIDES OF FOOTINGS TO BE CAST AGAINST UNDISTURBED GROUND.

CONCRETE QUANTITIES:

CONCRETE QUANTITIES ARE LISTED BELOW FOR THE APPROPRIATE CONCRETE LUMP SUM TENDER ITEMS:
CONCRETE IN BRIDGE - 187 CU.YD.
CONCRETE IN BARRIER WALLS - 12 CU.YD.
CONCRETE IN APPROACH SLABS - 11 CU.YD.

LIST OF DRAWINGS:

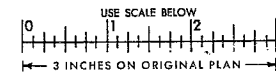
- G-36-1 GENERAL LAYOUT
- 2 BORE HOLE LOCATIONS & SOIL STRATA
- 3 FOOTINGS
- 4 RIGID FRAME
- 5 WINGWALLS
- 6 BARRIER WALLS
- 7 STEEL RAILING
- 8 20 FT. APPROACH SLAB
- 9 AS CONSTRUCTED ELEV. & DIM.
- 10 STANDARD DETAILS I
- 11 STANDARD DETAILS II




BM 583.97
GEODETIC DATUM
TOP OF 3/4" RIB
51" RT 279+73

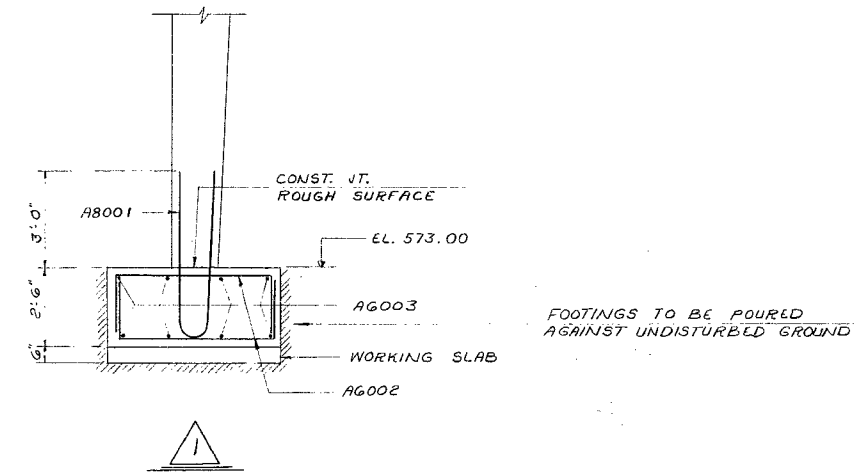
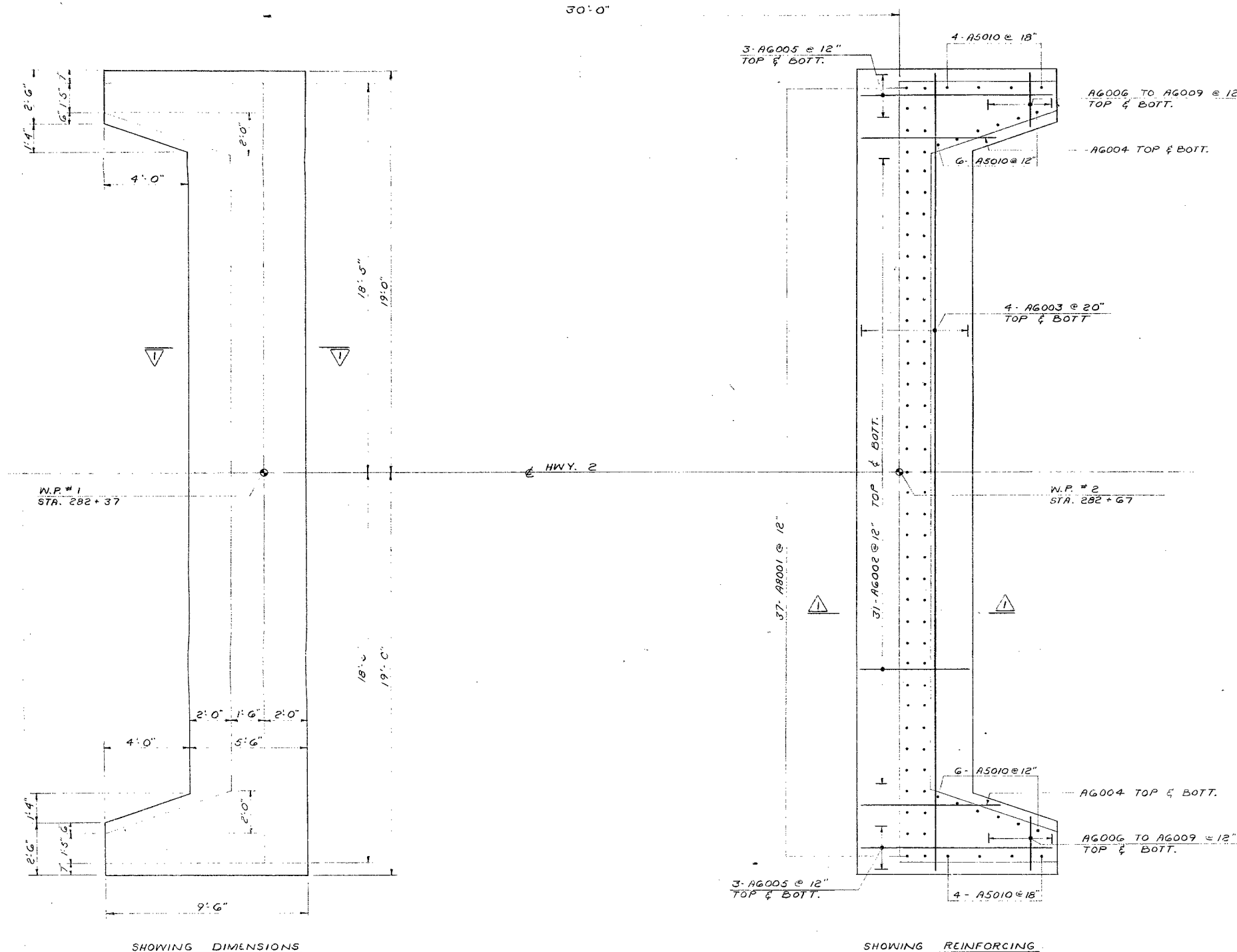


FOR REDUCED PLAN

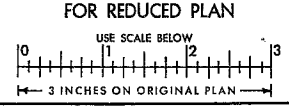


REVISIONS	DATE	BY	DESCRIPTION
1	JAN 26 1977	JFM	LOADING HS 20-44
2			
3			

DIST. NO. 1		
CONT No WP No 125-65-00		
MOISON CREEK BRIDGE 1.7 MI. S.E. OF BELLE RIVER E. LIMITS		SHEET
FOOTINGS		

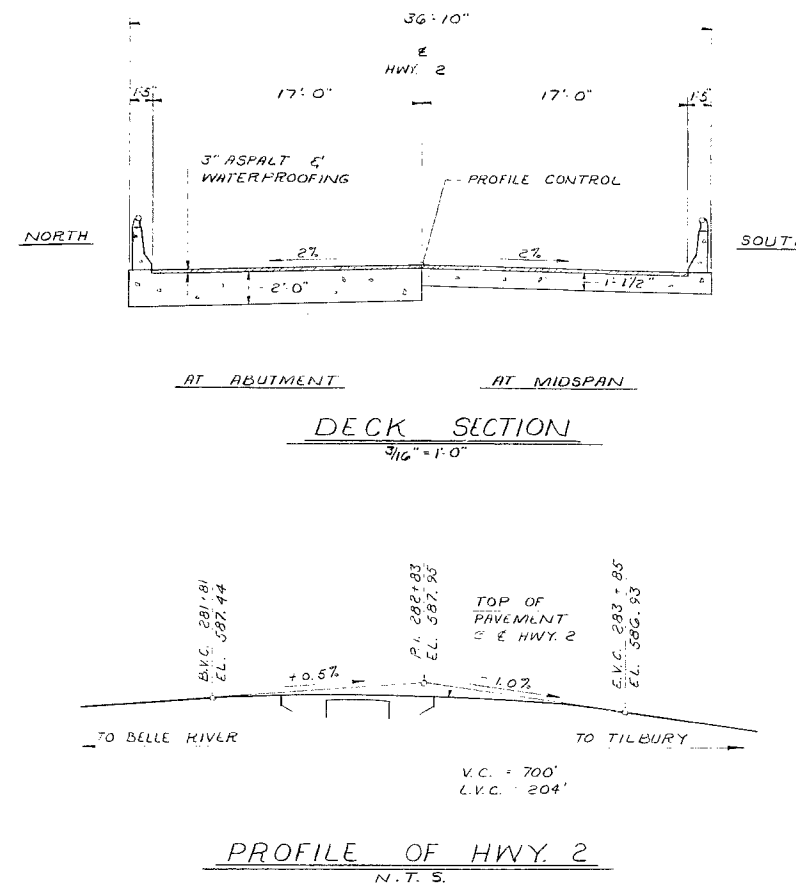
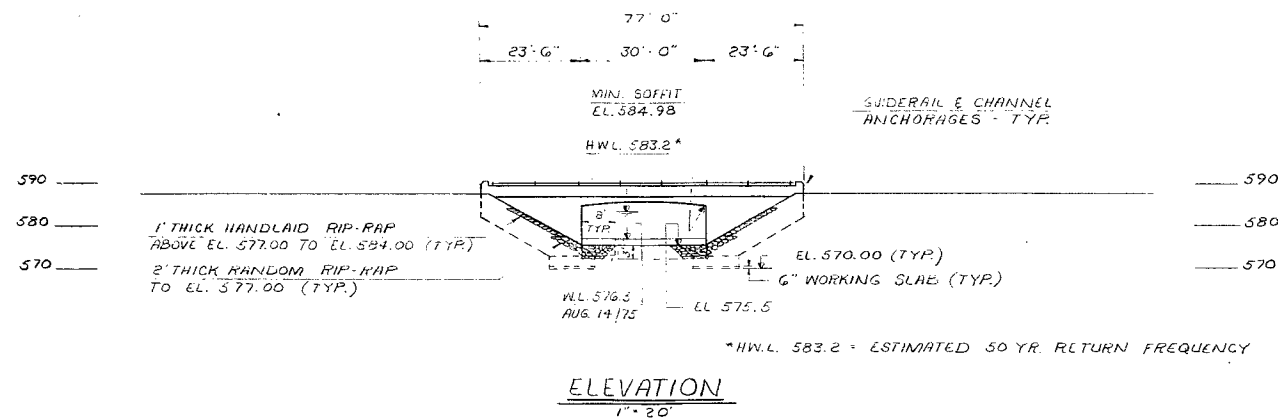
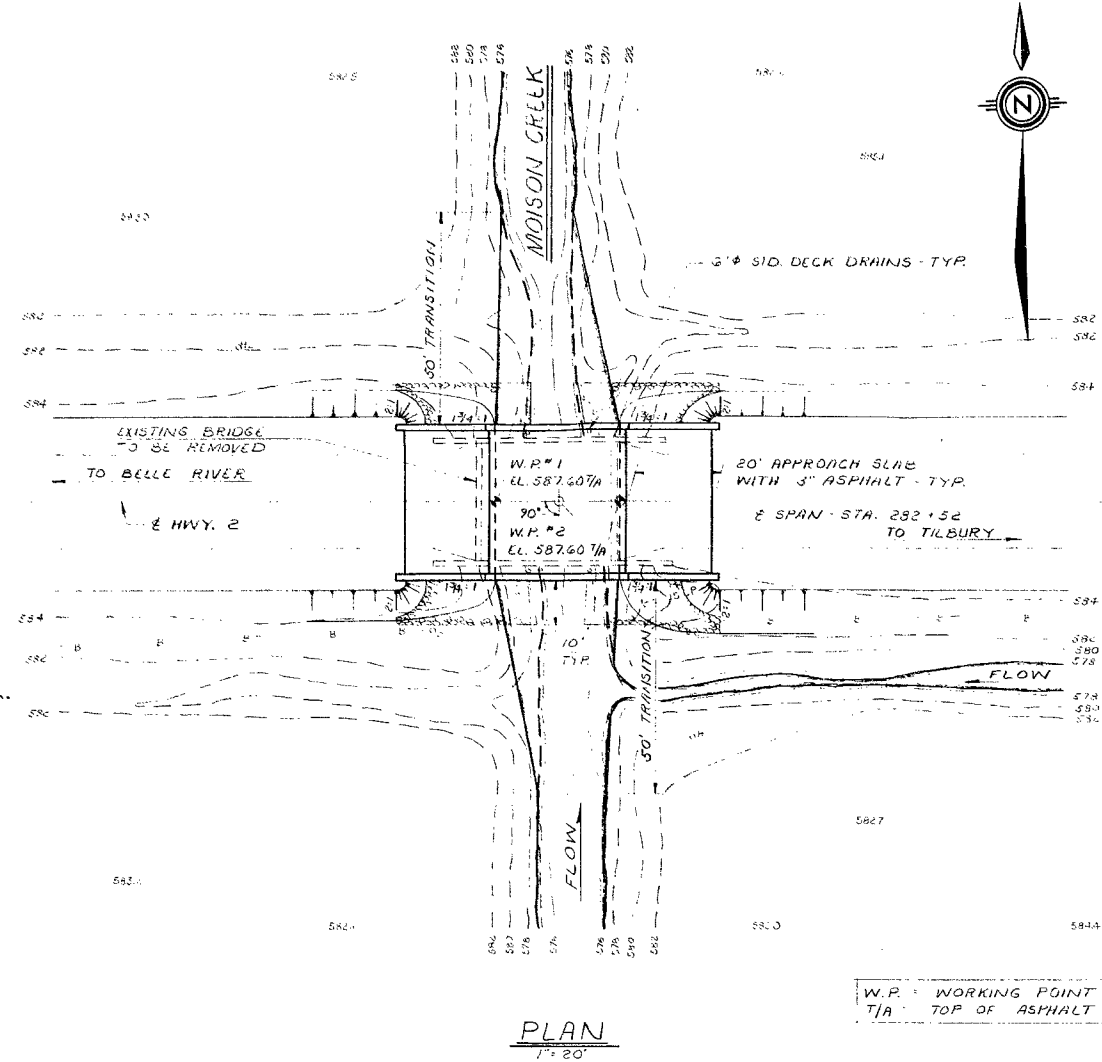


SCALE: 3/8" = 1'-0" UNLESS NOTED OTHERWISE



REVISIONS	DATE	BY	DESCRIPTION
DESIGN J.F.M. CHECK			LOADING HS20-44
DRAWING J.F.M. CHECK J.L.K.			SITE No 6-36
			DATE JAN. 77
			DWG 3

FOOTING LAYOUT



DIST. NO. 1	
CONT No	
WP No 125-65-00	
MOISON CREEK BRIDGE	SHEET
1.7 MI. S.E. OF BELLE RIVER E. LIMITS	
PRELIMINARY	

NOTES:

CLASS OF CONCRETE

FOOTINGS & APPROACH SLABS - 3000 P.S.I.
REMAINDER - 4000 P.S.I.

CLEAR COVER TO REINFORCING STEEL

FOOTINGS & ABUTMENTS - 3"
DECK - 2" TOP; 1 1/2" BOTT.
OR AS NOTED ON THE DRAWINGS.

REINFORCING STEEL GRADE

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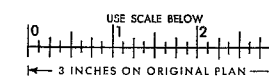
CONCRETE IN BRIDGE CU.YD.
CONCRETE IN BARRIER WALLS CU.YD.
CONCRETE IN APPROACH SLABS CU.YD.

LIST OF DRAWINGS:

- 6-36-1 GENERAL LAYOUT
- 2 BORE HOLE LOCATIONS & SOIL STRATA
- 3 FOOTING LAYOUT
- 4 RIGID FRAME & WINGWALLS
- 5 BARRIER WALLS
- 6 STEEL PARAPET RAILING
- 7 20 FT. APPROACH SLAB
- 8 AS CONSTRUCTED ELEV. & DIM.
- 9 STANDARD DETAILS I
- 10 STANDARD DETAILS II

BM 583.97
GEODETIC DATUM
TOP OF 3/4" RIB
51" RT 279 + 73

FOR REDUCED PLAN



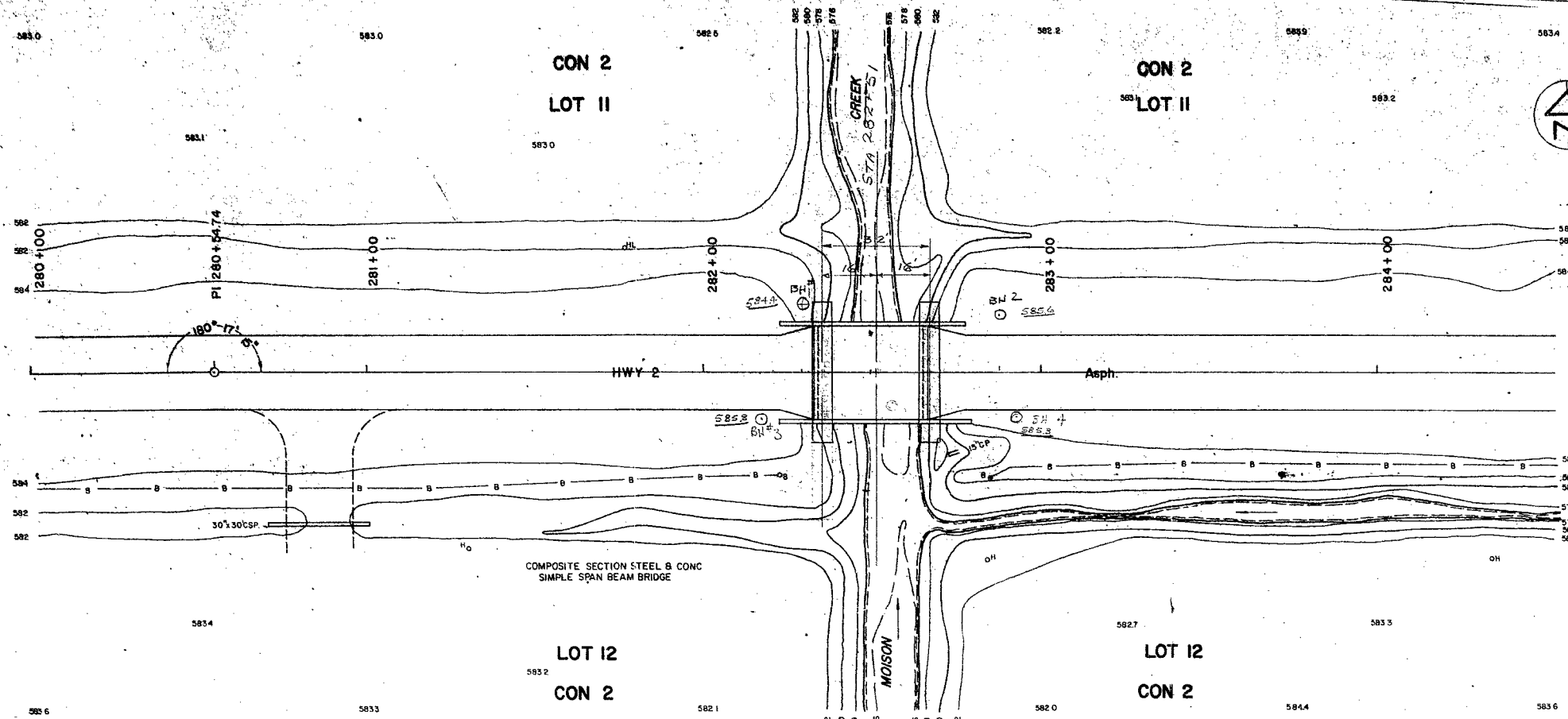
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	CHECK	LOADING	HS 20-44
DRAWING	J.F.M.	CHECK	J.L.K. SITE No 6-36 DWG P1



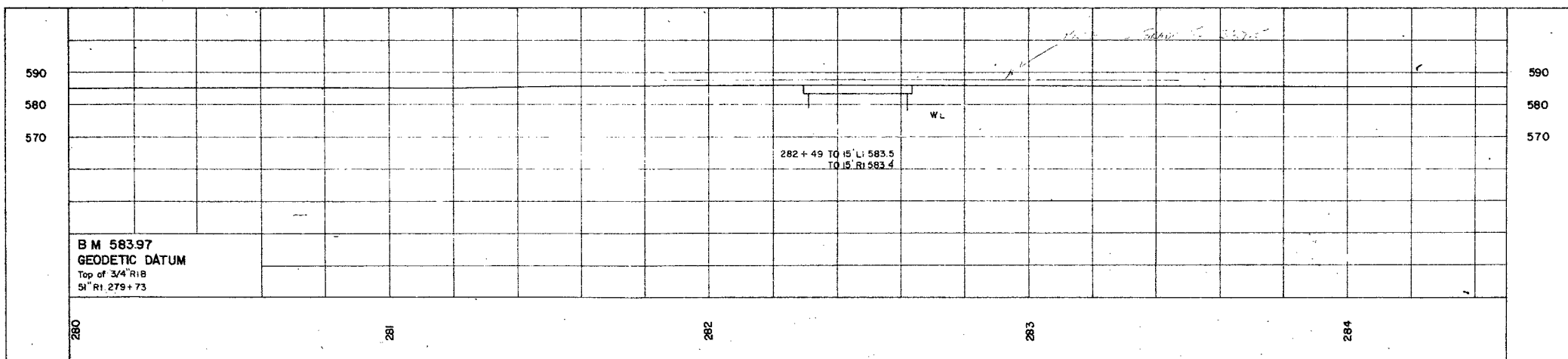
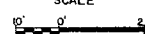
4057-14

CO ESSEX
TWP ROCHESTER

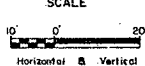
PROBABLE FOOTING LOCATION



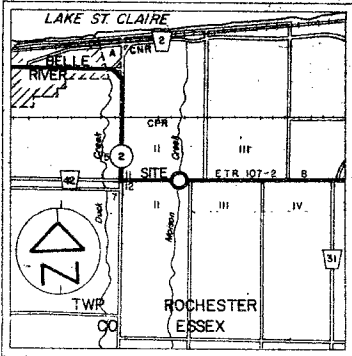
PLAN
SCALE



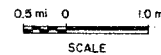
PROFILE
SCALE



TO E1085.5 583.47	E1585.8 E1586.0	E1585.8	TO E1585.4 583.49
EXISTING CROSS	SECTION	OVER MOISON CREEK	STRUCTURE



KEY PLAN



WP 125-65-00

DATE	REVISIONS & ADDITIONS	BY	CH'KD

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN DIVISION - DESIGN SERVICES BRANCH
ENGINEERING SURVEYS OFFICE

BRIDGE SITE 4037-14

EXISTING CROSSING
AT
HWY 2
AND
MOISON CREEK
APPROX 11.7 MI. WEST OF HWY 401

LOTS 11 & 12
TWP ROCHESTER
CON 2
CO ESSEX

SCALE AS SHOWN	DISTRICT CHATHAM	REGION SOUTH WESTERN
WO 93-631-71	Date of Survey Plan May '74 May '74	SITE 6-36
SURVEY BY Chief of Party L. LESLIE Supervisor R. AGNEW	DRAWN BY Draftsman J. COSSEY Supervisor J. SALVATORI	CHECKED BY Draftsman J. SALVATORI Supervisor J. SALVATORI

PLAN E-5361-1

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT 1976

GEOCRES No. 40J7-14
DIST. 1 REGION Southwestern
W.P. No. 125-65-00
CONT. No. 78-01
W. O. No. _____
STR. SITE No. 6-36
HWY. No. 2
LOCATION Maison River Bridge
1.7 mi Southeast of Belle River
East Limits

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS. ① documents to be unfolded
before microfilming
② photos enclosed

FOUNDATION INVESTIGATION REPORT

for

W.P. 125-65-00

Site No. 6-36

Hwy. 2, District 1, Chatham

Maison River Bridge

1.7 Miles Southeast of Belle River East Limits

1. INTRODUCTION

A request for a foundation investigation at the crossing of Hwy. 2 and Maison Creek was received from Mr. A.P. Watt, Regional Structural Planning Engineer, in a memorandum dated September 15, 1975.

Subsequently, a field investigation was carried out by the Soil Mechanics Section, to determine the subsoil and groundwater conditions at the site.

This report contains the results of this investigation and our recommendations pertaining to the design of the structure foundations and approaches.

2. SITE DESCRIPTION

The structure replacement site is located at the crossing of Hwy. 2 and Maison Creek, approximately 1.7 miles southeast of Belle River East Limits. The surrounding area is flat and cultivated farmland.

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

3. SUBSURFACE CONDITIONS

(3.1) General

Generally, uniform subsoil conditions were found to prevail over the site area. The subsoil consists of a 7-9 ft. thick zone of cohesive type roadway fill material, followed by a deep deposit of clayey silt. The boundaries between the different deposits are shown on the Record of Borehole Sheets attached to the Appendix. The estimated stratigraphical profile of Drawing 1256500-A is based upon this information.

(3.2) Fill Material

This layer was intersected in both borings and extends from immediately below the ground surface down to elev. 577 \pm . The material was found to consist of a mixture of brown coloured clayey silt, sand and gravel. The consistency may be described as stiff to very stiff.

(3.3) Clayey Silt, Some Sand and Traces of Gravel

The fill material is underlain by a stratum composed of brown and grey clayey silt with some sand and traces of gravel. The thickness of the deposit is in excess of 100 ft. (the borings were terminated within this zone at elev. 484).

An overconsolidated zone, due to desiccation and/or weathering, with thickness ranging from 8 to 12 ft., was found to extend from the upper surface of the stratum. This zone is brown in colour and has a very stiff to hard consistency; 'N' values ranged from 18 to 39 blows per ft. 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 5000 psf. Below the desiccated zone, the colour of the soil is grey and the consistency ranges somewhat randomly from firm to hard. For design purposes the following undrained shear strength values are suggested:

Existing Fill Material	1000 psf.
elev. 575-569	4000 psf.
elev. 569-550	1750 psf.
elev. 550-484	1250 psf.

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

	<u>Range</u>
Natural Moisture Content: (%)	18- 26
Liquid Limit: (%)	26- 35
Plastic Limit: (%)	12- 20
Bulk Density: (PCF)	123- 133
Unconfined Shear Strength: (PSF)	675-2845
Field Vane Test: (PSF)	920-2000
Sensitivity	1- 3

Grain-size distribution curves are included in the Appendix of this report (Fig. 1).

4. GROUNDWATER CONDITIONS

The groundwater level in B.H. #2 was found to be at the same elev. (577+) as the water level in the creek.

An artesian condition was encountered in B.H. #1 at elev. 489 with a head to elev. 587+.

The borehole was sealed and backfilled.

5. DISCUSSION AND RECOMMENDATIONS

(5.1) General

It is proposed to replace the existing single span structure at this location. The new structure will have the same span length (32 ft.) and will be wider by about 5 ft. on each side. The proposed profile grade will be at elev. 587.5 which is about 2 ft. higher than the existing grade.

As described in the previous paragraphs of this report, the subsoil at the site consists of a deep deposit of clayey silt with some sand and traces of gravel. The upper 8 to 12 ft. of the deposit is a desiccated crust. Below this depth the undrained shear strength of the material decreases. The desiccated crust appears to be suitable for spread footing type foundations.

(5.2) Foundations

(5.2.1) Spread Footings in Original Ground

The structure may be supported on spread footings placed within the very stiff to hard desiccated zone of the subsoil between elev. 575 and elev. 565.

A safe net pressure of 2.5 tsf. may be assumed for design purposes.

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 concrete working slab immediately on exposure.

The base of the footings should have a minimum cover of 4 ft. for frost protection purposes.

The depth of footings will be governed by hydrological requirements, as determined by the Hydrology Section.

(5.2.2) Friction Pile Support

No. 14 timber piles may be used at this location. The timber piles should have embedded lengths of 45 ft. in original soil, in which case 20 ton per pile design loads may be employed.

It is assumed that the piles will be entirely below the groundwater level. If any lengths of the piles remains above groundwater level, these should be treated to prevent decay.

The pile caps should be protected against frost action by four ft. of earth cover.

(5.2.3) Dewatering

The footing excavations will likely extend below the observed water level. Due to the relatively impervious nature of the subsoil, no major dewatering problems are anticipated. It is believed that, at the bottom of the excavations, the clayey silt will have adequate internal strength so that no instability will occur.

(5.3) Approach Embankments

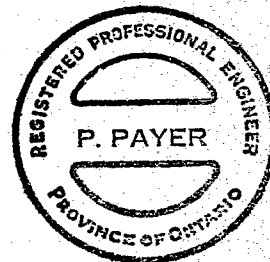
The approach embankments will be about 12 ft. high over the creek bed. The proposed new profile grade is only 2 ft. higher than the existing roadway. No stability problems are anticipated. The

side slopes should be constructed with 2 horizontal to 1 vertical slopes.

Backfill to the abutment wall should be in accordance with current MTC practices.

Settlement of the subsoil induced by the new structure and approach fills will be negligible.

P. Payer
P. PAYER
Senior Engineer



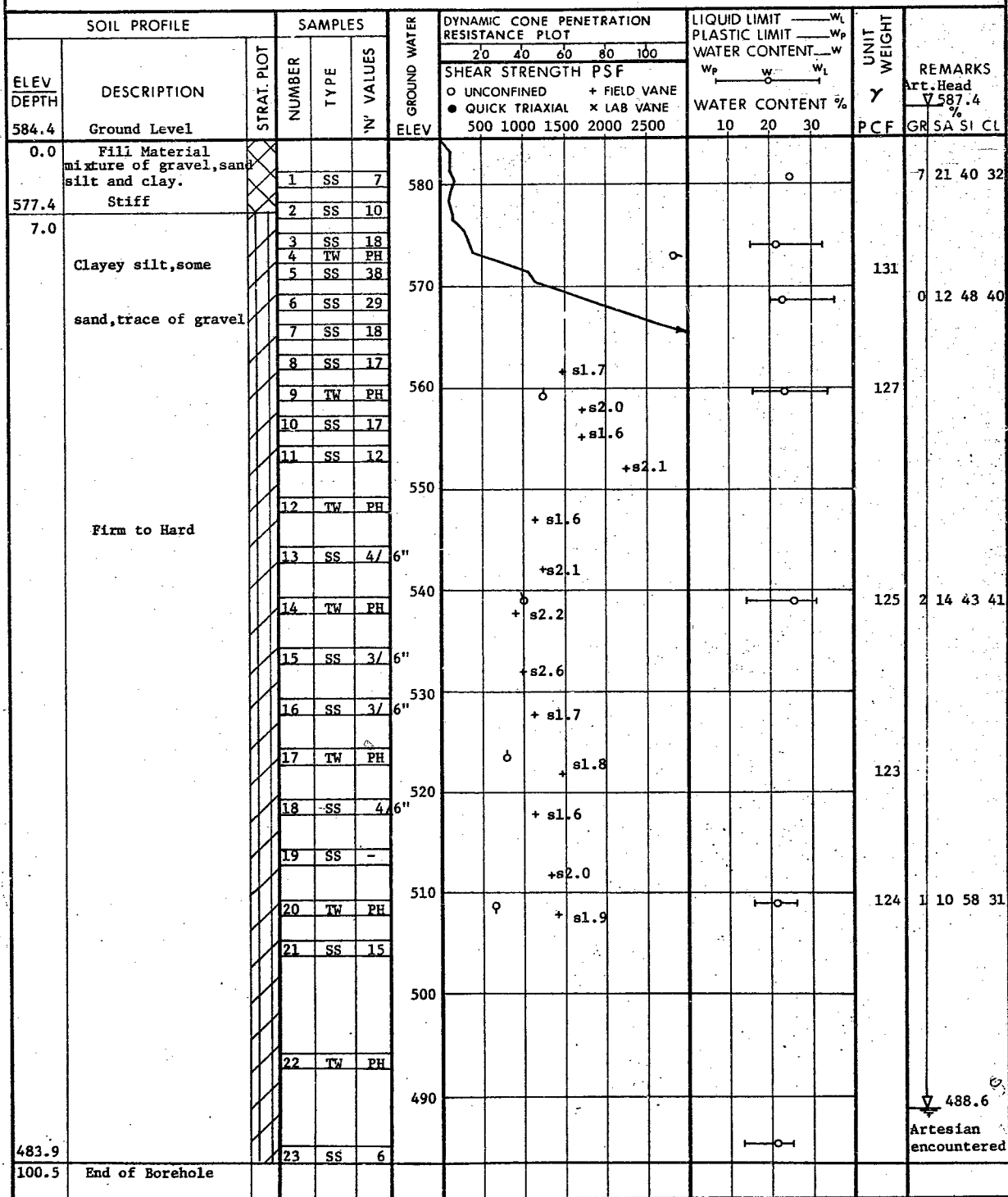
K.G. Selby
K.G. SELBY
Supervising Engineer

February, 1976

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 1

WP 125-65-00 LOCATION Sta. 282 + 29 o/s 22' Lt. E Hwy. 2 ORIGINATED BY MK
DIST 1 HWY 2 BORING DATE January 14 to 21, 1976 COMPILED BY GP
DATUM Geodetic BOREHOLE TYPE Cont. Flight Auger, BX Casing CHECKED BY



488.6
Artesian encountered

RECORD OF BOREHOLE NO 2

WP 125-65-00

LOCATION Sta. 282 + 87 o/s 17' Lt. of Hwy. 2

ORIGINATED BY MK

DIST 1 HWY 2

BORING DATE January 16 to 19, 1976

COMPILED BY GP

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger

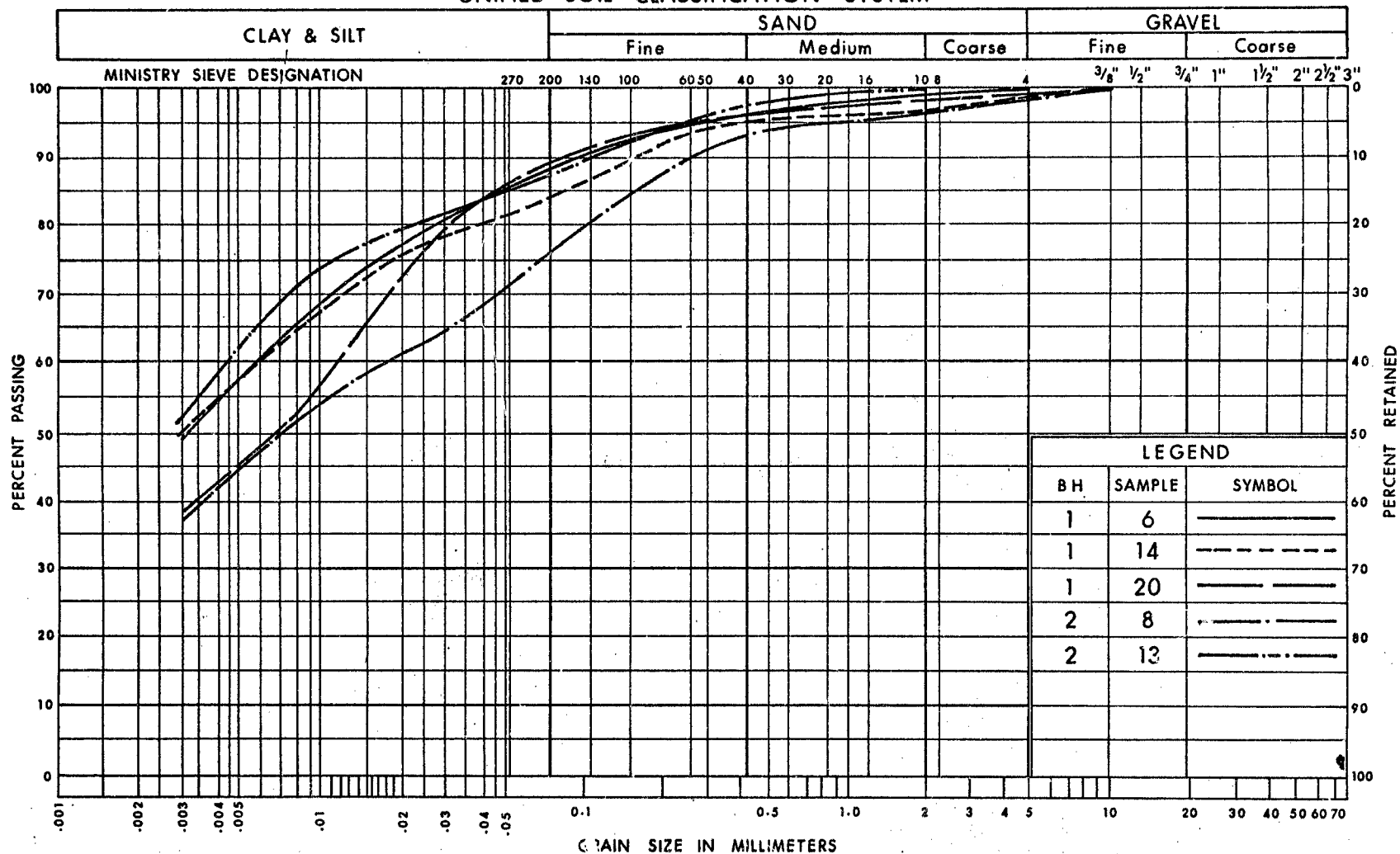
CHECKED BY

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 PCF	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100	w_p	w	w_L	
585.6	Ground Level														
0.0	Fill material mixture of sand, silt & clay.		1	SS	10										0 16 46 38
577.1	Stiff to Very Stiff		2	SS	17										
8.5	Clayey silt, some sand, trace of gravel.		3	SS	18										
			4	SS	34										
			5	SS	24										
			6	SS	14										
			7	SS	9										
			8	TW	PH										133 1 22 46 31
			9	SS	PH										
			10	SS	12										
	Stiff to Hard		11	SS	14										
			12	TW	PH										
			13	TW	PH										123 0 13 42 45
534.1			14	SS	8										
51.5	End of Borehole														

WP 125-65-00 LOCATION Sta. 282 + 94 o/s 15' Rt. of Hwy. 2 ORIGINATED BY MK
DIST 1 HWY 2 BORING DATE January 16, 1976 COMPILED BY GP
DATUM Geodetic BOREHOLE TYPE Cone Test only CHECKED BY GP

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

UNIFIED SOIL CLASSIFICATION SYSTEM



Ontario

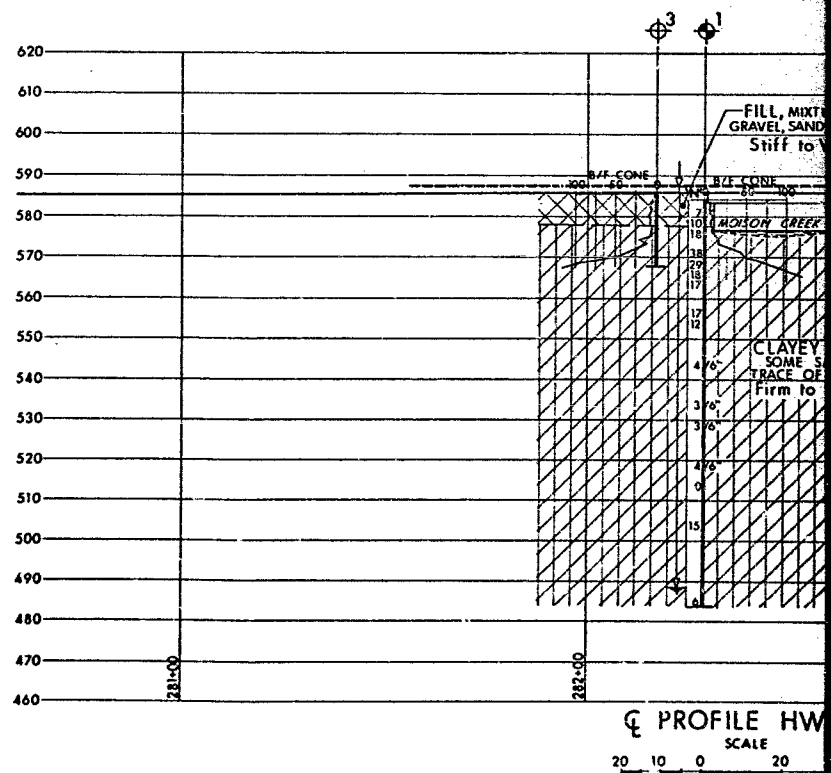
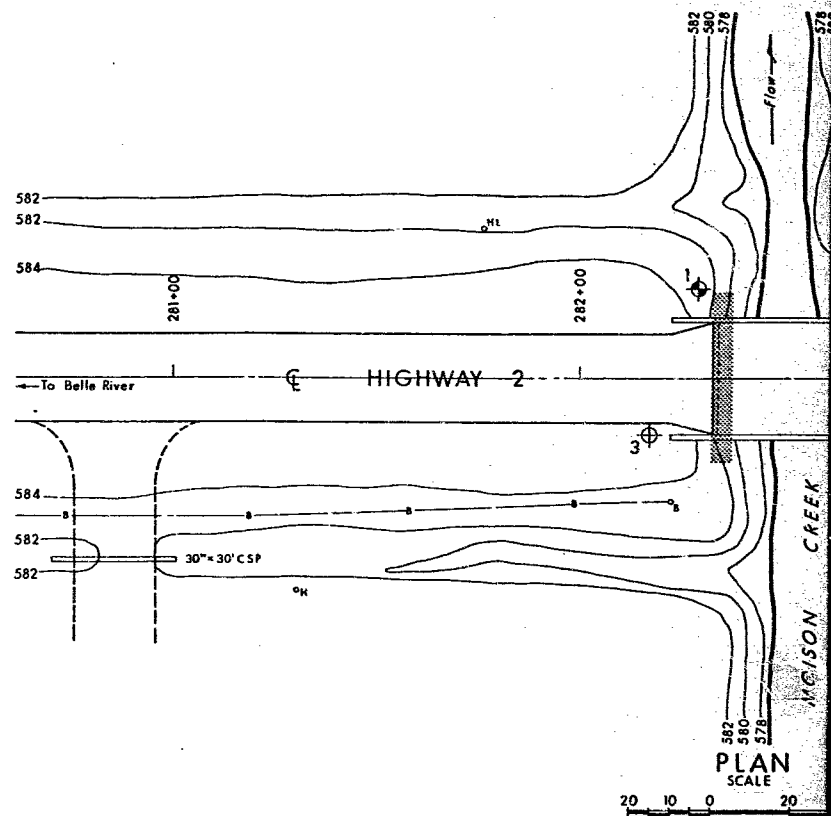
 Ministry of
Transportation and
Communications

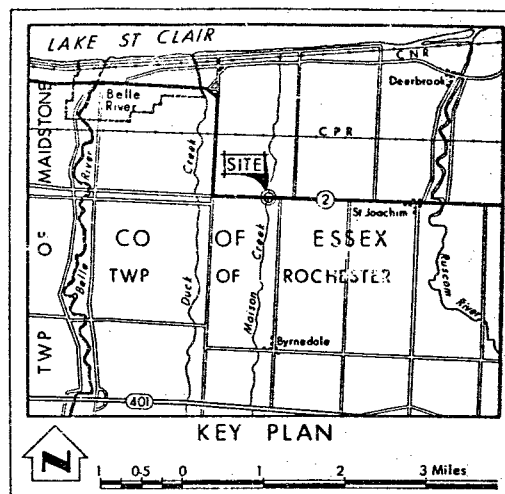
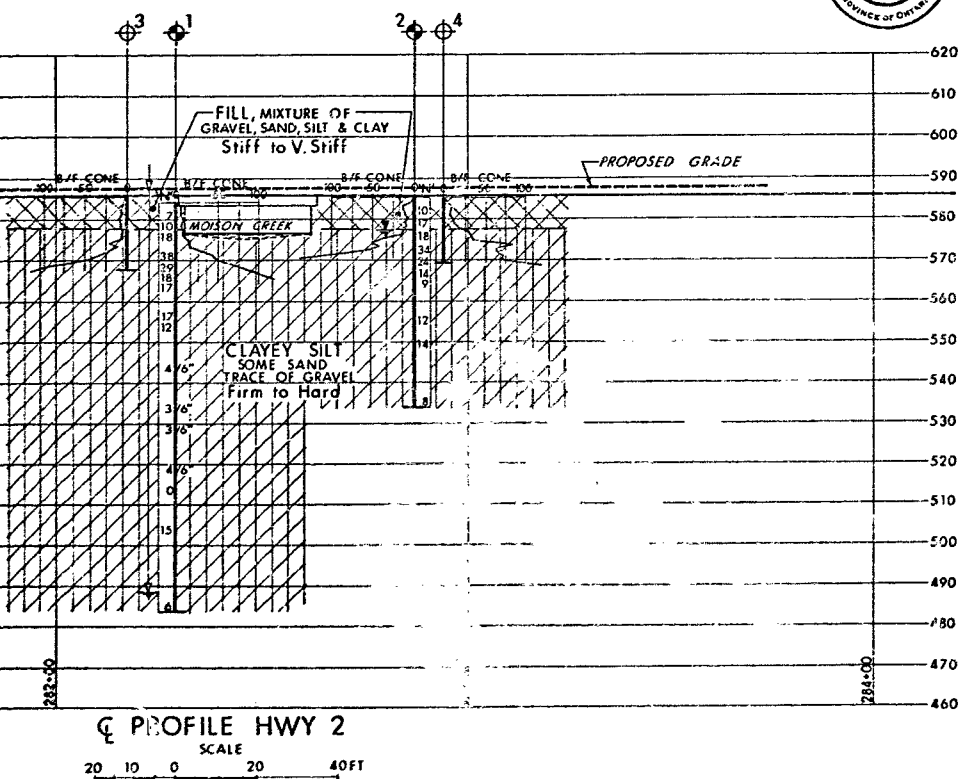
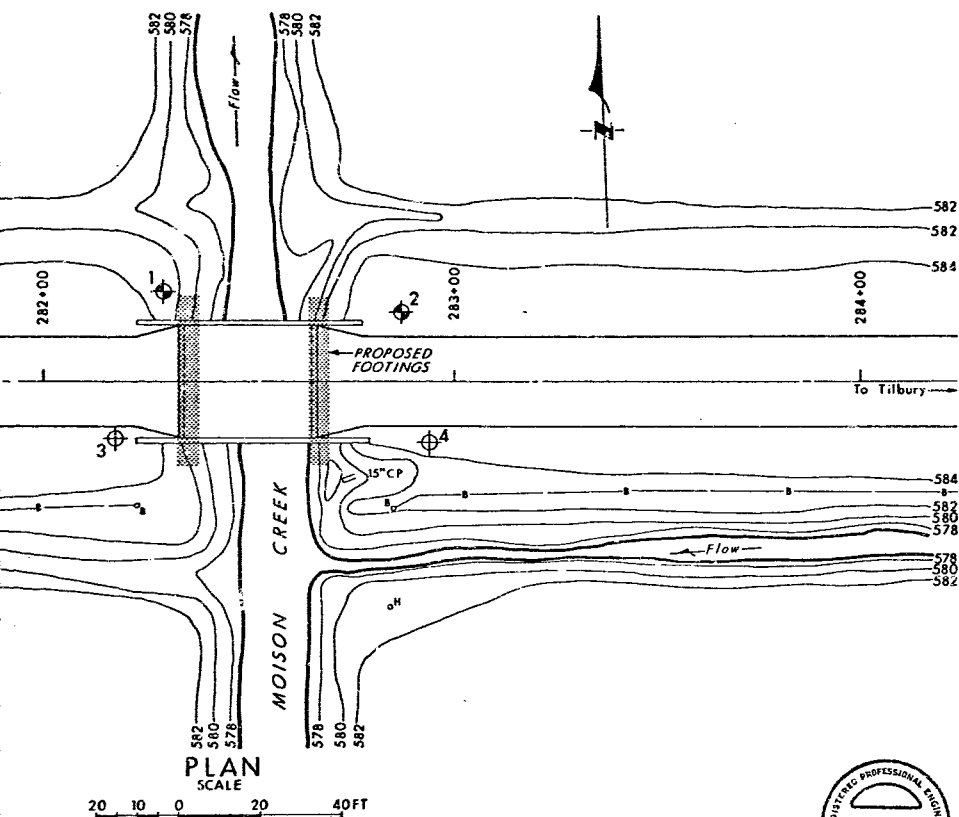
ENGINEERING SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
CLAYEY SILT
SOME SAND, TRACE OF GRAVEL

FIG No 1

W P 125-65-00





LEGEND

- Bore Hole
- ⊕ Dynamic Cone Penetration Resistance Test
B/F CONE - Blows/ft. Cone Test (350 ft. lbs. energy/blow)
- ⊕ Bore Hole & Cone Test
- ≡ Water Levels established at time of field investigation, Jan 1976
- ⊕ Head Artesian Condition Encountered

NO.	ELEVATION	STATION	OFFSET
1	584.4	282+29	22' LT
2	585.6	282+87	17' LT
3	585.8	282+17	14' RT
4	585.3	282+94	15' RT

NOTE

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

REVISION	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
ENGINEERING SERVICES BRANCH—GEOTECHNICAL OFFICE—SOIL MECHANICS SECTION

MOISON CREEK

HIGHWAY NO. 2 DIST. NO. 1
CO. ESSEX
TWP. ROCHESTER LOT 11 & 12 CON. II

BORE HOLE LOCATIONS & SOIL STRATA

SUBMIT P.P.	CHECKED <input checked="" type="checkbox"/>	W.P. NO. 125-65-00	DRAWING NO.
DRAWN <input checked="" type="checkbox"/>	CHECKED <input checked="" type="checkbox"/>	W.G. NO.	1256500-A
DATE Feb 20, 1976	SITE NO. 6-36	BRIDGE DRAWING NO.	
APPROVED	CONT. NO.		



Memorandum

To: See Below

From: Structural Office,
West Bldg., Downsview.

Attention:

Date: 77 11 07

Our File Ref.

In Reply to

Subject: Group W.P. 631-71-01
W.P. 125-65, Site 6-36, ✓
Maison Creek Bridge.
W.P. 143-61-01, Site 6-34,
Duck Creek Bridge.
Highway 2, District 1.

A meeting of the Structural Review Committee is to be held on December 14, 1977 at 9:00 a.m. in Boardroom B, West Building, to review the above projects.

Please arrange for you or your representative to attend.

NZ/im

N. Zoltay,
Structural Contract
Specifications Engineer.

Memo sent to:

Mr. A. E. McKim
Mr. E. Van Beilen
Mr. C. S. Grebski
Mr. K. Bassi
Mr. C. Mirza ✓
Mr. J. Harris

c.c. Mr. J. B. Wilkes
Mr. R. A. Dorton





Ministry of
Transportation and
Communications

Memorandum



To: Mr. K. G. Selby, Supvr. Eng.
Soil Mechanics Section
Geotechnical Office
West Bldg., Downsview

From: Structural Planning Office
Southwestern Region

Attention:

Date: September 15, 1975

Our File Ref.

In Reply to

Subject: W.P. 125-65-00, Bridge Site 6-36
Moison Creek Bridge
1.7 miles southeast of Belle River east limits
Highway 2
District 1, Chatham

Would you kindly arrange to have a foundation investigation conducted at the above location. I have enclosed two copies of the site plan, number E-5361-1, with the probable footing locations marked in red.

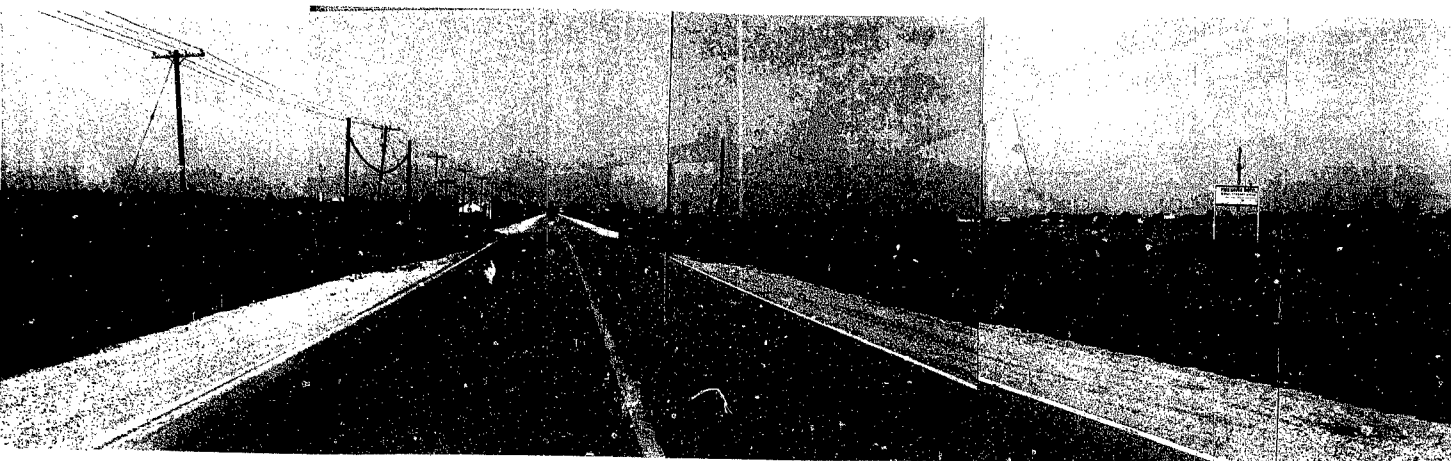
Would you also have an additional boring made in the streambed just downstream of the existing bridge to get some idea of the scour that might have taken place in the past. Also please comment on the suitability of this site for a structural plate horizontal ellipse.

I have enclosed a set of pictures of the site and a Field Reconnaissance Report for your use. The drawings of the existing bridge may be obtained from the Document Section, Downsview, under bridge site 6-36, drawing number M-3058.

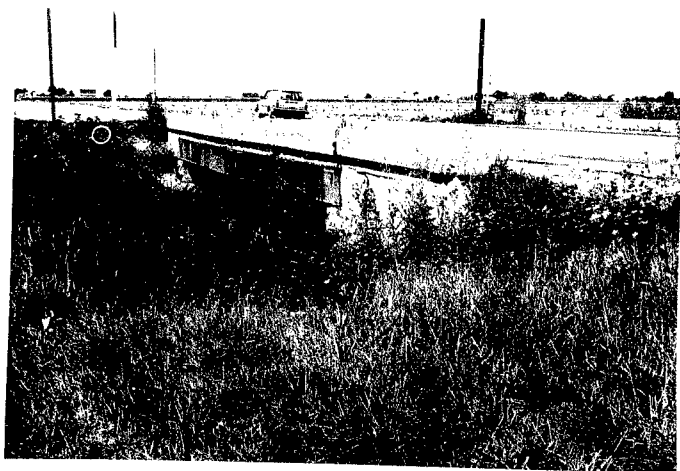
A. P. Watt
Regional Structural Planning Engineer

APW:sm
Enc.

cc A. Crowley
J. Anderson



looking west along Highway 2



south elevation