

G.I.-30 SEPT. 1976

GEOCRES No. 30M5-62DIST. 4 REGION                     W.P. No. 170-67-01  
(former 195-58-00)CONT. No. 76-128W. O. No.                     STR. SITE No. 10-194HWY. No. 403LOCATION Waterdown Rd.  
Retaining WallNo. of PAGES -                     

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.                     REMARKS:

Department of Highways Ontario

Copy for the information of

Mr. K. Selby,  
Foundation Office, Lab. Bldg.

Mr. G. Burkhardt,  
Reg. Bridge Planning Engineer,  
Central Region,  
Central Building

B.S. Richardson,  
Bridge Office

January 14, 1971

W.P. 170-67-01, Site No. 10-194  
Proposed Retaining Wall  
Waterdown Road Underpass  
Highway 403, District No. 4

This refers to your letter of January 12th.

Passive pressure of soil in front of abutments is not considered. In this case the friction on the base is well below the permissible value.

The scheme is obviously feasible. I assume that the doubt in your mind is whether shoring will be required. It seems to be a rather early stage to consider such details, but I have sent to K. Selby the data he needs to investigate this.

B.S. Richardson,  
Regional Bridge Design Engineer

BSR:rd

c.c. C.S. Grebski  
K. Selby

The Retaining wall will require a cut of approx.  
12 ft and may be founded on spread footings  
placed on shale bedrock (Elev. 357-360)

**G. Burkhardt,**  
**Regional Bridge Planning Eng.,**  
**Bridge Planning Section,**  
**Central Region.**

**F. Walshe**

*K. Selby*  
**E.J. McCabe,**  
**Senior Project Planning Engineer,**  
**Functional Planning Section,**  
**Central Region.**

**January 11, 1971.**

**Re: W.P. 170-67-01, Proposed Interchange at**  
**Highway 403/Waterdown Road, Bridge #12,**  
**Original W.P. 195-58-01,**  
**Proposed Retaining Wall.**

I am enclosing a copy of the memo dated January 7, 1971 from Mr. K. Selby in connection with above.

As suggested in the above memo, would you please check the factor of safety of the abutment against sliding and also confirm that the proposed location of the retaining wall is quite in order at your earliest convenience?

I am also enclosing a copy of the sketch showing the proposed location of the retaining wall with relation to the abutment.

*N. Sen*

**N. Sen,**

**EJM/NS/mv**  
**Encl.**

**For: E.J. McCabe,**  
**Senior Project Planning Engineer.**

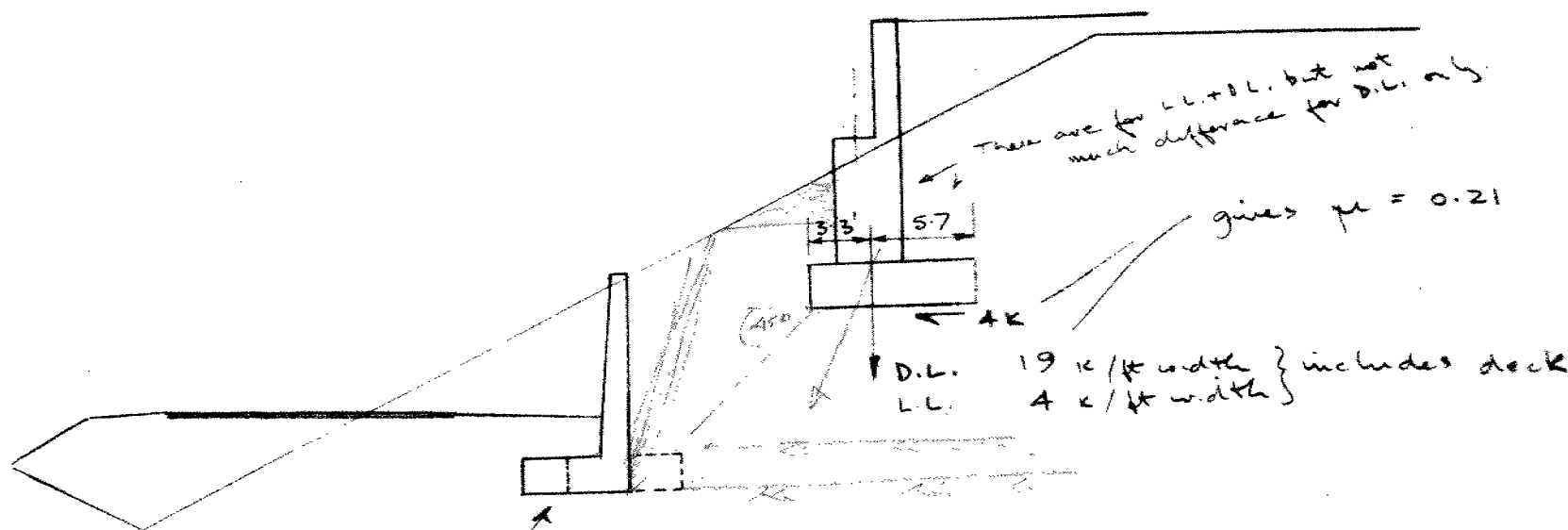
**c.c. - R. Fitzgibbon**  
**K. Selby ✓**

To K. Selby

Z.S.R.  
14/1/71

Figures shown are approximate and  
unchecked but should be good enough for your purposes.  
If accuracy is important we can get exact figures later  
during design stage.

Z.S.R.



Retaining wall this slope would slide  
Assume dotted shape

Site 10-194

Aug 403 Det 4

Re Burkheart - Goblecki memo 12/1/71

Mr. E. J. McCabe  
Sr. Project Planning Engineer  
Punct. Planning Section  
Central Region

K. G. Selby  
Supervising Foundation Engineer  
Materials & Testing  
Room 107, Lab. Bldg.

January 7, 1971

30MS-62

W.P. 170-67-01 Interchange at  
C.A.H. 403 and Waterdown Road  
Br. #12 - original W.P. 195-58-01  
Proposed Retaining Wall

71-11-007

As requested, we have reviewed your proposal for the abovementioned retaining wall as shown on the sketch attached to your memo dated December 14, 1970. We are of the opinion that the wall can be constructed without detrimental effect on the existing abutment, provided that removal of soil in front of the abutment footing will not drastically reduce the safety factor of the abutment against sliding. Normally passive resistance is neglected in the design, but it would be as well to check with the Bridge Office whether this is actually the case.

*K. G. Selby*

K. G. Selby

SUPERVISING FOUNDATION ENGINEER  
For

A. G. Stermac

PRINCIPAL FOUNDATION ENGINEER

KGS/jt

cc - G. Burkhardt  
B. Richardson  
Foundation Files  
General Files ✓

30MS-62

MEMORANDUM

TO: K. Selby  
Supervising Foundation Engineer,  
Materials & Testing Office,  
ATTENTION: Lab Building

FROM: E. J. McCabe,  
Sr. Project Planning Engineer,  
Functional Planning Section, Central Reg.  
DATE: December 14, 1970.

OUR FILE REF.

IN REPLY TO

SUBJECT:

W. P. 170-67-01 - Interchange at C. A. H. 403 and Waterdown Road  
Existing Structure #12, original W. P. 195-58-01  
Proposed Retaining Wall

Reference is made to the discussion our Mr. Sen had with you at your office on December 7, 1970, as a result of previous discussions with Mr. F. Walshe in connection with the location of the above retaining wall.

As a result of the above discussion, I am now enclosing a sketch showing the elevation of the end span of the above bridge and also my proposed location of the retaining wall.

Would you kindly investigate the feasibility of this proposal and let me have your comments at your earliest convenience?

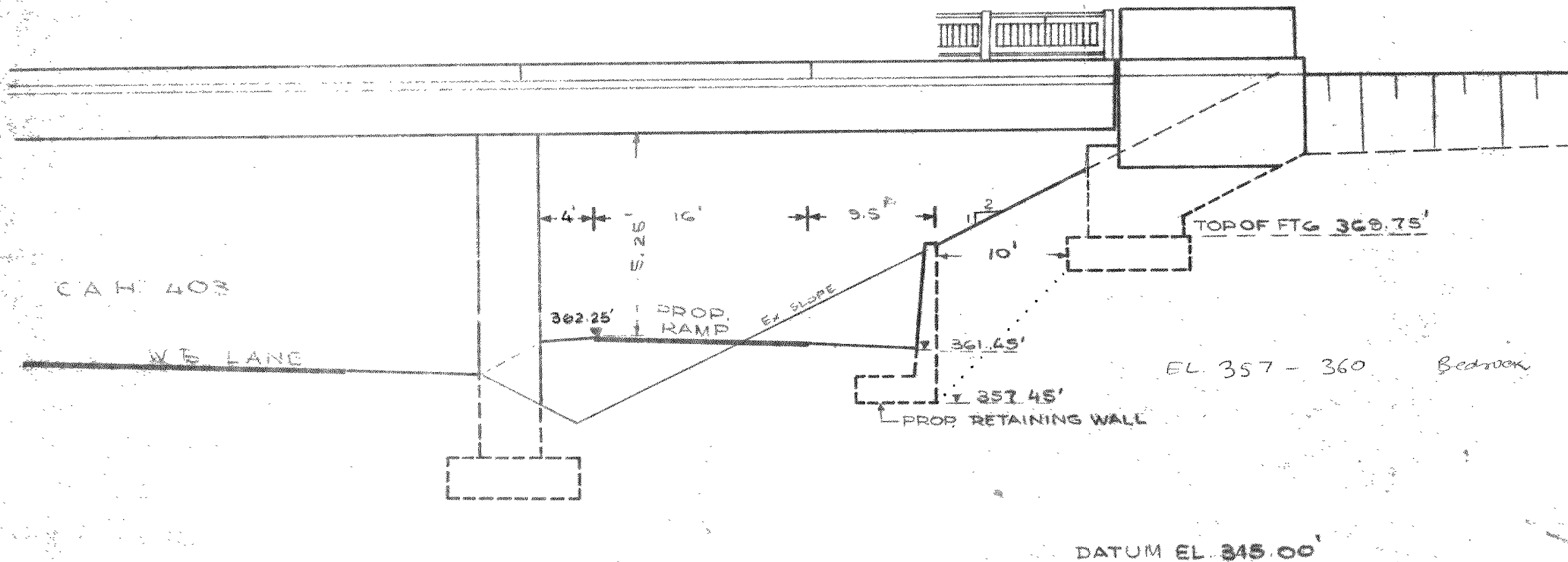
*N. Sen.*

N. Sen.

FOR: E. J. McCabe,  
Sr. Project Planning Engineer.

EJM/NS/mw  
Encls.

c. c. F. Walshe  
R. Fitzgibbon.



SKETCH SHOWING PROP. RETAINING WALL IN  
NORTH-END SPAN OF THE FREEWAY  
UNDERPASS AT WATERDOWN RD.

SCALE 1" = 10'

30M5-62

This sketch is on Fiehe  
in 94 RS.

GEOCRES No. 30M5-62

DIST. 4 REGION Central

W.P. No. 58-76-02

CONT. No. 76-128

W. O. No.

STR. SITE No. 10-194

HWY. No. 403

LOCATION Waterdown Road  
(2.2 mi w of QEN) Retaining  
Wall

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS EFFORT.

REMARKS: documents to be unfolded  
before microfilming



*W. McFarlane*

STRUCTURAL PLANNING AND DESIGN

REPORT

FOR

A RETAINING WALL AT HIGHWAY NO: 403

AND WATERDOWN ROAD INTERCHANGE

W.P. 58-76-02, SITE 10-194

DISTRICT NO:4

M. T. C. — TORONTO  
RECEIVED

SEP 14 1976

STRUCTURAL  
OFFICE

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

STRUCTURAL PLANNING OFFICE

CENTRAL REGION

CONTENTS:

MEMORANDUM OF TRANSMITTAL

STRUCTURAL PLANNING REPORT

DESIGN CRITERIA (WILL BE FORWARDED  
WHEN AVAILABLE)

FOUNDATION REPORT W.J.F - 59-68

ATTACHMENTS:

APPROVED PLANS E - 5436-1

B - 194

REVISION AND ADENDA:

STRUCTURAL PLANNING REPORT  
CENTRAL REGION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS,  
ONTARIO

RETAINING WALL AT HIGHWAY NO: 403 AND WATERDOWN ROAD  
INTERCHANGE

KING'S HIGHWAY No. 403

DIST. No. 4

CO. HALTON

TWP. E. FLAMBOROUGH

LOT. 6 AND 7

CON. 1

SITE No.

W. P. No.

10-194

58-76-02

DRAWING

No.

10-194

REGIONAL STRUCTURAL PLANNING ENG. G.C.E. BURKHARDT

STRUCTURAL PLANNING ENG. W. KULMATICAS

STRUCTURAL PLANNING SUPERVISOR \_\_\_\_\_

DATE SEPTEMBER 1976



## Memorandum

To: Mr. C.S. Grebski  
Structural Design Engineer  
West Building

From: G.C.E. Burkhardt  
Structural Planning Office  
3501 Dufferin Street

Attention:

Date: September 10th, 1976

Our File Ref.

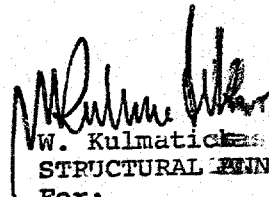
In Reply to

Subject: RETAINING WALL AT  
HIGHWAY NO:403 AND WATERDOWN  
ROAD INTERCHANGE  
W.P. 58-76-02, SITE 10  
DISTRICT NO:4, HAMILTON :

Herewith enclosed are:

1. Structural Planning and Design Report
2. Design Criteria (will be forwarded when available)
3. Foundation Report W.J. F-59-68
4. Approved Plan E-5436-1
5. Approved Plan B-194

Preliminary Drawings for this retaining wall should be available by October 1, 1976 and the Tracing completed by November 10, 1976. The D4 completion date is November 24, 1976.

  
W. Kulmatische  
STRUCTURAL PLANNING ENGINEER  
For:  
G.C.E. Burkhardt  
REG. STRUCTURAL PLANNING ENG.

c.c. C.R. Wilmot (Letter only)  
M. Ernesaks  
R. Pillar  
R. Dorton (Letter only)  
C.R. Robertson  
W. Lin (Letter only)  
R. Fitzgibbon (Letter only)  
J. Anderson (Letter only)

# STRUCTURAL PLANNING REPORT

FOR

A RETAINING WALL AT HIGHWAY NO: 403

AND WATERDOWN ROAD INTERCHANGE

W.P. 58-76-02, SITE 10-194

DISTRICT NO: 4

## PROPOSED WORK:

To improve the traffic conditions at the above indicated site it is intended to construct an interchange, which will connect Highway No: 403 with the Waterdown Road. As can be observed on the attached B Plan, showing the general arrangement of this interchange, the ramp connecting these two roads passes between the south abutment and pier of the existing bridge, which at present carries Waterdown Road over Highway No: 403. To provide sufficient space for this ramp and shoulders, part of the fill in front of the south abutment will have to be removed and a retaining wall erected to support the remaining fill and abutment.

## PROPOSED ALIGNMENT:

### CROSS-SECTION OF PROPOSED RAMP:

The cross-section of the proposed ramp under the bridge shall provide from north to south; a 4 foot shoulder between the southern edge of the pavement and the other outline of the west pier columns, 16 foot wide pavement with a 2% slope from north to south, a 8 foot shoulder between the north edge of the pavement and the face of the retaining wall. The vertical clearance between the soffit of the bridge and pavement is  $\pm$  16.5 feet as shown on Plan E-5436-1.

### LONGITUDINAL ALIGNMENT:

The retaining wall requires to support the fill in front of the south abutment has a total length of 135 feet. The western corner is located at Sta 16+25 (ramp chainage) and the elevation of it is 362.0. For the next 20 feet - Sta 16 + 45 it raises on a slant to El 369.0 (top of the wall) and proceeds horizontally to Sta 17+26, from there it drops to El 362.0 at Sta 362.0. The approx. elevation of the finished ramp is 360.75.

17+60.

### GENERAL ARRANGEMENT:

Control line of the E-NS ramp, in the vicinity of the retaining wall, is located 96 feet south parallel to the centre line of Hwy# 403 and intersects the centre line of Waterdown Road at a right hand angle of  $85^{\circ} 05' 38''$  H.O.T. 99 + 03.65 Waterdown Road (co-ordinate 15,737,322.226N) and H.O.T. 17 + 91.88 W-NS ramp (co-ordinate 904,224.238E). The distance between the control line and face of the retaining wall is 8 feet. All the above described and related co-ordinates, angles and dimensions are presented on a plan of coordinates attached to this Report.

### SOIL CONDITIONS AT SITE:

The site is underlain by shale bedrock covered by a shallow 12 to 18 foot thick overburden of very hard sandy, silty clay, with an average value of "N" of 90 blows/foot. The soil mechanics section advises us that the allowable pressure under the retaining wall toe, if the bottom of the footing is placed at  $El + 355.0$ , the allowable bearing under the toe may be assumed as 3 tons per sq. foot. Due to the clayey nature of the soil a key should be provided to guard against sliding of the wall.

Water table at the time of the investigation was found at  $El + 357$ . In view that no water bearing sand seams or artesian water conditions were encountered, seepage into footings excavation will be minor and could be handled by conventional methods.

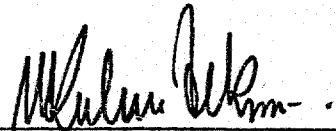
### CONSTRUCTION PROCEDURE:

Although the construction of this retaining wall outside the bridge abutment should not present any special problem, certain precautions described below, shall be observed during construction of the wall in front of the abutment.

The south abutment of the previously mentioned bridge is supported on 26 - 12BP53 piles driven to bedrock, with a 2:1 fill in front of it. To avoid the danger of the abutment moving forward, not more than half of the fill should be reduced to a slope of 1:1 to make space for the retaining wall construction. Once the first half of the wall is constructed and the fill placed behind it to the full height, the second part using the same method should be built.

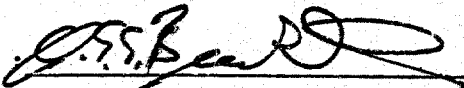
SERVICES:

The Planning and Design Office (Mr. D. Smith) advises us that no utilities are located at the site, where the retaining wall is to be constructed. All other utilities which may interfere with the construction of the interchange will be re-located by the Planning and Design Office.

REPORT PREPARED: 

STRUCTURAL PLANNING ENG

APPROVED BY

  
REG. STRUCTURAL PLANNING ENG

CONSTRUCTION  
INVESTIGATION & DESIGN  
REPORT

Site 10-194.

SOIL MECHANICS SECTION

ENGINEERING SERVICES BRANCH  
GEOTECHNICAL OFFICE



Ontario

Ministry of  
Transportation and  
Communications





ONTARIO  
DEPARTMENT OF HIGHWAYS

**Memo to** Mr. A. M. Toye, **Date** July 24, 1959.  
Bridge Engineer. **Subject** Re: FOUNDATION REPORT -  
**From** Materials & Research Section. W.F. 195-58 - W.C. 5-59-17.  
Attention: Mr. S. McCombie.

This memo accompanies our detailed report covering the investigation for the above structure site. Reference to the contents of this report shows that a shallow layer of hard, silty clay overlies shale bedrock. The strength and compressibility characteristics of the subsoil are such that the structure can be supported on spread footings founded at shallow depth.

If footings are founded within the cohesive stratum, an allowable bearing capacity of 5 tons/sq. ft. can be used; and if footings are founded directly on the shale bedrock, a minimum bearing pressure of at least 10 tons/sq. ft. is permissible.

The strength and compressibility characteristics of the clay layer are such that the approach embankments can be designed using a standard 2:1 slope.

If you have any queries concerning the contents of this report, please contact our office.

LGS/Waef  
encl.

cc: Messrs.

A. M. Toye  
H. A. Tregaskes  
D. G. Ramsay  
J. Ford  
R. E. Richardson  
P. F. Weber  
A. Watt  
Foundation Section  
Gen. Files.

*L. G. Soderman*  
L. G. Soderman,  
PRINCIPAL SOILS AND FOUNDATIONS ENGINEER.

# FOUNDATION REPORT

on

Ray. No. 403, Line 'B' Rd. All'ce. between  
Lots 6 & 7, Con. I, Twp. of Plainborough East.

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Site Plan No: 59-69A.

Plan No: F 2407-26.

Profile No: F 2407-27.

Chainage: Sta. 202/14.

## Distribution:

Mr. A. H. Toye, Bridge Engineer.	(2)
Mr. H. A. Tregaskes, Construction Engineer.	(1)
Mr. D. G. Ramsey, Road Design Engineer.	(1)
Mr. J. Ford, Project Design Engineer.	(1)
Mr. R. E. Richardson, District Engineer, Hamilton.	(1)
Mr. P. F. Weber, Regional Soils Engineer.	(1)
Mr. A. Watt, Ont. Water Resources Commission.	(1)
Foundation Section.	(1)
General Files.	(1)

W.P. 195-58.

W.J. F-59-63.

## INTRODUCTION:

Presented in this report are the results of a subsoil investigation carried out at a structure location approximately 1/2 mile north of Aldershot. At this location proposed Hwy. #403 Line 'B' crosses the existing paved road between Lots 6 & 7, Con. I, Twp. of Flamborough East (Sta. 202/14, Profile No. F 2407-27). This report contains the field and laboratory findings and recommendations for the foundation of the structure.

The field work commenced on June 25th, 1959 and was completed on July 1st, 1959.

## DESCRIPTION OF THE SITE & GEOLOGY:

The topography of the site is generally level to undulating. The areas on both sides of the gravel road are presently uncultivated and in pasture. The surrounding region consists of several fairly large valleys. A broad belt of red shale is exposed and the long lower slopes on the north-east side of the site are highly eroded.

The site is located on the Niagara Escarpment which extends from Niagara River to Bruce Peninsula. According to available geological information, this region is the valley of a pre-glacial river which joined the basins of Lake Ontario and Lake Erie. This site is generally covered by shallow deposits of clay, underlain by shale bedrock.

## DESCRIPTION OF FIELD & LABORATORY WORK:

Field work consisted of 4 sampled boreholes with dynamic cone penetration tests adjacent to each borehole. The exploration programme was carried out by a standard core-drill machine adapted for soil sampling. Conventional wash boring procedures were followed.

cont'd. /E ...

DESCRIPTION OF FIELD & LABORATORY WORK: (cont'd.) ...

Samples were recovered at depths required by means of a 2" O.D. split spoon sampler. The dimensions of this spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration test. Rock samples were obtained by rotary drilling using an AXT corebit and retained in a 5-ft. double tube core-barrel.

Upon receipt in the laboratory, samples were visually examined and identified. Routine index tests were performed on selected representative samples.

Laboratory and field test results have been summarized in Table No. 1 and are included in this report under Appendix I.

Drawing No. F 59-68A shows the borehole locations and the estimated subsoil stratigraphy.

SUBSOIL CONDITIONS:

The site is underlain by shale bedrock covered by a shallow overburden of very hard clay.

In each of the sampled boreholes, the topsoil was found to be underlain by clay silt, silty clay and clay. This stratum extends approximately 10 to 16 ft. below the existing ground surface. Underlying this stratum and immediately overlying the shale bedrock, a thin layer of red clay with gravel and fragments of shale was encountered.

Bedrock was drilled and cored in order to determine its quality and soundness.

cont'd. /3 ...

SUBSOIL CONDITIONS: (cont'd.) ...

In the order of stratigraphic succession, the following soil types are defined:-

1. Hard, Clayey Silt to Silty Clay:

The layer of clayey silt to silty clay was found to be continuous over the site. The upper zone has been subjected to oxidation resulting in its present brown colour. Below the oxidized zone the colour is predominantly grey. The very hard dense clay silt contains 60% of silt and 10% sand. The average unit weight and moisture content were found to be 135 p.c.f. and 12%, respectively. Standard penetration tests carried out during sampling, gave 'N' values varying from 50 to 60.

Underneath the hard clayey silt crust the thin stratum of very hard silty clay was encountered. The colour is also red and contains approximately 45% of silt, 12% of sand and 12% fine to medium gravel. Its consistency is defined by moisture content of 12%, liquid and plastic limits of 28% and 17%, respectively. The average 'N' value was found to be 90 blows.

The hard silty clay layer is followed by a thin layer of very hard red clay. The moisture content is 14% and has a plastic limit of 14%. The bedrock was encountered immediately below the hard red clay.

2. Bedrock:

The bedrock formation consists of interbedded red and grey shale. The top layer of 6" of the bedrock is medium soft. The shale is in a sound condition with no signs of weathering or

cont'd. /4 ...

SUBSOIL CONDITIONS: (cont'd.) ...

2. Bedrock: (cont'd.) ...

fracture. Bedrock is at Elev. 356.7' in Boring 1; Elev. 359.1' in Boring 2; Elev. 350.0' in Boring 3, and at Elev. 349.3' in Boring 4. From the elevations of bedrock surface encountered in the four borings, it appears that the rock surface is sloping in a South-Westerly direction.

WATER CONDITIONS:

Observations and measurements carried out during boring and sampling operations indicate that a water table is at approximately Elev. 362' in Borings 1 & 2, and Elev. 357' in Borings 3 & 4. In view of the fact that no water-bearing sand seems of any significance, or artesian water conditions were encountered during the exploration programme, seepage into footing excavations will be local and of minor quantities.

FOUNDATION CONSIDERATIONS:

Reference to the borehole logs appended to the report, shows that the subsoil conditions at the site consist of shale bedrock overlain by a very hard silty clay layer varying from 12 to 18 feet in thickness. Reference to the profile of Hwy. 403 at this site, shows that the proposed grade line elevation is 359.0'.

At the location of Borings 1 & 2 (approximate north abutment location) shale bedrock was encountered at elevations 359.1' to 356.7'. Because of the proximity of the underlying bedrock to the proposed grade line, footings for this abutment can be founded directly within the bedrock formation. An allowable

cont'd. /: ...

FOUNDATION CONSIDERATIONS: (cont'd.) ...

bearing capacity of at least 10 tons/sq. ft. can be used. A nominal amount of scaling of the upper fragmented and weathered layer of the bedrock surface can be anticipated.

At the south abutment location ( i.e., Boreholes 3 & 4) the bedrock was encountered at Elevations 349.3' and 350.1'. The hard silty clay overlying the bedrock, has sufficient strength to safely support a footing pressure of 5 tons/sq. ft.

At this abutment location, footings can either be founded on the bedrock using a design pressure of 10 tons/sq. ft., or founded in the hard cohesive material overlying the bedrock, using a bearing pressure of 5 tons/sq. ft.

Strength and compressibility characteristics of the subsoil at this site are such that the approach embankments can be designed using a standard 2:1 slope.

CONCLUSIONS & RECOMMENDATIONS:

- (1) The site is underlain by red shale bedrock covered by a shallow layer of very hard stiff clayey glacial till.
- (2) At the location of the north abutment, it is recommended that footings be founded directly on the underlying shale bedrock formation, and that a bearing pressure of 10 tons/sq. ft. be used. A nominal amount of scaling of the surface of the bedrock formation can be expected. At the south abutment location, the thickness of the overburden is such that footings can either be founded in the hard clay stratum, or carried down to the bedrock formation. If spread footings are founded within the hard cohesive layer overlying the

cont'd. /! ...



CONCLUSIONS & RECOMMENDATIONS: (cont'd.) ...

(2) (cont'd.) ...

bedrock, an allowable bearing pressure of 5 tons/sq. ft. is recommended. If footings are founded directly upon the bedrock formation, an allowable bearing pressure of 10 tons/sq.ft. can be used.

(3) No ground water problems with respect to footing excavation, are anticipated. Total and differential settlements should be negligible.

(4) The proposed grade line does not present any approach fill stability problems.

M. Devata,  
Foundation Engineer.



APPENDIX I.

W.P. 195-58

[illegible]

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

1/2 UNCONFINED COMPRESSION (Cu) ---  
VANE TEST (C) AND SENSITIVITY (S) ---  
NATURAL MOISTURE AND  
LIQUIDITY INDEX ---  
LIQUID LIMIT ---  
PLASTIC LIMIT ---

CONSISTENCY		NATURAL SAMPLE UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
10      20      30		
	S1	133.7
	S2	_____
	S3	_____
	S4	_____



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

2" DIA SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONC  
2" SHELBY  
CASINO

1/2 UNCONFINED COMPRESSION (QU) ---  
VANE TEST (C) AND SENSITIVITY (S) ---  
NATURAL MOISTURE AND  
LIQUIDITY INDEX ---  
LIQUID LIMIT ---  
PLASTIC LIMIT ---

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION	
				RESISTANCE	P.S.F.
	† Ground level				
	Top soil	367.1			
	Very hard dry brown clay	366.1			
	Very hard light grey clay and gravel	362.1			
	Light brown clay with gravel dry and hard	358.1			
	Ax Core 17-21.5' red and gray shale 90% recovery	350.1			
	End of borehole	345.6			
	Cone penetration: 350 ft/lb with 2" cone				

Graph showing strength and penetration resistance (blows/ft) versus depth (feet). The curve starts at 0 blows/ft at the surface and increases to approximately 10 blows/ft at 10 feet depth, then continues to rise more steeply.

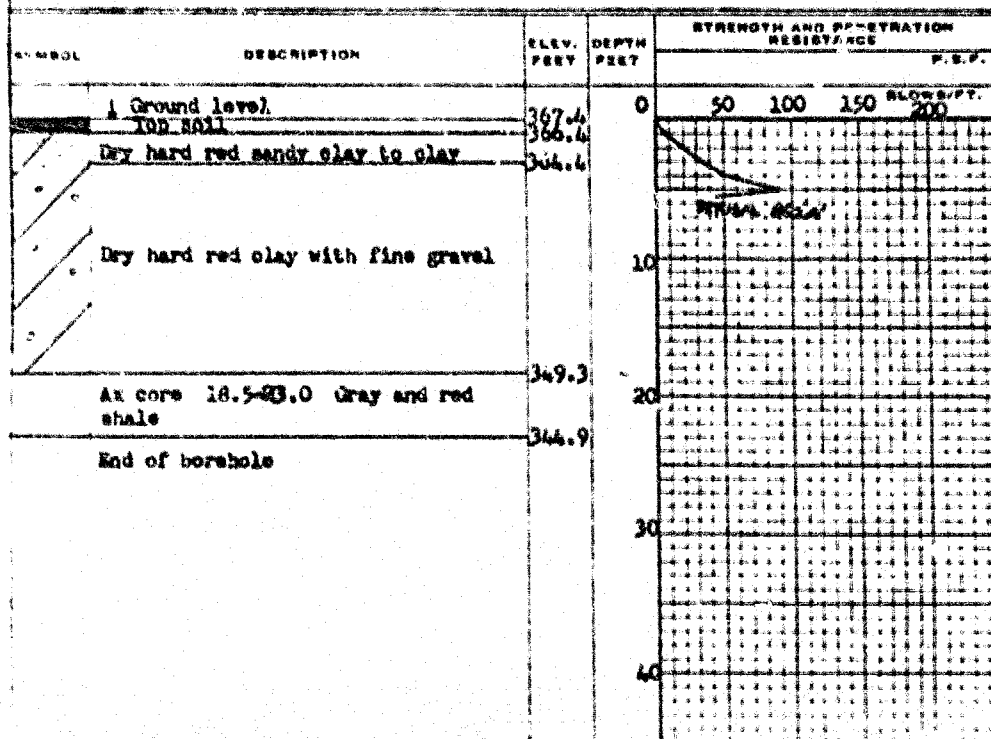
[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 195-58 \_\_\_\_\_ BORE HOLE NO. 4  
JOB 559-68 \_\_\_\_\_ STATION \_\_\_\_\_  
DATUM 267.9' \_\_\_\_\_ COMPILED BY B.K.  
BORING DATE July 1/59 \_\_\_\_\_ CHECKED BY M.D.

### LEGEND

1/2 UNCONFINED COMPRESSION (QU) -  
VANE TEST (C) AND SENSITIVITY (S) -  
NATURAL MOISTURE AND  
LIQUIDITY INDEX  
LIQUID LIMIT  
PLASTIC LIMIT



CONSISTENCY

NATURAL

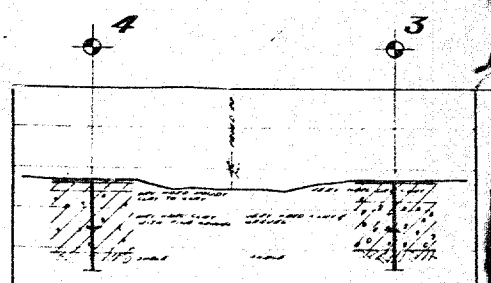
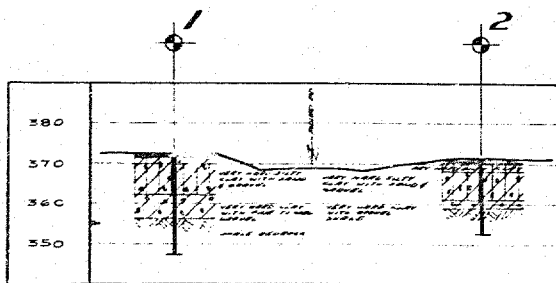
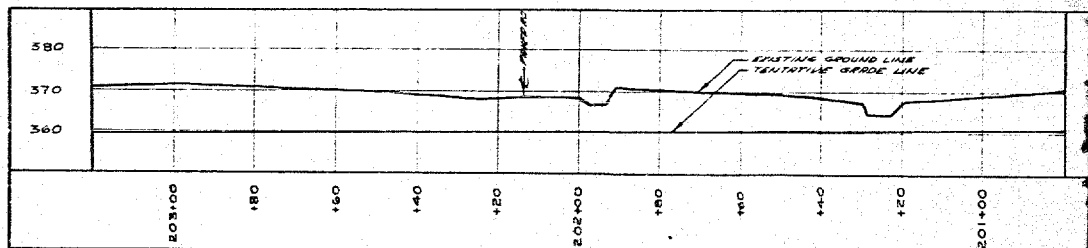
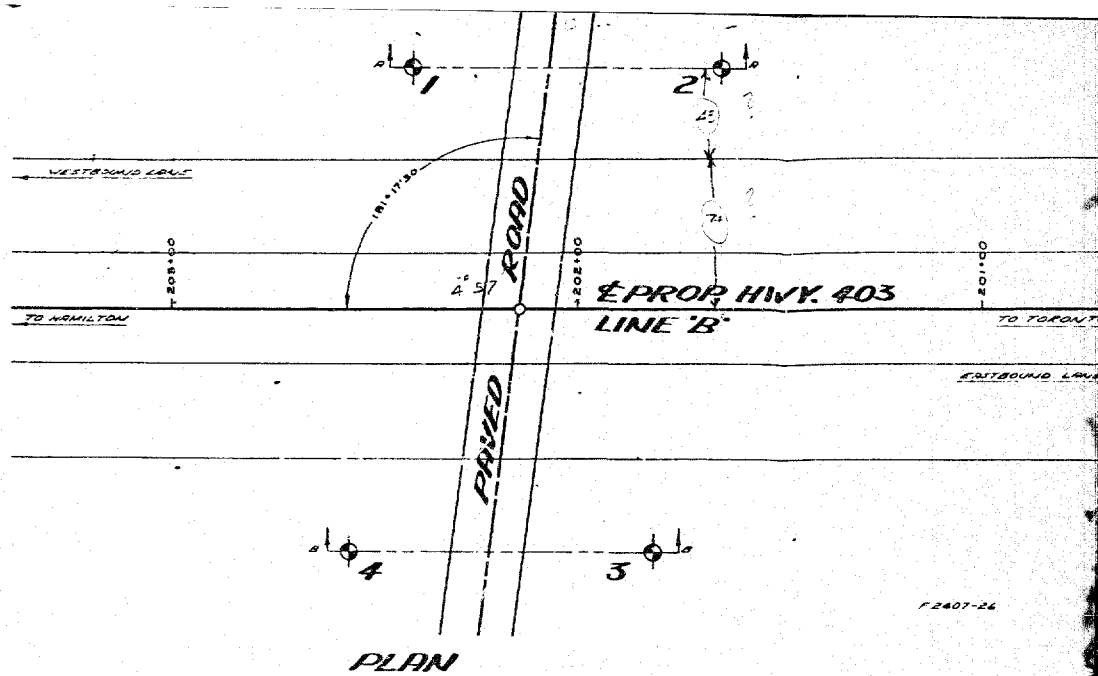
SAMPLE UNIT WT.

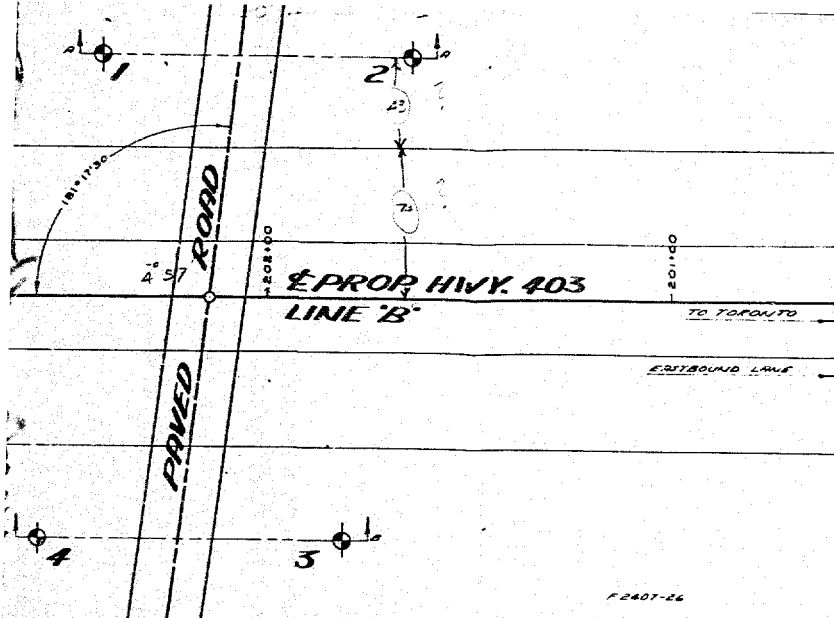
P.C.F.

MOIST. CONTENT - % DRY WT.

10 20 30

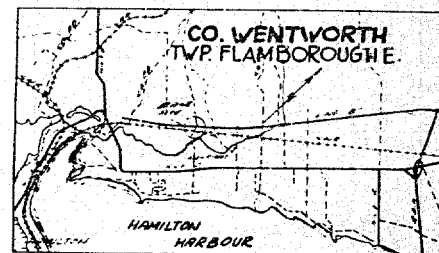
31





PLAN

F2407-26



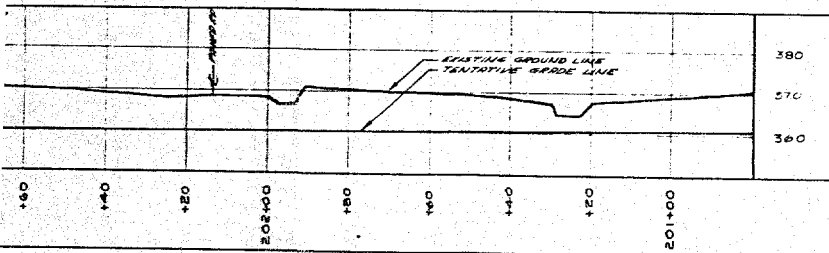
KEY PLAN

SCALE  
1 in = 1 mi

LEGEND			
BORE HOLE			
DELINEATION HOLE			
BORE & DELINEATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E
1	372.9	202+40	59' RT
2	371.1	201+65	59' RT
3	367.1	201+80	59' LT
4	367.4	202+56	59' LT

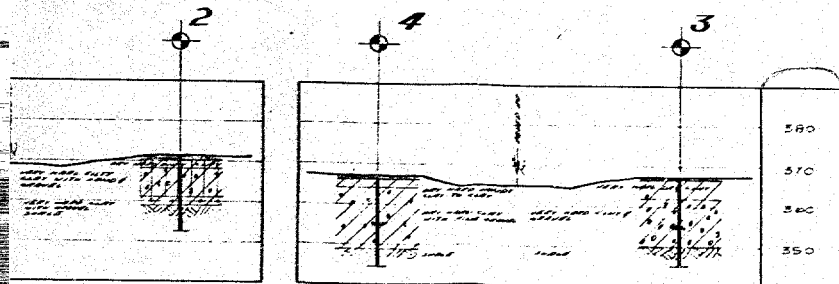
NOTE

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 UNDESIGNABLE CHANGE.



PROFILE

F2407-27



B-B

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION

**PAVED ROAD  
PROPOSED CROSSING**

SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY. 403	DISTRICT 4	COUNTY WENTWORTH
TOWNSHIP FLAMBOROUGH EAST	LOT 677	CON 5
LOCATION 200 EMI N. OF HURON		
DRAWN BY THERLDES	CHECKED BY	DATE 27 JULY 59
DATE 27 JULY 59	APPROVED BY	DATE 1 AUG 1959
SCALE 1 IN = 20 FT		

F59-68A





LISTING OF VERIFIED BIDS - NOTICE OF AWARD OF CONTRACT

TENDER OPENING NO. 51

CONTRACT NO. 76-128

DATE March 23rd, 1977

DESCRIPTION

GRADING, DRAINAGE, GRANULAR BASE, HOT MIX PAVING AND STRUCTURE  
NECESSARY AVAILABLE RATING IS ( 4 ) IN ( G ) OR ( P )

Partial Interchange at Waterdown Road and Highway 403, 2.0 Miles  
East of Highway 6

HIGHWAY 403

HAMILTON DISTRICT

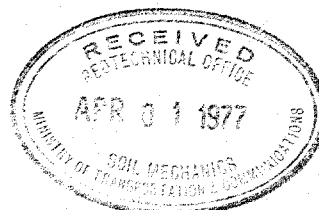
MILEAGE: 0.7

Bot Holdings Limited	
Bot Construction Limited	
Bot Construction (Canada) Limited	
Clarkson Construction Company Limited	\$ 449,690.86
Bramall and Company Construction Limited	450,822.18
Lamco Construction Limited	
Richview Construction Limited	462,752.88
Elirpa Construction & Materials Limited	470,857.00
Dufferin Construction Company ( A Division of Dufferin Materials & Const. Ltd.)	474,781.00
Capital Paving Limited	484,189.42
Warren Bitulithic Limited	497,017.42
Fermar Paving Limited	498,987.70
The Geo. Campbell Company Limited & Campbell Quarries Limited	500,489.57
King Paving & Materials Division of The Flintkote Company of Canada Limited	532,399.90
Dineen Roads & Bridges Limited	563,634.00

AWARDED TO: BOT HOLDINGS LIMITED  
BOT CONSTRUCTION LIMITED  
BOT CONSTRUCTION (CANADA) LIMITED  
CLARKSON CONSTRUCTION COMPANY LIMITED,  
1224 SPEERS ROAD,  
OAKVILLE, ONT.

WP. 58-76-02 GEO. NO 3045-62

DATE MARCH 29th, 1977



MEETING OF  
STRUCTURAL REVIEW COMMITTEE

Time: 9:30 a.m., January 26th, 1977  
Place: Boardroom B, West Building  
Attending: Full Time: A.E. McKim - Construction Branch  
M. Stoyanoff - Structural office  
F. Gormek - Structural Maintenance  
Part Time: W. McFarlane - Structural office  
W. Lin - " "  
K. Selby - Soil Mechanics Section  
M. Devata - " " "  
K. Jorns - Hydrology Section

Projects Reviewed: (a) Retaining Wall at Waterdown Road  
Hwy. 403, District 4,  
Site 10-194, W.P. 58-76-02  
(b) Etobicoke Creek Bridge  
Hwy. 401, District 6,  
Site 24-313, W.P. 103-69-09

A presentation of the design features and other data was made for each project by Mr. McFarlane for the Retaining Wall and by Mr. Lin for the Etobicoke Creek Bridge.

The following items were discussed:

Retaining Wall at Waterdown Road (W.P. 58-76-02)

Foundations

Because of the close proximity of the proposed retaining wall to the abutment of the existing bridge, the method of excavation for the foundations as detailed on the drawings, and the back-filling operations were queried.

After discussion, it was agreed that the excavation which is shown as open with a 1:1 slope back to the abutment footing and carried out in stages, is stable and will not jeopardize the existing structure.

The Soils Mechanics Section recommended that the traffic on the existing bridge be diverted to the side of the bridge away from the construction to alleviate live load. Mr. McFarlane is to investigate the feasibility of detouring the traffic in this manner, and include the requirements for maintenance of traffic in the contract if this scheme is acceptable.

This item is to be co-ordinated with Regional Planning and Design.

Structure

The location of construction joints was reviewed and found to be compatible with the construction staging.



Hydrology

The hydrological requirements were reviewed and the Committee confirmed that the design incorporated all the recommendations of the Hydrology Section.

Foundations

The depth of mass concrete under the footing was questioned and found to be satisfactory as shown.

Structure

- (a) Reinforcing bar marked P5030 is to be revised in shape to a hook type to facilitate installation. The detail shown in the drawings for the bar is to be deleted.
- (b) Expanded polystyrene used for forming at the abutments is to be deleted from the drawings.
- (c) As the piles will be driven to rock Standard SS3-11 for driving of piles is not needed and will be deleted from the drawings.
- (d) The class of expansion joint assembly is to be designated on the standard.
- (e) The barrier wall standard is to be reviewed and updated if warranted to the new standard.
- (f) The deck is to be machine finished.

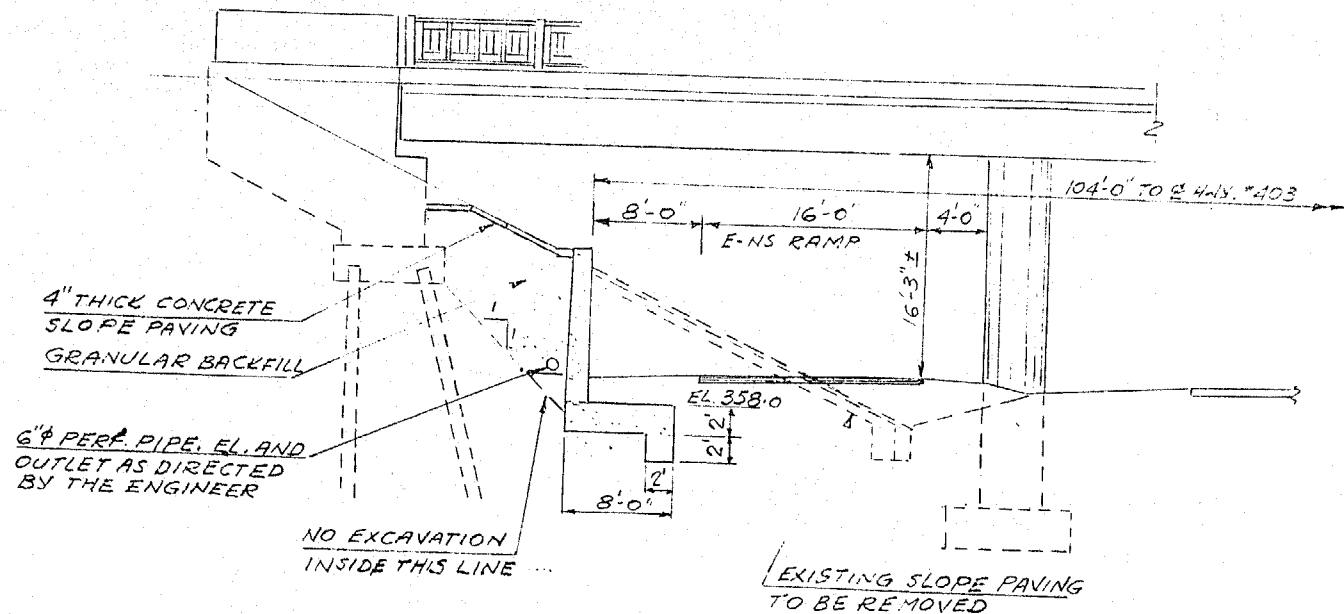
No other items were brought up and the meeting adjourned at 11:15 a.m.

MS:js

*M. Stoyanoff*

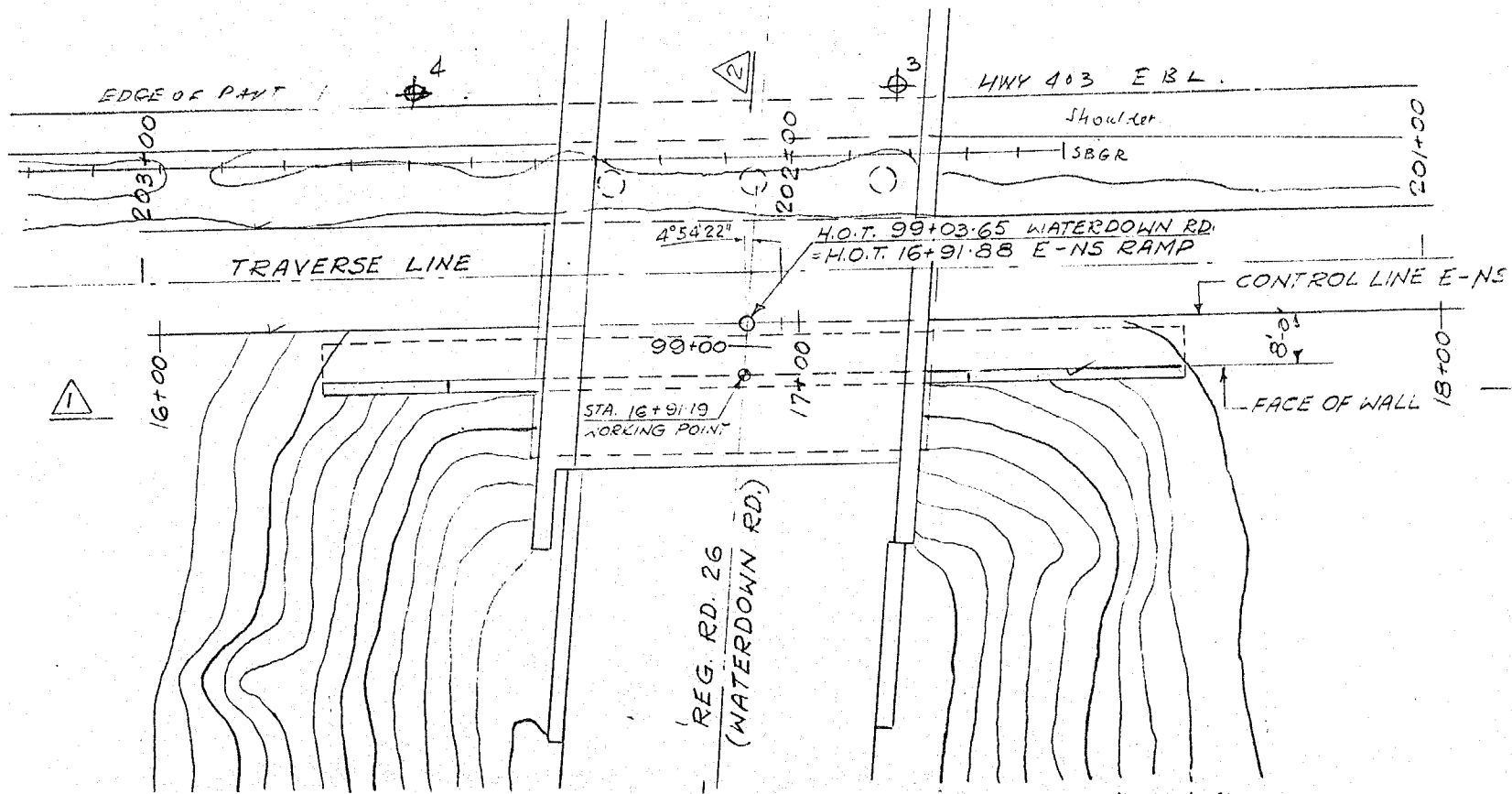
M. Stoyanoff  
Structural Contract Engineer

cc: J.B. Wilkes  
E. Orr  
R. Dorton  
C.S. Grebski  
G. Burkhardt  
M. Ernesaks  
J. Keen  
A. Radkowski  
K. Bassi  
All in Attendance



SECTION 2

1" = 10'-0"



Mr. G. Burkhardt,  
Regional Structural Planning Engineer  
Central Region 3501 Dufferin Street

Soil Mechanics Section  
Engineering Materials Office  
West Building, Downsview

February 4, 1977

Mr. W. W. Kulmatickas

Waterdown Road Interchange Retaining Wall  
W. P. 58-76-02 District 4, Hamilton

We have recommended that the above mentioned project be constructed in two stages in order to minimize or prevent movement of the abutment due to removal of fill material in front of it. This has already been incorporated in the design. At the same time we believe that it would be of further benefit to minimize the live loading due to traffic over the portion of the abutment adjacent to open excavation. Thus while the west half of the wall is being constructed traffic could be diverted to the east side of the road and vice versa. By this we are not thinking of an elaborate detour requiring traffic lights etc. Rather we are thinking of narrowing the laneways as much as is practical. Since the present width of the bridge is about 50 feet and since it is necessary to provide for only two lanes of traffic it would appear to us that narrowing by 15 or 20 feet should not be too difficult or expensive.

K. G. Selby  
Supervising Engineer

KGS/km

c.c. M. Stoyanoff  
W. McFarlane  
D. Waller  
H. Ernesaks

Files /  
Record Services



ONTARIO  
DEPARTMENT OF HIGHWAYS

Memo to Mr. A. M. Tove,  
Bridge Engineer.  
Materials & Research Section.

Date July 24, 1959.  
Subject Re: FOUNDATION REPORT -  
W.P. 195-58 - W.C. P-58-57.

From

Attention: Mr. S. McCombie.

This memo accompanies our detailed report covering the investigation for the above structure site. Reference to the contents of this report shows that a shallow layer of hard, silty clay overlies shale bedrock. The strength and compressibility characteristics of the subsoil are such that the structure can be supported on spread footings founded at shallow depth.

If footings are founded within the cohesive stratum, an allowable bearing capacity of 5 tons/sq. ft. can be used; and if footings are founded directly on the shale bedrock, a minimum bearing pressure of at least 10 tons/sq. ft. is permissible.

The strength and compressibility characteristics of the clay layer are such that the approach embankments can be designed using a standard 2:1 slope.

If you have any queries concerning the contents of this report, please contact our office.

*L. G. Soderman*

L. G. Soderman,  
PRINCIPAL SOILS AND FOUNDATIONS ENGINEER.

LGS/vaeF  
encl.

cc: Messrs. A. M. Tove  
H. A. Tregaskes  
D. G. Farnsay  
J. Ford  
R. E. Richardson  
P. F. Weber  
A. Watt  
Foundation Section  
Gen. Files.

# FOUNDATION REPORT

on

Hwy. No. 403, Line 'B' Rd. All'ces. between  
 Lots 6 & 7, Con. I, Twp. of Flamborough East.

Site Plan No: 59-69A.

Plan No: F 2407-26.

Profile No: F 2407-27.

Chainage: Sta. 202/14.

## Distribution:

Mr. A. M. Tove, Bridge Engineer.	(2)
Mr. H. A. Tregaskes, Construction Engineer.	(1)
Mr. D. G. Ramsay, Road Design Engineer.	(1)
Mr. J. Ford, Project Design Engineer.	(1)
Mr. R. E. Richardson, District Engineer, Hamilton.	(1)
Mr. P. F. Weber, Regional Soils Engineer.	(1)
Mr. A. Watt, Ont. Water Resources Commission.	(1)
Foundation Section.	(1)
General Files.	(1)

W.P. 195-58.

W.J. F-59-62.



#### INTRODUCTION:

Presented in this report are the results of a subsurface investigation carried out at a structure location approximately 1/2 mile north of Aldershot. At this location proposed Hwy. #403 Line 'B' crosses the existing paved road between Lots 6 & 7, Con. I, Twp. of Flamborough East (Sta. 202/14, Profile No. F 2407-27). This report contains the field and laboratory findings and recommendations for the foundation of the structure.

The field work commenced on June 25th, 1959 and was completed on July 1st, 1959.

#### DESCRIPTION OF THE SITE & GEOLOGY:

The topography of the site is generally level to undulating. The areas on both sides of the gravel road are presently uncultivated and in pasture. The surrounding region consists of several fairly large valleys. A broad belt of red shale is exposed and the long lower slopes on the north-east side of the site are highly eroded.

The site is located on the Niagara Escarpment which extends from Niagara River to Bruce Peninsula. According to available geological information, this region is the valley of a pre-glacial river which joined the basins of Lake Ontario and Lake Erie. This site is generally covered by shallow deposits of clay, underlain by shale bedrock.

#### DESCRIPTION OF FIELD & LABORATORY WORK:

Field work consisted of 4 sampled boreholes with dynamic cone penetration tests adjacent to each borehole. The exploration programme was carried out by a standard core-drill machine adapted for soil sampling. Conventional wash boring procedures were followed.

cont'd. /2 ...

DESCRIPTION OF FIELD & LABORATORY WORK: (cont'd.) ...

Samples were recovered at depths required by means of a 2" O.D. split spoon sampler. The dimensions of this spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration test. Rock samples were obtained by rotary drilling using an AXT corebit and retained in a 3-ft. double tube core-barrel.

Upon receipt in the laboratory, samples were visually examined and identified. Routine index tests were performed on selected representative samples.

Laboratory and field test results have been summarized in Table No. 1 and are included in this report under Appendix I.

Drawing No. P 59-68A shows the borehole locations and the estimated subsoil stratigraphy.

SUBSOIL CONDITIONS:

The site is underlain by shale bedrock covered by a shallow overburden of very hard clay.

In each of the sampled boreholes, the topsoil was found to be underlain by clay silt, silty clay and clay. This stratum extends approximately 10 to 16 ft. below the existing ground surface. Underlying this stratum and immediately overlying the shale bedrock, a thin layer of red clay with gravel and fragments of shale was encountered.

Bedrock was drilled and cored in order to determine its quality and soundness.

cont'd. /3 ...

SUBSOIL CONDITIONS: (cont'd.) ...

In the order of stratigraphic succession, the following soil types are defined:-

1. Hard, Clayey Silt to Silty Clay:

The layer of clayey silt to silty clay was found to be continuous over the site. The upper zone has been subjected to oxidation resulting in its present brown colour. Below the oxidized zone the colour is predominantly grey. The very hard dense clay silt contains 60% of silt and 10% sand. The average unit weight and moisture content were found to be 135 p.c.f. and 12%, respectively. Standard penetration tests carried out during sampling, gave 'N' values varying from 50 to 60.

Underneath the hard clayey silt crust the thin stratum of very hard silty clay was encountered. The colour is also red and contains approximately 45% of silt, 12% of sand and 12% fine to medium gravel. Its consistency is defined by moisture content of 12%, liquid and plastic limits of 28% and 17%, respectively. The average 'N' value was found to be 90 blows.

The hard silty clay layer is followed by a thin layer of very hard red clay. The moisture content is 14% and has a plastic limit of 14%. The bedrock was encountered immediately below the hard red clay.

2. Bedrock:

The bedrock formation consists of interbedded red and grey shale. The top layer of 6" of the bedrock is medium soft. The shale is in a sound condition with no signs of weathering or

cont'd. /4 ...

SUBSOIL CONDITIONS: (cont'd.) ...

2. Bedrock: (cont'd.) ...

fracture. Bedrock is at Elev. 356.7' in Boring 1; Elev. 359.1' in Boring 2; Elev. 350.0' in Boring 3, and at Elev. 349.3' in Boring 4. From the elevations of bedrock surface encountered in the four borings, it appears that the rock surface is sloping in a South-Westerly direction.

WATER CONDITIONS:

Observations and measurements carried out during boring and sampling operations indicate that a water table is at approximately Elev. 352' in Borings 1 & 2, and Elev. 357' in Borings 3 & 4. In view of the fact that no water-bearing sand seams of any significance, or artesian water conditions were encountered during the exploration programme, seepage into footing excavations will be local and of minor quantities.

FOUNDATION CONSIDERATIONS:

Reference to the borehole logs appended to the report, shows that the subsoil conditions at the site consist of shale bedrock overlain by a very hard silty clay layer varying from 12 to 18 feet in thickness. Reference to the profile of Hwy. 403 at this site, shows that the proposed grade line elevation is 359.0'.

At the location of Borings 1 & 2 (approximate north abutment location) shale bedrock was encountered at elevations 359.1' to 356.7'. Because of the proximity of the underlying bedrock to the proposed grade line, footings for this abutment can be founded directly within the bedrock formation. An allowable

cont'd. /: ...

FOUNDATION CONSIDERATIONS: (cont'd.) ...

bearing capacity of at least 10 tons/sq. ft. can be used. A nominal amount of scaling of the upper fragmented and weathered layer of the bedrock surface can be anticipated.

At the south abutment location (i.e., Boreholes 3 & 4) the bedrock was encountered at Elevations 349.3' and 350.1'. The hard silty clay overlying the bedrock, has sufficient strength to safely support a footing pressure of 5 tons/sq. ft.

At this abutment location, footings can either be founded on the bedrock using a design pressure of 10 tons/sq. ft., or founded in the hard cohesive material overlying the bedrock, using a bearing pressure of 5 tons/sq. ft.

Strength and compressibility characteristics of the subsoil at this site are such that the approach embankments can be designed using a standard 2:1 slope.

CONCLUSIONS & RECOMMENDATIONS:

- (1) The site is underlain by red shale bedrock covered by a shallow layer of very hard stiff clayey glacial till.
- (2) At the location of the north abutment, it is recommended that footings be founded directly on the underlying shale bedrock formation, and that a bearing pressure of 10 tons/sq. ft. be used. A nominal amount of scaling of the surface of the bedrock formation can be expected. At the south abutment location, the thickness of the overburden is such that footings can either be founded in the hard clay stratum, or carried down to the bedrock formation. If spread footings are founded within the hard cohesive layer overlying the

cont'd. // ...

CONCLUSIONS & RECOMMENDATIONS: (cont'd.) ...

(2) (cont'd.) ...

bedrock, an allowable bearing pressure of 5 tons/sq. ft. is recommended. If footings are founded directly upon the bedrock formation, an allowable bearing pressure of 10 tons/sq.ft. can be used.

(3) No ground water problems with respect to footing excavation, are anticipated. Total and differential settlements should be negligible.

(4) The proposed grade line does not present any approach fill stability problems.

M. Devata,  
Foundation Engineer.

APPENDIX I.

W P. 195-52

[illegible]



## DEPARTMENT OF HIGHWAYS - ONTARIO

W P 195-58 BORE HOLE NO. 1

JOB P59-68 STATION 2024013

DATUM 372.7' COMPILED BY B.K.

BOILING DATE June 25/59 CHECKED BY K.D.

2" DIA SPLIT TUBE \_\_\_\_\_

2" SHELBY TUBE  
2" SPLIT TUBE

2" DIA. CONE

2 SHELBY  
CASING

DATE \_\_\_\_\_

### LEGEND

1/2 UNCONFINED COMPRESSION (Cu) — — 0

VANE TEST (C) AND SENSITIVITY (S) - - -  
NATURAL MOISTURE AND

LIQUIDITY INDEX - - - - -

LIQUID LIMIT \_\_\_\_\_  
PLASTIC LIMIT \_\_\_\_\_[illegible]

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION	
				RESISTANCE	P.S.F.
	↓ Ground level	372.2	0		
	Top soil	371.7			
	Very hard dark brown clay silt with sand and gravel	366.7			
	Very hard red silty clay with gravel and sand	362.7			
	Very hard red clay with fine to medium gravel	356.7			
	Shale bed rock				
	Ax core 16.0-20.0 100% recovery				
	" " 20.0-25.0 Medium hard				
	shale no sign of weathering				
	End of borehole	347.7			

Cone penetration:  
350 ft./lb. with 2" Dia. cone

CONSISTENCY		NATURAL
MOIST. CONTENT, % DRY WT.		SAMPLE UNIT WT P.C.F.
10	20	30
		S1 333.7
		S2 —
		S3 —
		S4 —
		S5 —
		S6 —
		S7 —
		S8 —
		S9 —
		S10 —
		S11 —
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		S79 —
		S80 —



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

SEND

BORE HOLE NO. 3

BORE HOLE NO. 3  
201+80 (59'27")

STATION

COMPILED BY     B.K.    

CHECKED BY\_ \_ M.D.

2" DIA SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA CONF  
2" SHELBY  
CASING

### LEGEND

1/2 UNCONFINED COMPRESSION (QU) -- 3  
VANE TEST (C) AND SENSITIVITY (S) -- 4  
NATURAL MOISTURE AND  
LIQUIDITY INDEX -- 5  
LIQUID LIMIT -- 6  
PLASTIC LIMIT -- 7

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION	
				RESISTANCE	P.S.F.
	↓ Ground level	367.1	0		
	Top soil	366.1			
	Very hard dry brown clay	362.1			
	Very hard light grey clay and gravel	358.1			
	Light brown clay with gravel dry and hard				
		350.1			
	Core 17-21.5' red and gray shale 90% recovery	345.6			
	End of borehole				
	Cone penetration: 350 ft/lb with 2" cone				
	<del>Hard</del> clayey silt sand & gravel (glacial till) Hard				

[illegible]

## DEPARTMENT OF HIGHWAYS - ONTARIO

1W P. 195-58 BORE HOLE NO. 4

JOB P59-68 STATION

DATUM 367.9' COMPILED BY S.K.

BORING DATE JULY 1/59 CHECKED BY M.D.

BORE HOLE NO. 4

STATION - [REDACTED]

COMPILED BY S.K.

CHECKED BY           M.D.          

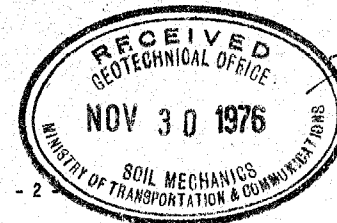
2" DIA SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION (QU) \_\_\_\_\_  
VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_  
NATURAL MOISTURE AND \_\_\_\_\_  
LIQUIDITY INDEX \_\_\_\_\_  
LIQUID LIMIT \_\_\_\_\_  
PLASTIC LIMIT \_\_\_\_\_

C.M.S.L.	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	
	1 Ground level		0	50	100
	Top Soil	367.6		150	200
	<del>Dry hard red sandy clay to clay</del>	<del>366.4</del>			
	MIXTURE OF CLAYEY SILT, SAND & GRAVEL				
	<del>Dry hard red clay with (blue-green)</del>	<del>364.6</del>			
	(GLACIAL TILL)				
	HARD				
	<del>At core 18.9-23.0 Gray and red</del>	349.3			
	<del>shale.</del>				
	End of borehole	344.9			
	SHALE (RED) BEDROCK				
	INTERBEDDED WITH				
	GREY SHALE				
	SOUND				

[illegible]



# COLE, SHERMAN & ASSOCIATES LIMITED

CONSULTING ENGINEERS AND PLANNERS

November 23, 1976  
Our Ref: 3676

## PROGRESS MEETING 76-5

W.P.58-76-01, Partial Interchange  
Highway 403 at Waterdown Road  
District 4, Hamilton

DATE: Tuesday, November 23, 1976 @ 9:00 a.m.

PLACE: Cole, Sherman & Associates Offices

PRESENT:

M.T.C.

C.S.A.

Mr. J.G. Celmins - Planning & Design  
Mr. N.D. Smith - " "  
Mr. J. Robertson - " "  
Mr. V.R. Berkis - Illumination  
Mr. D. Mullett - Geotechnical Office  
Mr. T. Mitchell - Traffic  
Mr. J.J. Regan - District 4

Mr. R.L. Sinkov  
Mr. K.T. Olsen  
Mr. J. Doi  
Mr. B.H. Hurd

### 1. Review of Minutes of Meeting 76-4

ACTION

- Signs - Mr. Regan advised that the required field information has been sent to the Consultant.
- Electrical Standards - Mr. Doi advised that City of Burlington has agreed to accept MTC standards and specifications for all underground work on this contract. All above ground plant will be as per Burlington standards. The City also requested that illumination poles for illuminating the north half of the structure be moved some 25' north, closer to the Sovereign Road intersection.
- Property Plan - Mr. Celmins supplied a copy of Plan P-2792-63 to the Consultant. This plan outlines the new limit of MTC lands east of Waterdown Road and south of Hwy 403. No security fence is to be erected along this new boundary.
- Utilities - Mr. Regan advised that Union Gas does not require liner protection for its plant at the W-NS ramp.
- Existing hydro information is still outstanding. J. Regan to check with A. Maass re: liner protection for watermain, relocation of two H-poles and relocation of one fire hydrant.
- A Legal Agreement is presently being prepared to acquire the use of the Bell Canada ducts in the Waterdown Road structure.

J. Regan

### 2. Other Meetings

ACTION

- Electrical Meeting 76-E-2 - Meeting held with Halton Region and City of Burlington on November 15, 1976 to discuss traffic signal equipment.

### 3. Other Business

- Waterdown Road/Panin Road/Sovereign Road Intersection - MTC Traffic Section met with representatives of Halton and Burlington early in November 1976 to finalize municipal requirements at this intersection. A plan outlining these requirements was supplied to the Consultant on November 3, and reviewed with Regional Traffic on November 9, 1976. Today, the consultant presented a design for this intersection, the geometrics representing a design speed of 30 mph modified to fit existing property restrictions. This proposal was accepted by the meeting.

Traffic Section would prepare a plan showing pavement markings for review by the municipalities.

T. Mitchell

- NS-W Ramp Terminal at Hwy 403 - The steep side slopes along the existing fill section of Highway 403, Sta 228 to Sta 231, right, where the highway passes over Hidden Valley Road and Grindstone Creek, restrict the amount of widening that can be carried out to accommodate the parallel lane and taper of the NS-W ramp. Since the grade on this ramp in advance of the bullnose is approximately 4%, the total length of parallel lane plus taper can be reduced from 1325' to 1000' (assuming design speed of 70 mph on highway and 40 mph on ramp). It was agreed by this meeting to reduce the total length by 300'.

C.S.A.

- Illumination Poles on Retaining Wall - Illumination poles, on both sides of the Waterdown Road structure, will be mounted on top of the proposed retaining wall along the W-NS ramp. The Consultant has forwarded design data to MTC Structural Office for inclusion in the structure drawings.

W. Kulmatich

- Fencing - New security fence along the south side of the Panin Road braid intersection is to be offset 12 feet from edge of pavement to ensure that illumination poles will be on the municipal side of the fence.

C.S.A.

### 4. Future Meetings

- Municipal Meeting 76-3 - Mr. Smith will arrange a meeting with Halton Region and City of Burlington to finalize intersection design, traffic signals and illumination. (Possible dates: Tuesday, November 30 and Thursday December 2, 1976).

N.D. Smith

### 5. Next Meeting

The next Progress Meeting will be held on Tuesday, December 14, 1976 at 9:00 a.m.

cc: MTC - 28 copies  
CSA - Those present

Submitted by:

BRAM HURD

Mr. G.C.E. Burkhardt  
Regional Structural Planning Engineer  
Central Region  
3501 Dufferin Street, Downsview

Soil Mechanics Section  
Geotechnical Office  
West Building, Downsview

September 15, 1976

Mr. W. Kulmatickas

Retaining Wall at Hwy. 403 and Waterdown Road  
W.P. 58-76-01, Site 10-194  
Hwy. 403, District 4, Hamilton

---

As requested, we have reviewed your proposal for the above retaining wall at the proposed new interchange, as shown on Plan #E5436-1.

Our recommendations are as follows:

1. The proposed wall footing may be constructed at elev. 355+ (as indicated on the Plan) using design pressures up to 3.0 tsf.
2. It may be assumed that an adhesion of 2000 psf will apply between the footing base and the underlying cohesive subsoil for purposes of computing the sliding resistance. A 'key' should be provided at the base of footing to increase this resistance.
3. For stability reasons the retaining wall should be constructed in not less than two stages, completing one segment at the time.
4. The excavation should begin initially with 1:1 slopes (abutment side) then proceed with sheeted and braced vertical slopes.
5. The backfill to the retaining wall should be as per MTC standard SD-4-58.

If additional information is required please contact our Office.

P. Payer  
Senior Engineer

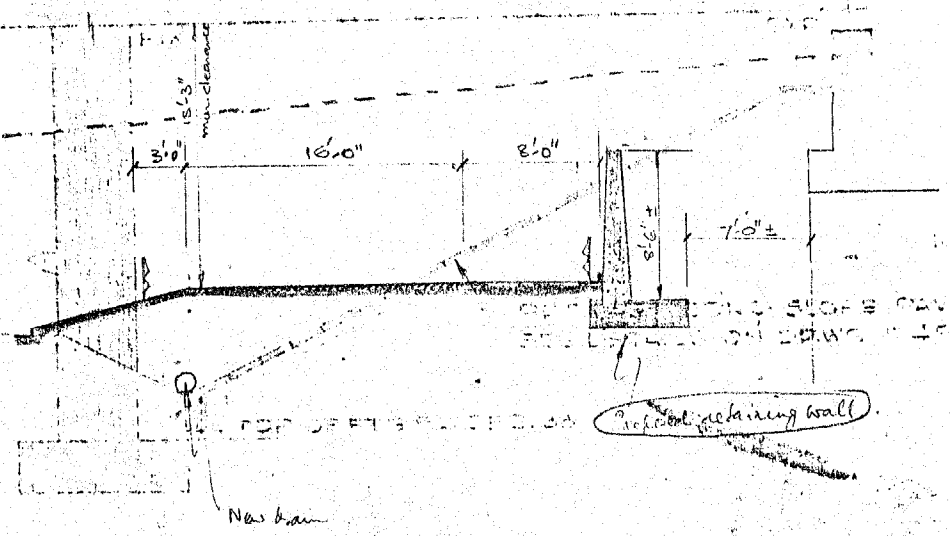
For: K.G. Selby  
Supervising Engineer

KGS/PP/gs

cc: H. Greenland  
R. Fitzgibbon  
J. Anderson  
Files  
Record Services

TO THE ROAD

TRACE ALONG 1/2 ROADWAY



DATUM

WATERDOWN ROAD UNDERPASS 1" = 10'

High 403 DIST. 4

W.P. 170-67-01 SITE 10-194

10/6/01

Mr. E. J. McCabe  
Sr. Project Planning Engineer  
Funct. Planning Section  
Central Region

30 MOS-062  
K. G. Selby  
Supervising Foundation Engineer  
Materials & Testing  
Room 107, Lab. Bldg.

January 7, 1971

W.P. 170-67-01 Interchange at  
C.A.H. 403 and Water on Road  
Pr. #12 - original 195-58-01  
Proposed Retaining

As requested, we have reviewed your proposal for the abovementioned retaining wall as shown on the sketch attached to your memo dated December 14, 1970. We are of the opinion that the wall can be constructed without detrimental effect on the existing abutment, provided that removal of soil in front of the abutment footing will not drastically reduce the safety factor of the abutment against sliding. Normally passive resistance is neglected in the design, but it would be as well to check with the Bridge Office whether this is actually the case.

*K. G. Selby*  
K. G. Selby

SUPERVISING FOUNDATION ENGINEER  
For

A. G. Stermac  
PRINCIPAL FOUNDATION ENGINEER

KGS/jt

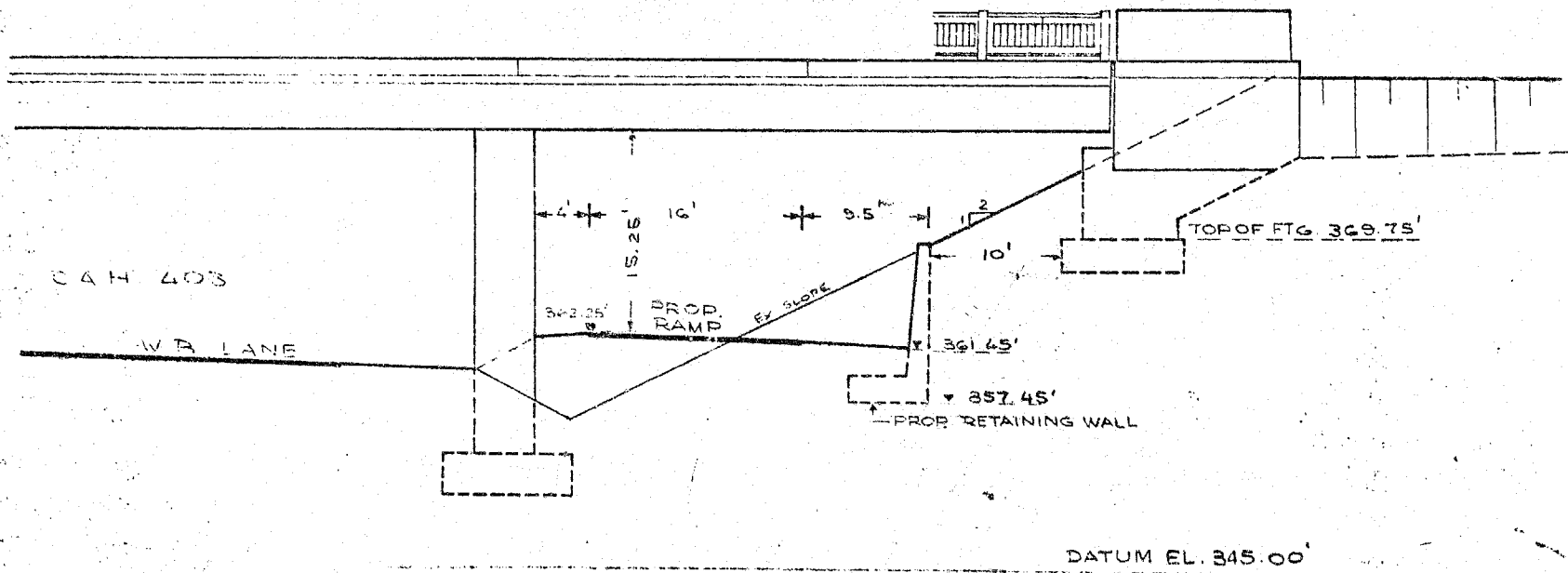
cc - G. Burkhardt ✓  
B. Richardson  
Foundation Files  
General Files

BRIDGE OFFICE  
CENTRAL REGION

FILE COPY

DATE.....





SKETCH SHOWING PROP RETAINING WALL IN  
 NORTH-END SPAN OF THE FREEWAY  
 UNDERPASS AT WATERDOWN RD.

SCALE 1" = 10'



# COLE, SHERMAN & ASSOCIATES LIMITED

CONSULTING ENGINEERS AND PLANNERS

## PROGRESS MEETING 76-2

W.P. 58-76-01, Partial Interchange  
Highway 403 at Waterdown Road  
District 4, Hamilton

DATE: Tuesday, July 27, 1976, 9:00 a.m.

PLACE: Cole, Sherman & Associates Offices

PURPOSE: To establish program dates

PRESENT:	J.G. Celmins	-	Planning and Design
	N.D. Smith	-	Planning and Design
	V.R. Berkis	-	Electrical Design
	A.D. Silbiger	-	Electrical Design
	E. Shedler	-	Surveys and Plans
	D. Mullett	-	Materials and Testing
	C. Farrell	-	Structural Planning
	J.H. van de Wall	-	Regional Traffic
	J.J. Regan	-	District
	K. Olsen	-	Cole, Sherman
	R.L. Sinkus	-	Cole, Sherman

### 1. Drawings

#### Action

A preliminary 1" = 40' base plan (manuscript) was supplied to the Consultant. Surveys and Plans will update it in the field before preparing contract drawing background sheets.

E. Shedler

Profiles for contract drawings will be developed from cross-section information. A "C" profile will not be prepared for this project. Planning profiles will be sufficient for utility negotiations.

### 2. Survey

Mr. Shedler supplied co-ordinates for Highway 403 and Waterdown Road alignments.

### 3. Soils

A soils profile will not be prepared for this project. Printed borehole log information will be supplied instead.

D. Mullett

Field investigations will start during the first week of August, after Surveys and Plans stake approximate centrelines.

E. Shedler

- 2 -

### 4. Signs

Two ground mounted signs are to be provided for in sundry. Regional Traffic to determine if footings are warranted.

J. van de Wall

### 5. Illumination and Signals

It was agreed that Regional Traffic review illumination warrants for the W-NS ramp gore area and the gap on Panin Road between the two intersections and submit a recommendation to Mr. Berkis.

J. van de Wall

Tentatively traffic signals are to be constructed by MTC and transferred to the City of Burlington for operation and maintenance. Mr van de Wall to review previous recommendations based on the current MTC policy and arrange a meeting with City of Burlington representatives on August 12.

J. van de Wall

### 6. Program Dates

Interim completion dates, acceptable to those present, were set during the meeting. These will be forwarded to the Regional Program Co-ordinator for confirmation.

N.D. Smith

Consultant to submit composite contract drawings and documents by December 15, 1976.

### 7. Next Meeting

The next progress meeting will be held on Tuesday, August 24, 9:00 a.m. at the Consultants' offices.

submitted by

*R. Sinkus*

R. L. SINKUS

RLS:kh

cc: N.D. Smith (28 copies)



1295  
Mr. B. A. Khojajian,  
Senior Project Manager,  
Planning & Design,  
Central Region.

Mr. D. J. Kimmett

G. C. E. Burkhardt,  
Structural Planning Office,  
3501 Dufferin Street.

May 28, 1976.

Hwy. 403 Waterdown Road Interchange  
New W-N/S Ramp,  
Site 10-194, W.P. 58-76-01,  
District #4, Hamilton.

I refer to your memo of May 20, 1976, regarding the above project.

We have reviewed your proposed scheme and can state that such a scheme is definitely feasible.

Temporary shoring will probably be required and it may be necessary to stage the construction to avoid removing all the fill at one time.

It may be necessary for the Soil Mechanics Section to perform a limited site investigation to confirm the strata at the proposed location.

In order to complete the retaining wall design in time for the 1976/77 Construction Program, site plans and profiles will be required in the near future.

CFF:lm

C. F. Farrell,  
SENIOR STRUCTURAL PLANNING ENG.,  
for:  
G. C. E. Burkhardt,  
REG. STRUCTURAL PLANNING ENG.

c.c. R. Fitzgibbon  
K. Selby ✓




**COLE, SHERMAN & ASSOCIATES LIMITED**
**CONSULTING ENGINEERS AND PLANNERS**

July 14, 1976

PROGRESS MEETING 76-1

 W.P. 58-76-01, PARTIAL INTERCHANGE  
 HIGHWAY 403 AND WATERDOWN ROAD  
 DISTRICT 4, HAMILTON

DATE: Wednesday, July 7, 1976, 2:00 p.m.

PLACE: M.T.C. Regional Offices

PRESENT:	N.D. Smith	- Planning and Design
	B. Khojajian	- Expressway Planning
	J. Hussey	- Engineering Plans
	K.G. Selby	- Soil Mechanics
	P.F. Weber	- Materials and Testing
	Z.J. Byblow	- Surveys and Plans
	W. Kulmatieckas	- Structural Planning
	C. Farrell	- Structural Planning
	J.H. van de Wall	- Regional Traffic
	J.J. Regan	- District 4, Construction
	B.H. Hurd	- Cole, Sherman
	R.L. Sinkus	- Cole, Sherman

ACTION

 1. PLANNING PROPOSALS

Mr. Khojajian outlined the current status of the project and presented the recommended scheme (Concept 2) for a partial interchange. A planning report will be issued shortly. The Design Criteria is being circulated for signatures.

Improvements to Plains Rd. (Hwy. 2)/Waterdown Rd. intersection will be included in this contract, currently on this year's program.

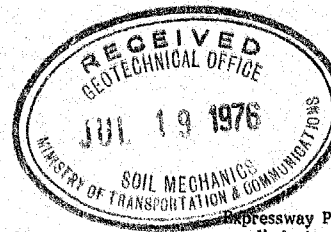
 2. DRAWINGS

1"=40' base drawings are underway. When completed they will be forwarded to Surveys and Plans for alignment information. J. Hussey

Contract drawing background sheets will be laid out by the Consultant and prepared by Surveys and Plans. CSA  
Z. Byblow

Soils profile will be prepared at a scale of 1"=40' horizontal and 1" = 10' vertical. Z. Byblow

Continued....2



- 2 -

ACTION

Expressway Planning to supply Mr. Byblow with planning profiles (plan supplied at meeting), and the Consultant with a reproduceable (film) plan showing the approved proposals. B. Khojajian

 3. SURVEY

It was tentatively agreed that the existing Hwy. 403 east to west chainage be maintained for this project and that ramp alignments be co-ordinated to the standard grid system.

Due to the tight schedule design cross-sections for the ramps west of Waterdown Rd. will be taken along Hwy. 403 chainage. Z. Byblow

After Surveys and Plans establish co-ordinates for Hwy. 403 alignment the Consultant will co-ordinate ramp alignments and forward same to Surveys and Plans for staking and ramp W-NS cross-sections east of Waterdown Rd. Z. Byblow  
CSA

 4. RETAINING WALL

A retaining wall will be required under the existing Waterdown structure, between W-NS ramp and the south abutment.

Structural Planning to request a site plan for the immediate area from Surveys and Plans, who will forward same to the Consultant for required geometric information. W. Kulmatieckas  
Z. Byblow  
CSA

A foundation investigation will not be required. Soil Mechanics will make a recommendation based on previous borings for the Waterdown Rd. structure. K. Selby

The Waterdown Rd. structure deck will not be waterproofed at this time.

 5. SOILS

Start of soils investigation is tentatively scheduled for the end of July. P. Weber

 6. ILLUMINATION, SIGNS AND SIGNALS

Partial illumination will be required at W-NS ramp terminal and at the braid design intersection of NS-W ramp and Panin Rd. Existing illumination at Panin Rd./Waterdown Rd. (2 luminaires) may require relocation.

Overhead signs will not be used. If possible, an advance sign will be mounted on the Lemmonville Rd. structure and a ground mounted sign provided for the W-NS exit ramp. J. van de Wall

Existing signals at Panin Rd./Waterdown Rd. intersection will be relocated; new signals installed at W-NS ramp terminal.

Continued....3

ACTION

Electrical design will be done by Consultant.

7. UTILITIES

Planning and Design to supply District (Al Maass) with prints of the area for negotiations with the Utility companies. Identified utilities to date include water, Bell, gas and hydro.

N.D. Smith  
District

8. TIMING

Due to the tight design schedule it was requested that all information pertaining to this project be made available as early as possible. Program dates will be established at the next progress meeting.

Highway 403 will be resurfaced through this area after this (W.P. 58-76-01) contract is completed. The resurfacing pavement will be feathered into the newly constructed curb and gutter, if any.

9. NEXT MEETING

The next progress meeting will be held on Tuesday, July 27, 9:00 a.m. at Cole, Sherman & Associates Limited offices, 2025 Sheppard Avenue East.

RLS:njm

Submitted by:

  
R.L. SINKUS

cc: M.T.C. (28 copies)



# COLE, SHERMAN & ASSOCIATES LIMITED

CONSULTING ENGINEERS AND PLANNERS

July 14, 1976

## PROGRESS MEETING 76-1

W.P. 58-76-01, PARTIAL INTERCHANGE  
HIGHWAY 403 AND WATERDOWN ROAD  
DISTRICT 4, HAMILTON

DATE: Wednesday, July 7, 1976, 2:00 p.m.

PLACE: M.T.C. Regional Offices

PRESENT:

N.D. Smith	- Planning and Design
B. Khojajian	- Expressway Planning
J. Hussey	- Engineering Plans
K.G. Selby	- Soil Mechanics
P.F. Weber	- Materials and Testing
Z.J. Byblow	- Surveys and Plans
W. Kulmattickas	- Structural Planning
C. Farrell	- Structural Planning
J.H. van de Wall	- Regional Traffic
J.J. Regan	- District 4, Construction
B.H. Hurd	- Cole, Sherman
R.L. Sinkus	- Cole, Sherman

## ACTION

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Continued....2

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CSA

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CSA

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K. Selby

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P. Weber

### 6. ILLUMINATION, SIGNS AND SIGNALS

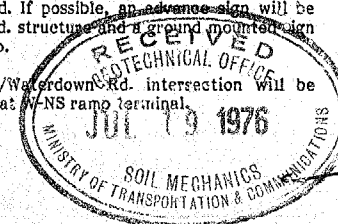
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J. van de Wall

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Continued....3



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9. NEXT MEETING

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RLS:njm

Submitted by:

  
R.L. SIMKUS

cc: M.T.C. (28 copies)

U.S. GEOLOGICAL SURVEY

GEOCRES No. 3045-62

DIST 4 REGION Central

W.P. No. 58-76-02

CONF. No. 76-128

W.C. No. \_\_\_\_\_

STR. SITE No. 10-194

HWY. No. 403

LOCATION Watkins Rd.

122 mi. W. of QFW Retaining

Wall

DATE OF FIELD WORK \_\_\_\_\_

BY \_\_\_\_\_

REMARKS \_\_\_\_\_

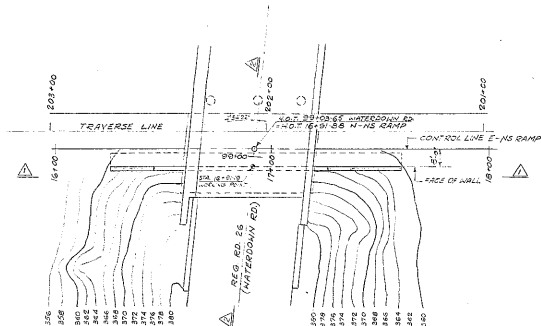
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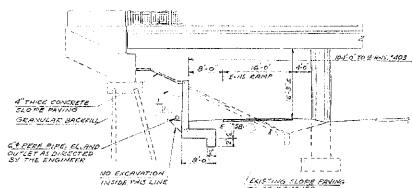




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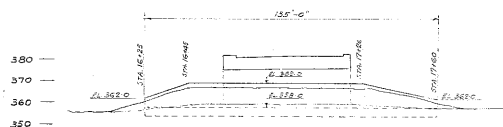


PLAN  
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SECTION 2  
1" = 10'-0"

1. FOR STABILITY REASONS, THE WALL SHALL BE BUILT IN AT LEAST TWO STAGES AT ANY TIME, FILL TO THE APPROXIMATE ELEVATION OF THE EXISTING FILL, MUST BE IN PLACE IN FRONT OF THE ABUTMENT FOR APPROXIMATE HALF THE WIDTH OF THE ABUTMENT

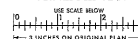


VIEW 

$I'' = 20^\circ - 2''$

GSM TOPO 67B  
EL 382.393  
WATERDUNK ROAD OVERPASS OVER HIGHWAY NR 403,  
TAB. 81 IN TOP OF EAST SIDEWALK OF WATERDUNK ROAD  
19.8 FEET NORTHERLY FROM THE SOUTHEAST CORNER OF  
BAPTIST HALL AND 613 FEET NORTHERLY FROM THE  
SOUTHWEST CORNER OF OVERPASS OVER HIGHWAY NR 403  
0.7 FEET FROM CURB.

FOR REDUCED PLAN

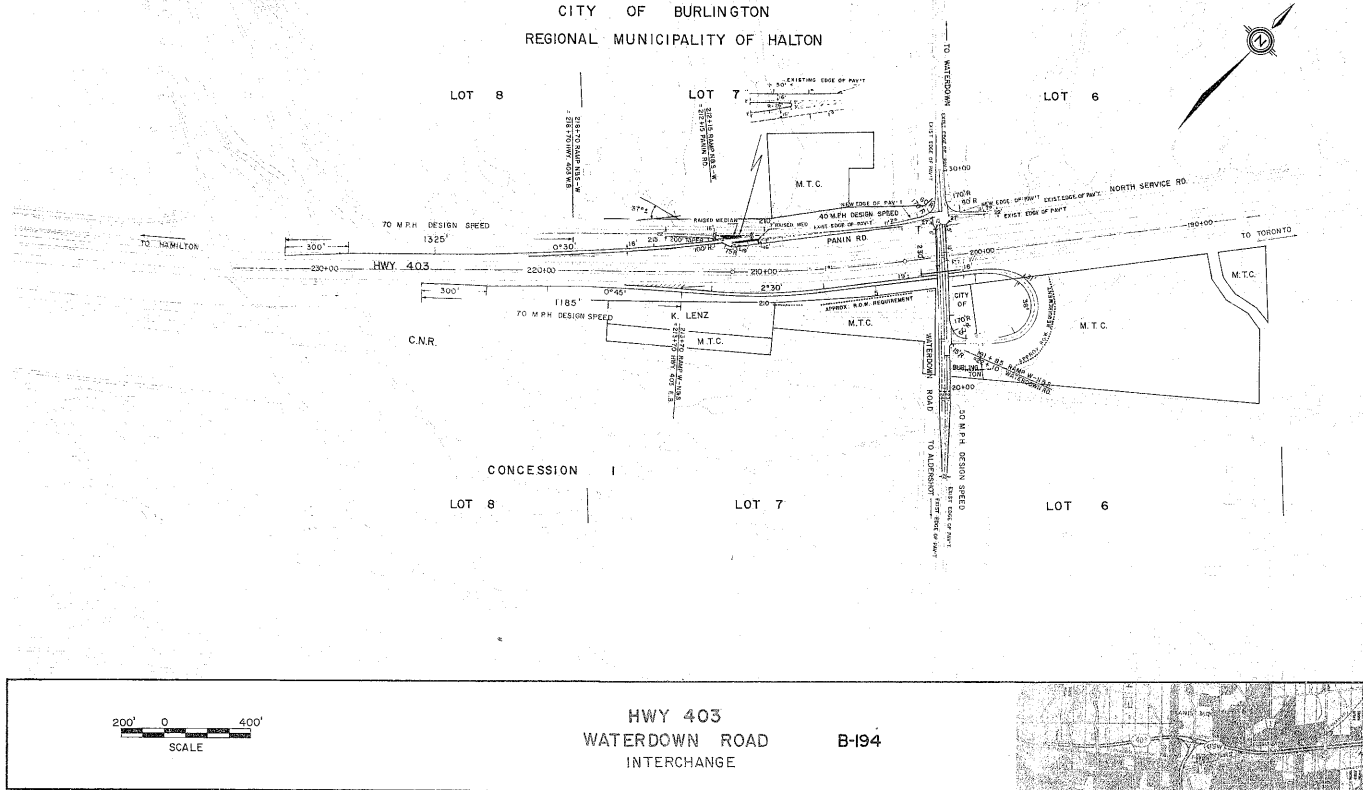


3	REVISIONS				
	DATE	BY	DESCRIPTION		
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	BRINKING	CHECK	TYPE N-10	DWO C	

30MS-62


W.P. 58-76-01

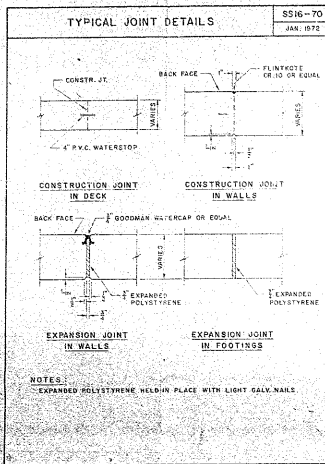
CITY OF BURLINGTON  
REGIONAL MUNICIPALITY OF HALTON



3045-62

89-5405

DISTRICT 4 CONT No WP No 58-76-02		
RETAINING WALL AT HWY 405 AND STATE ROAD TOL 4.05 STANDARD 118 TABLE		



FOR REDUCED PLAN

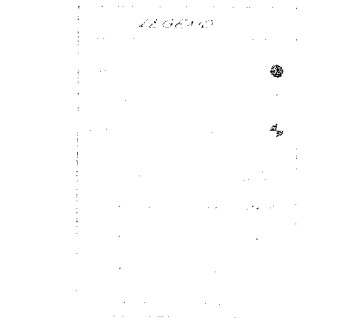
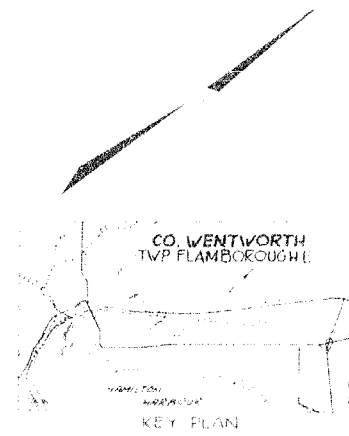
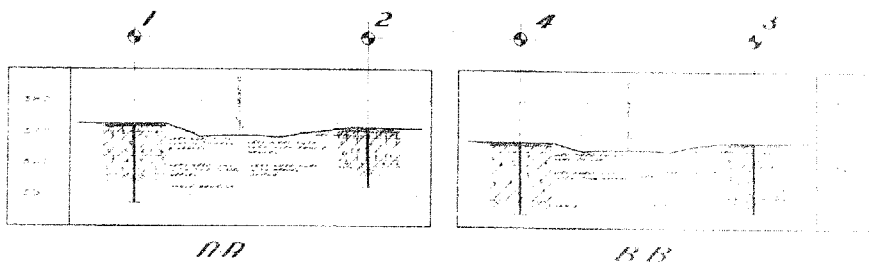
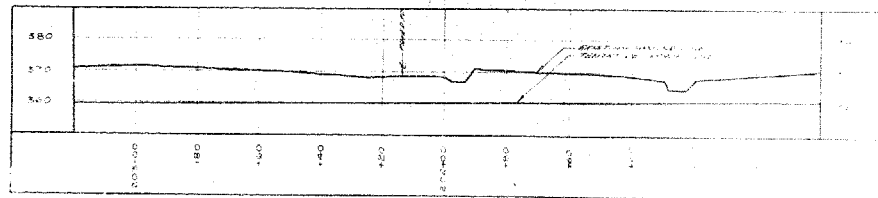
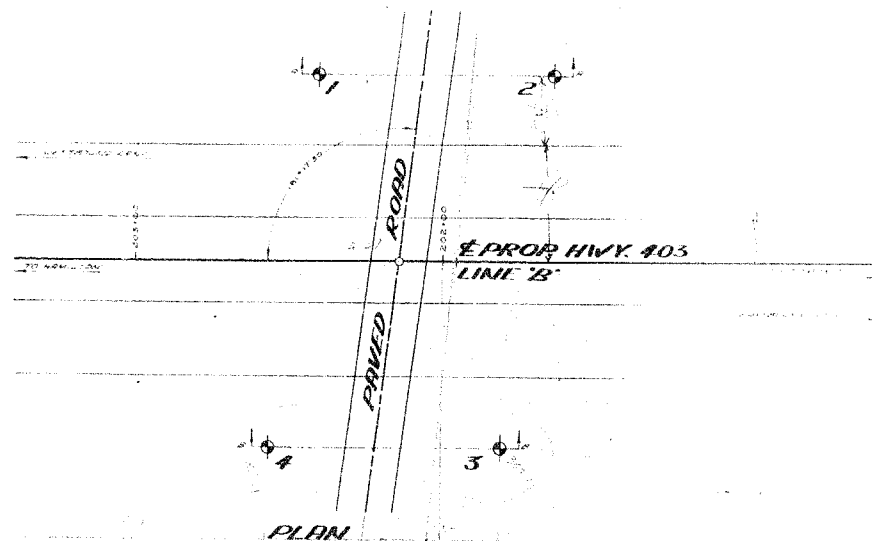
USE SCALE BELOW

10 0 10 20 30 40 50 60 70 80 90 100

1" = 10' HORIZONTAL SCALE

DATE	BY	DESCRIPTION
DESIGN	CHECK	LOADING
DRAWING	CHECK	DATE

DATE NO. 20



30115-62

PAVED ROAD  
PROPOSED CROSSING

159 687