

TROW, SODERMAN AND ASSOCIATES

SITE INVESTIGATIONS
AND
SOIL MECHANICS CONSULTATION

58-F-264 C

W. A. TROW, M.A.S.C., M.E.I.C., P.ENG.

L. G. SODERMAN, B.S.C., D.I.C., P.ENG.

884 WILSON AVE., DOWNSVIEW

ST. 8-5921

Project: C108/J2

August 31, 1958.

Mr. A. M. Toya,
Bridge Engineer,
Dept. of Highways of Ontario,
280 Davenport Road,
Toronto, Ontario.

Attention: Mr. McCombie

Core Drilling To Determine Underside of Existing Footings
Oakville Creek And Credit River Bridges
Queen Elizabeth Highway

Dear Sir:

Reported herein are the results of a drilling program carried out to determine the elevations of the underside of the footings supporting the piers and abutments of the above two bridges. Field work was performed during the period from July 16 to August 15, 1958.

Borings were performed using a standard rotary drilling machine fitted with AXT size diamond coring bits. A continuous log of each hole was prepared by our qualified Soils Engineer, who personally assisted with the drilling. Elevations of the top of the borehole were supplied by the local D.S.O. survey party.

The results of this investigation have been summarized for each bridge site; these summaries are included as Tables numbered 1 and 2. In addition, the continuous logs of each boring carried out are included for record purposes. The following comments are enumerated for your consideration:

(1) The bedrock formation supporting piers and abutments of these two structures is the Dundas Shale. This formation is grey in colour and is characterized by thin limestone interbeds. Mud seams are not uncommon in the upper zone of this formation.

The shale formation is competent, but is susceptible to severe disintegration upon drying and exposure to the elements. Freezing and thawing is not necessary to cause the shale to disintegrate. Excavations should not be allowed to remain open for any

period of time unless they are flooded to prevent disintegration of the shale. Exposed areas should be sealed prior to pouring concrete.

(2) Credit River Bridge: The concrete core recovered from the borings in abutments and piers of this structure, indicates that the concrete is free of voids and in sound condition. No mud seams were intersected within the depth of borings (10 feet below underside of footings). Footing performance is considered satisfactory.

(3) Oakville Creek Bridge: Concrete cored in the abutment and pier members of this structure is sound, with the exception of a few small zones of uncemented aggregate cored in Piers No.3 and 4. With the exception of a possible thin mud seam 5 feet below underside of footing at Pier No.3, the strata below the footings is competent and free of mud seams.

The east abutment of this structure which is a fixed support, shows evidence of movement. The north girder of the end span has moved away from the abutment and resulted in a structural crack along the plane of connection of this girder with the abutment. Closer inspection of the girders themselves, revealed vertical cracks at the mid-span sections of these members. It could not be concluded whether these cracks were structural cracks or shrinkage cracks. Visual observations could not fix the time at which these movements took place (i.e. during construction or post-construction).

No mud seams were encountered below the footing of the east abutment. This noted absence of mud seams would allow the footings for the proposed abutment extensions to be carried deeper than the footing of the existing abutment. In view of the movements evidenced, it appears advisable to found the new footings below the elevation of the underside of the existing footing.

We are pleased to have had this opportunity to be of service to you. If questions come to mind regarding either the factual data contained herein, or the comments submitted, please contact us.

Yours very truly,

L. G. Soderman

Lawrence G. Soderman (P. Eng.)

LGS/lcs
Encl.

Credit River Crossing
Queen Elizabeth Hwy. West

TABLE NO.1

SUMMARY OF BOREHOLE LOCATIONS
AND
ELEVATIONS OF UNDERSIDE OF FOOTINGS

| Pier No. | Hole No. | Hole Location | Elevation of Underside of Footing. |
|---------------|----------|-------------------------------------------------------------------|------------------------------------|
| West Abutment | 1 | 14'6" north of E of Bridge, 1'7" east of abutment breast-wall. | 286.6 |
| Pier No.1 | 2 | 4' south of E of Bridge, 4' east of E of columns. | 236.3 |
| Pier No.2 | 3 | 24'6" north of E of Bridge, 2'6" west of E of columns. | 226.36 |
| Pier No.3 | 4 | 23'3" north of E of Bridge, 5' west of E of columns. | 223.0 |
| Pier No.3 | 5 | 22'6" south of E of Bridge, 4'6" west of E columns. | 221.6 |
| Pier No. 4 | 6 | 16' north of E of Bridge, 5' east of E columns. | 224.3 |
| Pier No.5 | 7 | 3' south of E of Bridge, 9' west of E columns. | 236.8 |
| Pier No.6 | 8 | 17'8" south of E of Bridge, 4'4" west of E of columns. | 273.9 |
| East Abutment | 9 | 5' south of E of Bridge, 11" west of breastwall face. | 259.8 |
| East Abutment | 10 | 17' north of E of Bridge, 1' west of breastwall face. | 266.8 |

Above pier numbers correspond to those noted on
 Dept. of Highways of Ontario drawing No.D 2241-1, dated
 November 21, 1933.

SIXTEEN MILE CREEK CROSSING
(OAKVILLE CREEK)
QUEEN ELIZABETH HWY. WEST

TABLE NO. 2

SUMMARY OF BOREHOLE LOCATIONS
AND
ELEVATIONS OF UNDERSIDE OF FOOTINGS

| Pier No. | Hole No. | Hole Location | Elevation of Underside of Footing. (Ft.) |
|---------------|----------|---------------------------------------------------------------------------------|------------------------------------------|
| Pier No. 1 | 5 | Top of pedestal 15' north of north face of south column on 3 of columns. | 314.0 |
| Pier No. 2 | 4 | Top of pedestal 11' south of south face of north column on 2 of columns. | 273.4 |
| Pier No. 3 | 2 | South west corner of Pier No. 3. | 270.4 |
| Pier No. 3 | 1 | North east corner of Pier No. 3. | 263.3 |
| Pier No. 4 | 3 | Top of pedestal 3' north of north face south column on 2 of columns. | 277.4 |
| Pier No. 5 | 6 | Top of pedestal 4' south of south face of north column 2' east of 2 of columns. | 301.9 |
| Pier No. 6 | 8 | Top of pedestal 1' north of north face of south column on 2 of columns. | 321.7 |
| East Abutment | 7 | 1½' west of face of breastwall 10' south of bridge centre line. | 334.9 |
| West Abutment | | No boring carried out. | |

NOTE: Vertical cracks noted at mid-span of both girders of Span A. Evidence of movement also noted where south girder forms into abutment.

Above pier numbers correspond to those given on Dept. of Highways of Ontario drawing No. D 2301-1, dated April 13, 1936.

CREDIT RIVER CROSSING
QUEEN ELIZABETH HWY. WEST
BOREHOLE LOGS

CREDIT RIVER
BORING NO.1

| <u>Depth</u> | <u>Type of Core</u> | <u>Recovery</u> | <u>Remarks</u> |
|----------------|---------------------|-----------------|---------------------------------------------------------------------------------|
| 0' - 5" | --- | --- | Top of casing @ elevation 299.33 5" casing stick-up. Hole inclined @ 14°. |
| 5" - 9" | Concrete | --- | Drain trough. |
| 9" - 6'9" | --- | --- | Drill sand fill. |
| 6'9" - 7'10" | Concrete | 100% | Abutment wall, sound concrete. |
| 7'10" - 13'2" | Concrete | 96% | Sound concrete. |
| 13'2" - 13'7" | Shale | 100% | Bottom of footing @ 13'2". No mud seams noted. |
| 13'7" - 15'5" | Shale | 55% | No mud seams noted. Shale ground while drilling. |
| 15'5" - 16'2" | Shale | 100% | No mud seams noted. |
| 16'2" - 17'11" | Shale | 95% | " " " " |
| 17'11" - 23'3" | Shale | 94% | " " " " |

CREDIT RIVER
BORING NO.2

| <u>Depth</u> | <u>Type of Core</u> | <u>Recovery</u> | <u>Remarks</u> |
|-----------------|---------------------|-----------------|------------------------------------------------------------------------------------------------|
| 0' - 1'11" | Concrete | 96% | Top of hole @ top of concrete pedestal, elevation 260.00. Vertical hole. Sound concrete. |
| 1'11" - 3'9" | Concrete | 96% | Sound concrete. |
| 3'9" - 5'7" | " | 96% | " " " |
| 5'7" - 10'10" | " | 97% | " " " |
| 10'10" - 16'0" | " | 100% | " " " |
| 16'0" - 21'2" | " | 92% | " " " |
| 21'2" - 22'10" | Concrete & Shale | 100% | 7" sound concrete and 13" shale. (no mud seams noted). Footing bottom at 21'9". |
| 22'10" - 27'10" | Shale | 98% | No mud seams noted. |

Credit River, Boring No.2, Cont.

| | | | |
|-----------------|-------|-----|------------------------------------------------------------|
| 27'10" - 30'11" | Shale | 81% | No mud seams noted. Shale probably ground during drilling. |
| 30'11" - 32'9" | Shale | 96% | Shale probably ground during drilling. |

CREDIT RIVER
BORING NO.3

| Depth | Type of Core | Recovery | Remarks |
|----------------|--------------|----------|-------------------------------------------------------------------------------------|
| 0' - 2'0" | Concrete | 88% | Hole inclined @ 26° to vertical. Top of hole @ elevation 248.46. Sound concrete. |
| 2'0" - 4'4" | " | 79% | " " probably ground during drilling. |
| 4'4" - 6'1" | " | 100% | Sound concrete. |
| 6'1" - 10'9" | " | 100% | " " |
| 10'9" - 15'11" | " | 98% | " " |
| 15'11" - 19'8" | " | 36% | Appears to be sound concrete. Machine on pressure, probably ground core. |
| 19'8" - 24'8" | " | 95% | Sound concrete. |
| 24'8" - 30'3" | Shale | 50% | No mud seams noted, core probably ground while drilling. Bottom of footing @ 24'8". |
| 30'3" - 36'2" | Shale | 25% | Core probably ground, no mud seams noted. |

CREDIT RIVER
BORING NO.4

| Depth | Type of Core | Recovery | Remarks |
|--------------|--------------|----------|-----------------------------------------------------------------------------------------|
| 0' - 8" | _____ | _____ | Hole inclined @ 20° to vertical. Stick-up of casing = 8". Top of casing @ elev. 245.75. |
| 8" - 2'0" | _____ | _____ | Drill fill sand. |
| 2'0" - 3'6" | Concrete | 72% | Sound concrete. |
| 3'6" - 5'3" | Concrete | 95% | " " |
| 5'3" - 10'3" | Concrete | 100% | " " |

Credit River, Boring No.4, Cont.

| | | | |
|----------------|------------------|-----|------------------------------------------------------------------------------------|
| 10'3" - 15'6" | Concrete | 99% | Sound Concrete. |
| 15'6" - 20'8" | Concrete | 97% | " " |
| 20'8" - 25'10" | Concrete & Shale | 94% | 43" of sound concrete and 19" of sound shale recovered. Bottom of footing @ 24'3". |
| 25'10" - 30'5" | Shale | 76% | No mud seams noted. |
| 30'5" - 35'9" | Shale | 95% | " " " " |

CREDIT RIVER
BORING NO.5

| Depth | Type of Core | Recovery | Remarks |
|----------------|------------------|----------|----------------------------------------------------------------------------------------|
| 0' - 1'10" | Concrete | 93% | Hole inclined @ 19° to vertical. Top of hole in footing @ elev. 248.17 Sound concrete. |
| 1'10" - 3'8" | " | 100% | " " |
| 3'8" - 8'7" | " | 100% | " " |
| 8'7" - 13'9" | " | 87% | " " |
| 13'9" - 18'8" | " | 83% | " " |
| 18'8" - 22'3" | " | 91% | " " |
| 22'3" - 27'7" | " | 95% | " " |
| 27'7" - 32'10" | Concrete & Shale | 97% | 11" of sound concrete and 4'2" of sound shale recovered. Bottom of footing @ 28'6". |

CREDIT RIVER
BORING NO.6

| Depth | Type of Core | Recovery | Remarks |
|---------------|--------------|----------|---------------------------------------------------------------------------------------------|
| 0' - 1'4" | _____ | _____ | Hole inclined @ 25° to vertical. 1'4" is distance from concrete through water to raft deck. |
| 1'4" - 3'8" | Concrete | 86% | Sound concrete. |
| 3'8" - 5'10" | " | 100% | " " |
| 5'10" - 11'1" | " | 97% | " " |
| 11'1" - 16'3" | " | 98% | " " |

Credit River Boring No. 6, Cont.

| | | | |
|---------------|------------------|------|--------------------------------------------------------------------------------------------------------------------------------------|
| 16'3" - 21'3" | Concrete | 100% | Sound Concrete. |
| 21'3" - 26'7" | Concrete & Shale | 73% | 7" of sound concrete and 3'4" of shale recovered. No mud seams noted. Shale probably ground by drilling. Bottom of footing @ 21'10". |
| 26'7" - 31'6" | Shale | 100% | No mud seams noted. |

CREDIT RIVER
BORING NO. 7

| Depth | Type of Core | Recovery | Remarks |
|----------------|------------------|----------|-----------------------------------------------------------------------------------------------------|
| 0' - 8" | _____ | _____ | Hole inclined @ 23° to vertical. 8" stick-up of casing. Top of casing @ elevation 251.63. |
| 8" - 3'2" | _____ | _____ | Backfill around footing. |
| 3'2" - 5'4" | Concrete | 100% | Sound concrete. |
| 5'4" - 10'5" | " | 100% | " " |
| 10'5" - 15'6" | " | 100% | " " |
| 15'6" - 20'11" | Concrete & Shale | 94% | 12" of sound concrete and 4'1" of shale recovered. (no mud seams noted). Bottom of footing @ 16'6". |
| 20'11" - 26' | Shale | 100% | No mud seams noted. |

CREDIT RIVER
BORING NO. 8

| Depth | Type of Core | Recovery | Remarks |
|----------------|------------------|----------|------------------------------------------------------------------------------------------|
| 0' - 10" | _____ | _____ | 10" casing stick-up. Hole inclined @ 18° to vertical. Elevation of top of hole = 284.20. |
| 10" - 3'0" | _____ | _____ | Sand backfill. |
| 3'0" - 4'7" | Concrete | 100% | Sound concrete. |
| 4'7" - 9'10" | " | 95% | " " |
| 9'10" - 11'6" | Concrete & Shale | 100% | 1'5" of sound concrete & 3" of sound shale recovered. Bottom of footing @ 11'3". |
| 11'6" - 16'9" | Shale | 80% | No mud seams noted, core probably ground while drilling. |
| 16'9" - 21'10" | Shale | 78% | " " " |

CREDIT RIVER
BORING NO.9

| <u>Depth</u> | <u>Type of Core</u> | <u>Recovery</u> | <u>Remarks</u> |
|----------------|---------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0' - 2'5" | Concrete | 100% | Hole inclined @ 21 ⁰ to vertical. Elevation of top of hole = 297.17 Concrete is sound. |
| 2'5" - 4'10" | Concrete | 86% | Sound concrete. |
| 4'10" - 10'11" | Concrete | 51% | 3'1" of sound concrete recovered, from 7'11" machine not on pressure, probably shale not too well cemented therefore grinds easily. Inspection of the shale face exposed by the river @ the same elevation, indicates the shale to be dense and sound. Bottom of footing @ 7'11". |
| 10'11" - 14' | _____ | 0% | Evidences that the shale is being ground. No mud seams suspected. |

CREDIT RIVER
BORING NO.10

| <u>Depth</u> | <u>Type of Core</u> | <u>Recovery</u> | <u>Remarks</u> |
|---------------|---------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0' - 4" | Concrete | 100% | Hole inclined @ 17.7 ⁰ to vertical Elevation of top of hole = 297.17 Concrete is sound. |
| 4" - 2'8" | Concrete | 93% | Sound Concrete. |
| 2'8" - 5'0" | Concrete | 97% | " " |
| 5'0" - 10'0" | Concrete | 77% | 3'10" of sound concrete recovered. Drill entered shale at this depth but shale would not core, although evidence along bank shows shale to be dense and sound. Bottom of footing @ 8'10". |
| 10'0" - 16'5" | Shale | 17% | Shale would not core, heavy water return indicates grinding. Deposit exposed on bank is sound shale. |

OAKVILLE CREEK CROSSING
QUEEN ELIZABETH HWY. WEST
BOREHOLE LOGS

OAKVILLE CREEK
BORING NO.1 PIER NO.3

| Depth | Type of Core | Recovery | Remarks |
|---------------|------------------|----------|-----------------------------------------------------------------------------------------------------------------------------|
| 0' - 2'2" | Concrete | 100% | Top of hole elevation 285.47. Hole inclined @ 23° to vertical concrete is sound. |
| 2'2" - 7'6" | Concrete | 100% | Concrete is sound. |
| 7'6" - 13'2" | Concrete | 89% | Void or broken concrete at 11'8". |
| 13'2" - 19'6" | Concrete & Shale | 67% | Voids and poor concrete noted at two depths to 16'6". 41" concrete 9" mainly limestone. Bottom of footing @ 18'7". |
| 19'6" - 25'6" | Shale | 71% | No mud seams noted. |
| 25'6" - 31'3" | Shale | 70% | " " " " |

OAKVILLE CREEK
BORING NO.2 PIER NO.3

| Depth | Type of Core | Recovery | Remarks |
|---------------|------------------|----------|------------------------------------------------------------------------------------------------------------------------------|
| 0' - 2'3" | Concrete | 100% | Top of hole @ Elevation 288.71. Vertical hole. Concrete is sound. |
| 2'3" - 2'8" | Concrete | 93% | Concrete is sound. |
| 2'8" - 9'10" | Concrete | 100% | Few small air voids, otherwise sound. |
| 9'10" - 14'8" | Concrete | 100% | Concrete is sound. |
| 14'8" - 20'6" | Concrete & Shale | 90% | Concrete is sound. 43" concrete, 20" shale recovered. Shale is seamy, mudseams possible. Bottom of footing @ 18'4". |
| 20'6" - 23'2" | Shale | 63% | Mud seam suspected @ 23'. Shale is soft and probably washed away. |
| 23'2" - 29' | Shale | 54% | Shale appears sound while drilling but soft. |

OAKVILLE CREEK
BORING NO.3 PIER NO.4

| Depth | Type of Core | Recovery | Remarks |
|----------------|--------------|----------|----------------------------------------------------------------------------------|
| 0' - 2'3" | Concrete | 100% | Top of hole @ elevation 297.90 Vertical hole. Concrete is sound. |
| 2'3" - 4'1" | Concrete | 100% | Concrete is sound. |
| 4'1" - 5'9" | Concrete | 100% | " " " " |
| 5'9" - 10'9" | Concrete | 100% | " " " " |
| 10'9" - 11'4" | Concrete | 100% | Concrete is crumbly. |
| 11'4" - 16'7" | Concrete | 67% | Uncemented aggregates present, lost drilling water, hit voids on occasion. |
| 16'7" - 19'8" | Concrete | 76% | Uncemented aggregates 16'7" to 18'6". No water return. |
| 19'8" - 20'2" | Concrete | 100% | Uncemented aggregates, no water return. |
| 20'2" - 24'10" | Shale | 86% | 43" of soft shale recovered. Bottom of footing @ 20'6". |
| 24'10" - 30'1" | Shale | 75% | No mud seams noted. Top half of core is limestone. |

OAKVILLE CREEK
BORING NO.4 PIER NO.2

| Depth | Type of Core | Recovery | Remarks |
|----------------|--------------|----------|--------------------------------------------------------------------------|
| 0' - 1'8" | Concrete | 100% | Top of hole at elevation 296.21. Vertical hole. Concrete is sound. |
| 1'8" - 3'5" | Concrete | 100% | Concrete is sound. |
| 3'5" - 5'2" | Concrete | 100% | " " " " |
| 5'2" - 10'5" | Concrete | 100% | Uncemented aggregates & voids at 10', rest of concrete is sound. |
| 10'5" - 15'8" | Concrete | 100% | Sound concrete. |
| 15'8" - 20'10" | Concrete | 100% | Sound concrete. |

Oakville Creek, Boring No.4, Pier No.2 (Cont.)

| | | | |
|----------------|------------------------|------|--------------------------------------------------------------------------------------|
| 20'10" - 25'5" | Concrete and Shale. | 93% | 15' sound concrete recovered. 36" shale, no mud seams noted. Footing at 22'1". |
| 25'5" - 28'0" | Shale | 100% | Sound shale, limestone 25'5" to 26'5". |
| 28'0" - 32'5" | Shale | 100% | Sound shale. |

OAKVILLE CREEK
BORING NO.5 PIER NO.1

| <u>Depth</u> | <u>Type of Core</u> | <u>Recovery</u> | <u>Remarks</u> |
|---------------|---------------------|-----------------|------------------------------------------------------------------------------------------------------------------|
| 0' - 4'8" | Concrete | 78% | Vertical Hole. Top of hole @ elevation 321.44. Concrete starts at 2'0", crumbly at 3'. No water return. |
| 4'8" - 7'4" | Concrete | 94% | Concrete sound except for uncemented aggregates @ 7'. |
| 7'4" - 10'7" | Concrete & Shale | 61% | 2" of concrete and then shale. No mud seams noted. Bottom of footing @ 7'6". |
| 10'7" - 15'2" | Shale | 47% | Core ground, no mud seams noted. Limestone makes up first 14". |
| 15'2" - 18'0" | Shale | 100% | Sound shale. |

OAKVILLE CREEK
BORING NO.6 PIER NO.5

| <u>Depth</u> | <u>Type of Core</u> | <u>Recovery</u> | <u>Remarks</u> |
|---------------|---------------------|-----------------|------------------------------------------------------------------------------------------|
| 0' - 3'2" | — | — | Vertical hole. Top of hole @ elev. 310.77. Casing through fill to concrete. |
| 3'2" - 5'2" | Concrete | 83% | Sound concrete. |
| 5'2" - 7'8" | Concrete | 57% | Uncemented gravel noted @ two depths. |
| 7'8" - 9'5" | Concrete & Shale | 93% | 16" of sound concrete and 3" of mudded shale recovered. Bottom of footing @ 8'11". |
| 9'5" - 11'10" | Shale | 61% | No mud seams noted. |

Oakville Creek, Boring No.6, Pier No.5 (Cont.)

| | | | |
|-----------------|-------|------|--------------------------------------------------|
| 11'10" - 12'11" | Shale | 100% | Very little water return, no mud seams noted. |
| 12'11" - 14'7" | Shale | 100% | No mud seams noted. |
| 14'7" - 19'9" | Shale | 89% | " " " " |

OAKVILLE CREEK
BORING NO.7 EAST ABUTMENT

| Depth | Type of Core | Recovery | Remarks |
|---------------|------------------|----------|---------------------------------------------------------------------------------------------------|
| 0' - 2'2" | ----- | ----- | Hole at 11° to vertical. Top of hole @ elev. 339.79. Concrete starts at 2'2", drill through fill. |
| 2'2" - 4'3" | Concrete | 61% | Concrete sound, hit reinforcing steel at 4'3". |
| 4'3" - 5'4" | Concrete & Shale | 61% | 7" concrete recovered, and 1" shale, water changed color @ 5'0". Bottom of footing @ 5'0". |
| 5'4" - 9'1" | Shale | 80% | No mud seams noted. |
| 9'1" - 13'1" | Shale | 100% | " " " " |
| 13'1" - 15'1" | Shale | 100% | " " " " |

OAKVILLE CREEK
BORING NO.8 PIER NO.6

| Depth | Type of Core | Recovery | Remarks |
|----------------|------------------|----------|---------------------------------------------------------------------------------|
| 0' - 5'0" | ----- | ----- | Vertical Hole. Top of hole @ ground level, elevation 332.1. Drill through fill. |
| 5'0" - 6'11" | Concrete | 70% | Sound concrete, ground during drilling. |
| 6'11" - 10'8" | Concrete & Shale | 91% | 3'4" of concrete recovered and 1" of shale. |
| 10'8" - 11'3" | Shale | 57% | No mud seams noted. |
| 11'3" - 13'1" | Shale | 82% | " " " " |
| 13'1" - 18'2" | Shale | 80% | " " " " |
| 18'2" - 20'11" | Shale | 70% | " " " " |

BA
782

Toronto 5,
Sept. 3, 1958.

MEMORANDUM TO:

Mr. A. Rutka,
Acting Materials & Research Engineer,
Downsview, Ontario.

RE: BA 782 Credit River Bridge,
Oakville Creek Bridge,
E.E.W., Dist. #6.

Attached please find copy of above soil
report BA 782 for your file.

JCMcA*WF

J. C. McAllister,
for S. McCombie,
Bridge Planning Engineer.