

#58-F-230-C

ISLAND PARK

DR. : OTTAWA

QUEENSWAY.

BRIDGE #8

BA 825
58 F 230C

DE LEUW, CATHER & COMPANY
OF CANADA LIMITED
CONSULTING ENGINEERS
TORONTO OTTAWA

226 SPARKS STREET
OTTAWA 4, ONTARIO
CENTRAL 3-9663

October 31, 1958.

Mr. F.I. Hewson,
Consultant Liaison Engineer,
Bridge Design Office,
Department of Highways,
280 Davenport Road,
Toronto 2, Ontario.

Dear Mr. Hewson,

Re: Bridge No. 8 at Island Park Drive
Queensway Ottawa - District 9

We enclose herewith 3 copies of McRostie
and Associates soils foundation report No. SF-383
for the above structure.

Yours very truly,

DE LEUW, CATHER & CO. OF CANADA LIMITED.

Leon J. Marshall

Leon J. Marshall, P. Eng.,
Senior Structural Engineer.

LJM/pr
Encl.

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA 1

CANADA

G. C. McROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.
ASSOCIATES

A. SETO, B. ENG., P. ENG., M.E.I.C.

G. E. B. SINCLAIR, B.Sc., D.L.S., P. ENG., M.E.I.C.

W. J. MACLEAN, B.A., D.L.S., O.L.S.

ASSOCIATE CONSULTANT

D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

393 BELL STREET
TELEPHONE CE. 2-5334

30 October 1958

DeLeuw, Cather & Co. of Canada Ltd.,
226 Sparks St.,
Ottawa, Ont.

Re: Foundation Investigation - Island Park Drive

Gentlemen:

Enclosed are five copies of our report on the above investigation. This has been one of the most extensive investigations for Queensway structures to date and we would be glad to discuss any sections of the report.

Yours very truly,
McROSTIE & ASSOCIATES

per:



GCM/ed

BA 825

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA 1

CANADA

393 BELL STREET
TELEPHONE CE. 2-5334

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.
ASSOCIATES

A. SETO, B. ENG., P. ENG., M.E.I.C.

G. E. B. SINCLAIR, B.Sc., D.L.S., P. ENG., M.E.I.C.

W. J. MACLEAN, B.A., D.L.S., O.L.S.

ASSOCIATE CONSULTANT

D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

"ACCOUNT"

DeLeuw, Cather & Co. of Canada Ltd.,
226 Sparks St.,
Ottawa, Ont.

Inv. 4138

Job E-254

29 October 58

TO:

Foundation investigation at Ottawa Queensway and Island Park
Drive with report.

Period - W/E Sept 20/58 to Nov.1/58

| | | | |
|-------------------------------|------------|---|------------|
| 3 5/6 days Principal engineer | @ \$100.00 | = | \$383.33 |
| 5 11/12 days technician | @ \$30.00 | = | \$177.50 |
| 1 1/6 days draftsman | @ \$30.00 | = | \$35.00 |
| 163 hrs. drill rig & foreman | @ \$9.00 | = | \$1467.00 |
| 168½ hrs drill rig helper | @ \$3.00 | = | \$505.50 |
| 1/3 day clerical staff | @ \$20.00 | = | \$6.67 |
| Towing charges | | | \$15.00 |
| Sub-total | | = | \$2,590.00 |

Laboratory Tests

| | | | |
|---|------------------|---|-------------------|
| 106 Water content test | @ \$1.00 | = | \$106.00 |
| 4 mechanical analysis combination tests | @ \$20.00 | = | \$80.00 |
| 2 mechanical analysis Hydro-meter tests | @ \$12.00 | = | \$24.00 |
| 15 unconfined compression tests | @ \$7.00 | = | \$105.00 |
| 15 small scale Penetrometer tests | @ \$2.00 set | = | \$30.00 |
| 2 consolidation tests | @ \$40.00 | = | \$80.00 |
| 4 Rock core storage & handling | @ \$2.00 per box | = | \$8.00 |
| TOTAL ** | | | <u>\$3,023.00</u> |

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA 1

CANADA

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.

ASSOCIATES

A. SETO, B. ENG., P. ENG., M.E.I.C.

G. E. B. SINCLAIR, B.Sc., D.L.S., P. ENG., M.E.I.C.

W. J. MACLEAN, B.A., D.L.S., O.L.S.

ASSOCIATE CONSULTANT

D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

393 BELL STREET
TELEPHONE CE. 2-5334

"ACCOUNT"

DeLeuw, Cather & Co. of Canada Ltd.,
226 Sparks St.,
Ottawa, Ont.

Inv. 4138

Job E-254

29 October 58

TO:

Foundation investigation at Ottawa Queensway and Island Park
Drive with report.

Period - W/E Sept 20/58 to Nov.1/58

| | | | |
|-------------------------------|------------|---|----------------|
| 3 5/6 days Principal engineer | @ \$100.00 | = | \$383.33 |
| 5 11/12 days technician | @ \$30.00 | = | \$177.50 |
| 1 1/6 days draftsman | @ \$30.00 | = | \$35.00 |
| 163 hrs. drill rig & foreman | @ \$9.00 | = | \$1467.00 |
| 168 1/2 hrs drill rig helper | @ \$3.00 | = | \$505.50 |
| 1/3 day clerical staff | @ \$20.00 | = | \$6.67 |
| Towing charges | | | <u>\$15.00</u> |
| Sub-total | | = | \$2,590.00 |

Laboratory Tests

| | | | |
|---|------------------|---|-------------------|
| 106 Water content test | @ \$1.00 | = | \$106.00 |
| 4 mechanical analysis combination tests | @ \$20.00 | = | \$80.00 |
| 2 mechanical analysis Hydrometer tests | @ \$12.00 | = | \$24.00 |
| 15 unconfined compression tests | @ \$7.00 | = | \$105.00 |
| 15 small scale Penetrometer tests | @ \$2.00 set | = | \$30.00 |
| 2 consolidation tests | @ \$40.00 | = | \$80.00 |
| 4 Rock core storage & handling | @ \$2.00 per box | = | \$8.00 |
| TOTAL ** | | | <u>\$3,023.00</u> |

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA 1

CANADA

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.
ASSOCIATES
A. SETO, B. ENG., P. ENG., M.E.I.C.
G. E. B. SINCLAIR, B.Sc., D.L.S., P. ENG., M.E.I.C.
W. J. MACLEAN, B.A., D.L.S., O.L.S.
ASSOCIATE CONSULTANT
D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

393 BELL STREET
TELEPHONE CE. 2-5334

"ACCOUNT"

DeLeuw, Cather & Co. of Canada Ltd.,
226 Sparks St.,
Ottawa, Ont.

Inv. 4138

Job E-254

29 October 58

TO:

Foundation investigation at Ottawa Queensway and Island Park
Drive with report.

Period - W/E Sept 20/58 to Nov.1/58

| | | | |
|-------------------------------|------------|---|-----------------|
| 3 5/6 days Principal engineer | @ \$100.00 | = | \$383.33 |
| 5 11/12 days technician | @ \$ 30.00 | = | \$177.50 |
| 1 1/6 days draftsman | @ \$30. 00 | = | \$ 35.00 |
| 163 hrs. drill rig & foreman | @ \$ 9.00 | = | \$1467.00 |
| 168 1/2 hrs drill rig helper | @ \$ 3.00 | = | \$505.50 |
| 1/3 day clerical staff | @ \$ 20.00 | = | \$ 6.67 |
| Towing charges | | | <u>\$ 15.00</u> |
| Sub-total | | = | \$2,590.00 |

Laboratory Tests

| | | | |
|--|----------------------|---|-------------------|
| 106 Water content test | @ \$ 1.00 | = | \$106.00 |
| 4 mechanical analysis comb- ination tests | @ \$20.00 | = | \$ 80.00 |
| 2 mechanical analysis Hydro- meter tests | @ \$12.00 | = | \$124.00 |
| 15 unconfined compression tests | @ \$ 7.00 | = | \$105.00 |
| 15 small scale Penetrometer tests | @ \$ 2.00 set= | | \$ 30.00 |
| 2 consolidation tests | @ \$40.00 | = | \$ 80.00 |
| 4 Rock core storage & handling | @ \$ 2.00 per box | = | \$ 8.00 |
| TOTAL ** | | | <u>\$3,023.00</u> |

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA 1

CANADA

393 BELL STREET
TELEPHONE CE. 2-8334

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.
ASSOCIATES
A. SETO, B. ENG., P. ENG., M.E.I.C.
G. E. B. SINCLAIR, B.Sc., D.L.S., P. ENG., M.E.I.C.
W. J. MACLEAN, B.A., D.L.S., O.L.S.
ASSOCIATE CONSULTANT
D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

"ACCOCHET"

Belous, Gether & Co. of Canada Ltd.,
226 Sparks St.,
Ottawa, Ont.

Inv. 4138

Job B-254

29 October 58

TO:

Foundation investigation at Ottawa Queenway and Island Park
Drive with report.

Period - W/E Sept 20/58 to Nov.1/58

| | | | |
|-------------------------------|------------|---|------------|
| 3 5/6 days Principal engineer | @ \$100.00 | = | \$383.33 |
| 5 11/12 days technician | @ \$30.00 | = | \$177.50 |
| 1 1/6 days draftsman | @ \$30.00 | = | \$35.00 |
| 163 hrs. drill rig & foreman | @ \$9.00 | = | \$1467.00 |
| 168 1/2 hrs drill rig helper | @ \$3.00 | = | \$505.50 |
| 1/3 day clerical staff | @ \$20.00 | = | \$6.67 |
| Towing charges | | | \$15.00 |
| Sub-total | | = | \$2,590.00 |

Laboratory Tests

| | | | |
|--|---------------------|---|------------|
| 106 Water content test | @ \$1.00 | = | \$106.00 |
| 4 mechanical analysis comb- ination tests | @ \$20.00 | = | \$80.00 |
| 2 mechanical analysis Hygro- meter tests | @ \$12.00 | = | \$24.00 |
| 15 unconfined compression tests | @ \$7.00 | = | \$105.00 |
| 15 small scale Penetrometer tests | @ \$2.00 set | = | \$30.00 |
| 2 consolidation tests | @ \$40.00 | = | \$80.00 |
| 4 Rock core storage & handling | @ \$2.00 per box | = | \$8.00 |
| TOTAL ** | | | \$3,023.00 |

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA 1

CANADA

393 BELL STREET
TELEPHONE CE. 2-5334G. C. MCROSTIE, B.A.S.C., O.L.S., P. ENG., M.E.I.C.
ASSOCIATES

A. SETO, B. ENG., P. ENG., M.E.I.C.

G. E. B. SINCLAIR, B.S.C., D.L.S., P. ENG., M.E.I.C.

W. J. MACLEAN, B.A., D.L.S., O.L.S.

ASSOCIATE CONSULTANT

D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

FOUNDATION INVESTIGATION - ISLAND PARK DRIVE1. TERMS OF REFERENCE

We were requested by the Ottawa office of DeLeuw, Cather & Co. of Canada Ltd. to investigate the foundation conditions at the site of bridge No.8 and to prepare a report. Details of the proposed structure were discussed during the course of the investigation and elevations of footings for various units of the structure were agreed upon.

2. RECOMMENDATIONS2.1 Bearing Capacities

Since the soil conditions are variable and the elevations of various elements of the proposed structure also vary, it has been necessary to divide the study into six units with separate recommendations for each. The minimum capacities encountered in each element have governed the recommendations and further divisions could possibly be made if economics warrant.

Recommended bearing capacities for each section are as follows:-

- West abutment main structure - 4,000 pounds per sq. ft. at elevation 229 and groundwater control required.
- East abutment main structure - 4,000 pounds per sq. ft. at elevation 229 and groundwater control required.
- Southeasterly retaining wall - 5,000 pounds per sq. ft. at elevation 237
- Northeasterly retaining wall - 5,000 pounds per sq. ft. at elevation 231 to elevation 233
- Northwesterly retaining wall - 3,000 pounds per sq. ft. at elevation 234 in stiff clays and see note re soft layers below.
- Southwesterly retaining wall - 1,500 pounds per sq. ft. at elevation 234 and see note re layers below.

In considering the Northwesterly and Southwesterly retaining wall structures which are supported on clay layers, it should be noted that the strength of the clay decreases with depth and hence any design should be checked, using the actual dimensions of a proposed structure, for general shear failure and for local failure passing through the soft layers below.

2.2 Soil Compressibility

Compressibilities were considered for the claysoils under the Northwest and Southwest abutments. Consolidation tests show that the clay has been precompressed to greater pressures than the bearing capacities recommended above. In addition the consolidation settlements due to the weight of approach fills were examined and found not to be a factor for fills up to 30 feet in height.

2.3 Foundation Type

Structures supported on strip footings on the soils encountered are likely to be the most economical, but the entire success of such foundations depend on the control of groundwater during the construction period. Some construction precautions are given later..

With footings at elevation 229, the Southerly end of the East abutment would rest on weathered rock. A compacted granular cushion approximately two feet thick is recommended under this portion of the abutment footing. This would provide similar elastic deflections under live loads to those occurring in the soil supported portions of the structure.

The existing concrete box structure containing cave creek drain passes under or through the Westerly abutment location. Although abutment footings are planned to be below the invert elevation of this drain, the possibility of deeper excavation during the construction of the old drain should be watched for during construction of the new bridge.

An existing sanitary sewer runs beneath the proposed Easterly abutment and the excavation made during the sewer construction cannot be expected to have been backfilled with special care. Therefore, a method of spanning the excavation should be developed in the abutment or footing. The width of

the spanning section required might be reduced by the driving of sheet piling from the bottom of the footing excavation into the till soils below the former sewer excavation. The piling should be strutted across the top to prevent lateral yield of soil into the former sewer cut. Excavation and replacement of soil to the depth of the former sewer cut would present difficult problems in groundwater handling and of protecting the strength of the soils adjacent to the new trench.

2.4 Construction Precautions

The till soils underlying most of the structures are sufficiently permeable that groundwater pressure will tend to soften them and reduce bearing capacities unless the groundwater levels are lowered below excavation level during construction. We understand that at the time of construction a new drain could be available with its invert at approximately elevation 228. This drain would provide a useful outlet for construction groundwater and if possible the programming of this sewer as a unit of the Queensway contract prior to the footing excavations would be beneficial.

During the construction period a close watch should be kept for variations in soil conditions which can occur between the borehole locations. It can be seen from the existing boreholes that conditions are not uniform and any unexpected occurrences should be reported for appropriate action.

3. SITE INVESTIGATION

3.1 Field Work

Sixteen boreholes were made at the site with our test drilling equipment. Two inch split barrel samples were taken in the non-cohesive soils in conjunction with the standard penetration test. Two inch tube samples were taken in the cohesive soils and all samples were visually classified in the field and given laboratory classification confirmation. Groundwater levels were observed during the field programme.

Rock was diamond drilled and three-quarter inch diameter cores recovered for inspection. A careful watch was kept during drilling for drops or discontinuities in the rock formations. Core recovery percentages and loss of drill water were also noted carefully.

In addition to the sixteen boreholes one test hole was made with our Norwegian vane apparatus in order to obtain as complete information as possible on the shear strength of the softer clays found in hole no.1.

3.2 Laboratory Testing

Laboratory testing included moisture contents on all samples from which other properties can be inferred. Unconfined compression tests and small scale penetrometer tests were made on the clay samples, consolidation tests were done on two representative samples and mechanical analysis tests were carried out on representative samples to provide information on the construction behaviour of the soils.

3.3 Observations

Soil conditions at the site are quite variable. At the Easterly end of the site, approximately 10 to 20 feet of glacial till overlies rock. At the West end of the site, a layer of clay up to 15 feet thick overlies the till. Rock at the site is a shaly limestone of the Ottawa formation and its upper surface slopes to the North and West and is irregular. A few drops were encountered in the drilling which indicate the presence of horizontal seams, and the low core recovery percentages also indicate considerable weathering in the upper several feet of rock.

Groundwater levels vary from 5 to 15 feet below the present surface and these can be considered to be between the seasonal high and low levels. During wet seasons the groundwater would be near the surface unless drained by new sewers.

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QWY, ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 291.2 (Geodetic Datum)

REMARKS B.M. of 230.73 S.W. CORNER of catch basin at S.E. CORNER of
Clarendon, Iona, 155 Miles S.E. of Annapolis DATE Sept. 22/59

HOLE NO.

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | |
|--|--|--------------------------------------|------------------|--|---------------|-----------|------------------|---------------|
| | | | | | | | LB. HAMMER | NO CASING |
| | | | | | | | INCH DROP | INCH DIA. ROD |
| | | | | | | | BLOWS PER FOOT | |
| | | | | GROUND SURFACE | | | | |
| | | | | <i>Fill</i> | 0 | 291.7' | | |
| | 90 ⁺ 19 | 1-1 | | <i>HARD FISSURED BROWNISH GRAY CLAY</i> | 30 | | | |
| 55 | 27.85 R-90 | 1-2 | | | 20 | | | |
| 2.7 | 52.40 R-09 | 1-3 | | <i>VERY STIFF FISSURED BROWNISH GRAY CLAY WITH A TRACE OF SILT</i> | 10 | 281.7' | | |
| 1.0 | 11.22 R-00 | 1-4 | | <i>MEDIUM SOFT SILTY FISSURED GRAY CLAY</i> | | | | |
| 1.2 | 13.14 0.7, R-00 | 1-5 | | | 150 | | | |
| 1.2 | 03.07 0.9, R-00 | 1-6 | | <i>SOFT SILTY GRAY CLAY WITH A FEW PEBBLES</i> | | | | |
| 0.7 | 15.05 1.9, R-00 | 1-7 | | | 185 | | | |
| | | 1-8 | | <i>Loose Till</i> | 20 | 221.7' | | |
| | | | | <i>Cherty Limestone CORE RECOVERY - 35%</i> | 215 | | | |
| | | | | <i>Bottom of Hole</i> | 256 | 215.1' | | |

← OVER-NIGHT WATER LEVEL - 9.9'

Remoulded = R-

% WATER CONTENT

FLATE 2

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

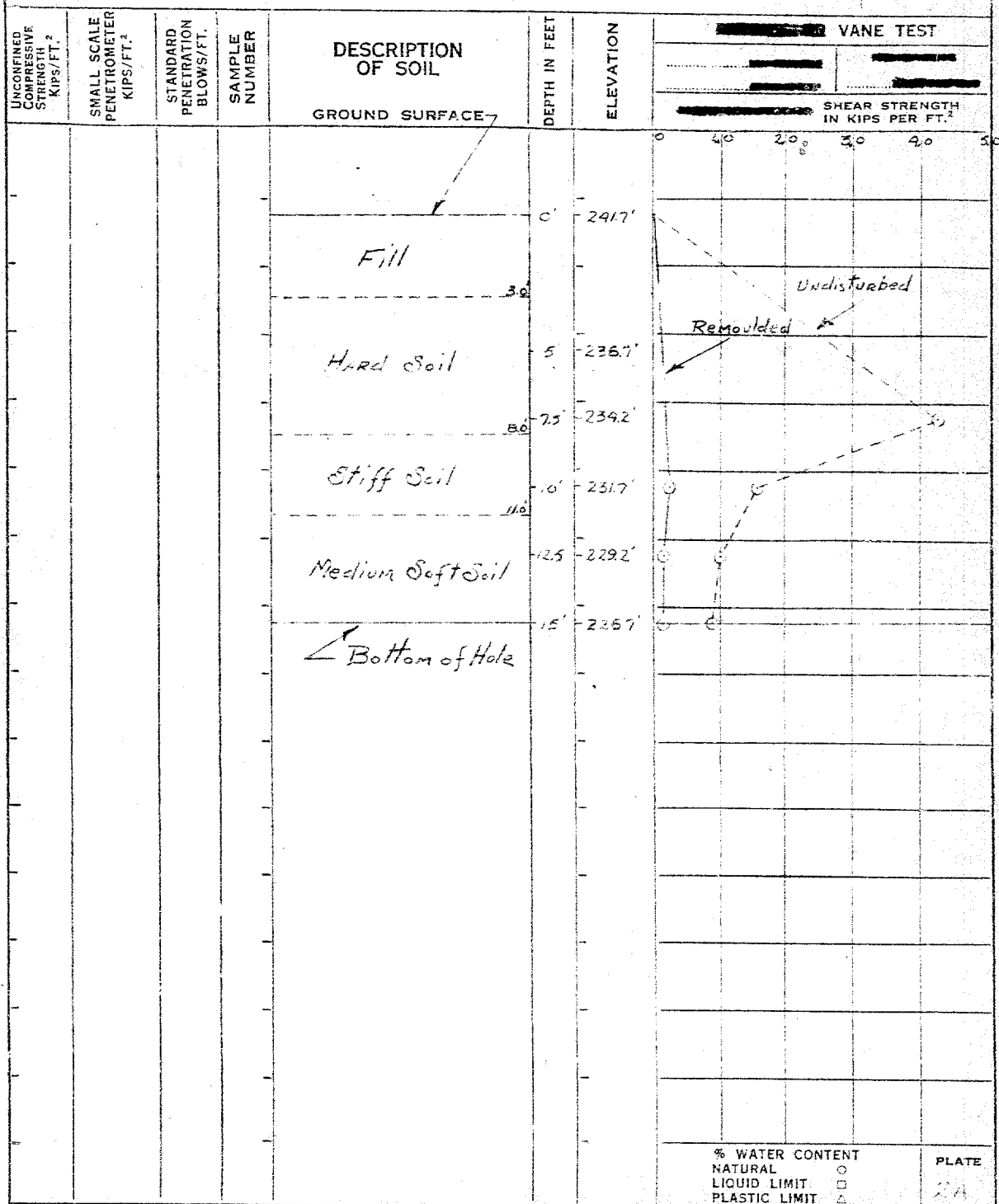
QWY; ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 291.7'DATE Oct. 22/58

HOLE NO.

REMARKS See plate #2

1-A



McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QWY, ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 241.0'

REMARKS *See plate #2*

HOLE NO.

2

DATE *Sept. 18/58*

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | | | | | |
|--|--|--------------------------------------|------------------|------------------------|--|-----------|------------------|--|---------------|--|--|--|
| | | | | | | | LB. HAMMER | | NO CASING | | | |
| | | | | | | | INCH DROP | | INCH DIA. ROD | | | |
| | | | | | | | BLOWS PER FOOT | | | | | |
| | | | | GROUND SURFACE | | | | | | | | |
| | | | | | 0' | 241.0' | | | | | | |
| | | | 7 | 2-1 | Fill | | | | | | | |
| | 5.0 | | 6 | 2-2 | Very Stiff Frissured Brownish Gray Clay with SAND layers | 5.0 | | | | | | |
| 18 | 53.49 R-0.9 | | 23 | 2-3 | | 9.0 | | | | | | |
| | | | 15 | 2-4 | Medium Dense Till | 10' | 231.0' | | | | | |
| | 84.06 43 | | 25 | 2-5 | | 13.0 | | | | | | |
| | | | 53 | 2-6 | Dense Sandy Till | | | | | | | |
| | | | 65 | 2-7 | | | | | | | | |
| | 77.40 11 | | 28 | 2-8 | | 20' | 221.0' | | | | | |
| | | | | | Shaley Limestone CORE RECOVERY- 95% | | | | | | | |
| | | | | | Bottom of Hole | 25.9 | 215.1' | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | </ | | | |

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY
OF LABORATORY TESTS

QWY. / ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 242.9'

REMARKS *See plate #2*

HOLE NO.

3

DATE *Oct. 3/58*

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | |
|--|--|--------------------------------------|------------------|--|---------------|-----------|------------------------------|---------------|
| | | | | | | | LB. HAMMER | NO CASING |
| | | | | | | | INCH DROP | INCH DIA. ROD |
| | | | | | | | BLOWS PER FOOT | |
| | | | | GROUND SURFACE | 0 | 243.4 | Over-Night Water Level - Dry | |
| | | 15 | 3-1 | Fill | | | ⊙ | |
| | | 17 | 3-2 | | | | ⊙ | |
| | | 11 for 6" | 3-3 | Medium Dense Till | 5.0 | | ⊙ | |
| | | 36 | 3-4 | Dense Till | 10' | 223.4 | ⊙ | |
| | | 124 | 3-5 | | | | ⊙ | |
| | | | | Weathered Rock & Till | 15.0 | | | |
| | | | | Shaley Limestone CORE RECOVERY - 22% 18.2 | 18.2 | 225.4 | | |
| | | | | Shaley Limestone CORE RECOVERY - 58% 23.2 | 23.2 | 223.4 | | |
| | | | | Shaley Limestone CORE RECOVERY - 88% 25.0 | 25.0 | 218.4 | | |
| | | | | Bottom of Hole | | | | |
| | | | | | | | % WATER CONTENT ⊙ | |
| | | | | | | | PLATE | |
| | | | | | | | 4 | |

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA CANADA

SOIL PROFILE AND SUMMARY
OF LABORATORY TESTS

QWY, ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 2449'

HOLE NO.

REMARKS See plate #2

4

DATE Oct. 8/58

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | | | |
|--|--|--------------------------------------|------------------|------------------------|---------------|-----------|------------------------------|--|---------------|--|
| | | | | | | | LB. HAMMER | | NO CASING | |
| | | | | | | | INCH DROP | | INCH DIA. ROD | |
| | | | | | | | BLOWS PER FOOT | | | |
| | | | | GROUND SURFACE | | | | | | |
| | | | | Topsoil | 0 | 2449' | Over-Night Water Level - Dry | | | |
| | | | | Loose Fine Sand | 10 | | | | | |
| | 3 ft 6" | | 4-1 | Medium Dense Sand | 50 | | | | | |
| | 17 | | | | 50 | | | | | |
| | | | 4-2 | Loose Till | 10 | | | | | |
| | 8 | | | | 10 | | | | | |
| | 48 | | 4-3 | | 10 | | | | | |
| | | | | | 10 | | | | | |
| | 44 | | 4-4 | Dense Till | 10 | 2349' | | | | |
| | | | | | 10 | | | | | |
| | 57 | | 4-5 | | 10 | | | | | |
| | | | | | 10 | | | | | |
| | 59 | | 4-6 | | 100 | | | | | |
| | | | | Shaley Limestone | 172 | | | | | |
| | | | | CORE RECOVERY - 60% | 172 | | | | | |
| | | | | Shaley Limestone | 155 | | | | | |
| | | | | CORE RECOVERY - 59% | 155 | | | | | |
| | | | | Shaley Limestone | 215 | 2249' | | | | |
| | | | | CORE RECOVERY - 62% | 215 | | | | | |
| | | | | Shaley Limestone | 272 | | | | | |
| | | | | CORE RECOVERY - 29% | 272 | | | | | |
| | | | | Shaley Limestone | 312 | 213.7' | | | | |
| | | | | CORE RECOVERY - 100% | 312 | | | | | |
| | | | | Bottom of Hole | | | | | | |
| | | | | | | | % WATER CONTENT | | | |
| | | | | | | | PLATE | | | |
| | | | | | | | 5 | | | |

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

GWY, ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 243.5'

REMARKS See plate #2

HOLE No.

6

DATE Sept 30/58

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | | | | | |
|--|--|--------------------------------------|------------------|-------------------------------|---------------|-----------|------------------|----|---------------|----|-------|--|
| | | | | | | | LB. HAMMER | | NO CASING | | | |
| | | | | | | | INCH DROP | | INCH DIA. ROD | | | |
| | | | | | | | BLOWS PER FOOT | | | | | |
| | | | | GROUND SURFACE | 0' | 243.5' | | | | | | |
| | | | | Fill | | | | | | | | |
| | | 9 | 6-1 | Loose Fine Sand | 2.5' | | ① | | | | | |
| | | 15 | 6-2 | Medium Dense Clayey Fine Sand | 6.5' | | ① | | | | | |
| | | 30 | 6-3 | Medium Dense Till | 9.6' | | ① | | | | | |
| | | 47 | 6-4 | Dense Sandy Till | 10' | 233.5' | ① | | | | | |
| | | 47 | 6-5 | | | | ① | | | | | |
| | | 25 | 6-6 | Medium Dense Till | 15.6' | | ① | | | | | |
| | | | | | 17.3' | | | | | | | |
| | | 60 | 6-7 | Boulders in Dense Till | 20' | 223.5' | ① | | | | | |
| | | 30 | 6-8 | | 23.8' | | ① | | | | | |
| | | | | Shaley Limestone | | | | | | | | |
| | | | | CORE RECOVERY - 89% | 26.0' | | | | | | | |
| | | | | Shaley Limestone | | | | | | | | |
| | | | | CORE RECOVERY - 97% | 28.7' | 219.8' | | | | | | |
| | | | | Bottom of Hole | | | | | | | | |
| | | | | | | | 20 | 40 | 60 | 80 | 100 | |
| | | | | | | | % WATER CONTENT | | | | PLATE | |
| | | | | | | | | | | | 7 | |

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QWY, ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 239.7'

REMARKS See plate #2 - see also Appendix Table 7.2

HOLE NO.

7

DATE Sept. 30/58

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | |
|--|--|--------------------------------------|------------------|------------------------|---------------|-----------|-------------------------|----------------------------|
| | | | | | | | LB. HAMMER INCH DROP | NO CASING INCH DIA. ROD |
| | | | | GROUND SURFACE | | | BLOWS PER FOOT | |
| | | | | Topsoil | 0' | 239.7' | | |
| | | | | Loose Till | 10' | | | |
| | | | | | 20' | | | |
| | | | | | 30' | | | |
| | | | | | 40' | | | |
| | | | | | 50' | | | |
| | | | | | 60' | | | |
| | | | | | 70' | | | |
| | | | | | 80' | | | |
| | | | | | 90' | | | |
| | | | | | 100' | | | |
| | | | | | 110' | | | |
| | | | | | 120' | | | |
| | | | | | 130' | | | |
| | | | | | 140' | | | |
| | | | | | 150' | | | |
| | | | | | 160' | | | |
| | | | | | 170' | | | |
| | | | | | 180' | | | |
| | | | | | 190' | | | |
| | | | | | 200' | | | |
| | | | | | 210' | | | |
| | | | | | 220' | | | |
| | | | | | 230' | | | |
| | | | | | 240' | | | |
| | | | | | 250' | | | |
| | | | | | 260' | | | |
| | | | | | 270' | | | |
| | | | | | 280' | | | |
| | | | | | 290' | | | |
| | | | | | 300' | | | |
| | | | | | 310' | | | |
| | | | | | 320' | | | |
| | | | | | 330' | | | |
| | | | | | 340' | | | |
| | | | | | 350' | | | |
| | | | | | 360' | | | |
| | | | | | 370' | | | |
| | | | | | 380' | | | |
| | | | | | 390' | | | |
| | | | | | 400' | | | |
| | | | | | 410' | | | |
| | | | | | 420' | | | |
| | | | | | 430' | | | |
| | | | | | 440' | | | |
| | | | | | 450' | | | |
| | | | | | 460' | | | |
| | | | | | 470' | | | |
| | | | | | 480' | | | |
| | | | | | 490' | | | |
| | | | | | 500' | | | |
| | | | | | 510' | | | |
| | | | | | 520' | | | |
| | | | | | 530' | | | |
| | | | | | 540' | | | |
| | | | | | 550' | | | |
| | | | | | 560' | | | |
| | | | | | 570' | | | |
| | | | | | 580' | | | |
| | | | | | 590' | | | |
| | | | | | 600' | | | |
| | | | | | 610' | | | |
| | | | | | 620' | | | |
| | | | | | 630' | | | |
| | | | | | 640' | | | |
| | | | | | 650' | | | |
| | | | | | 660' | | | |
| | | | | | 670' | | | |
| | | | | | 680' | | | |
| | | | | | 690' | | | |
| | | | | | 700' | | | |
| | | | | | 710' | | | |
| | | | | | 720' | | | |
| | | | | | 730' | | | |
| | | | | | 740' | | | |
| | | | | | 750' | | | |
| | | | | | 760' | | | |
| | | | | | 770' | | | |
| | | | | | 780' | | | |
| | | | | | 790' | | | |
| | | | | | 800' | | | |
| | | | | | 810' | | | |
| | | | | | 820' | | | |
| | | | | | 830' | | | |
| | | | | | 840' | | | |
| | | | | | 850' | | | |
| | | | | | 860' | | | |
| | | | | | 870' | | | |
| | | | | | 880' | | | |
| | | | | | 890' | | | |
| | | | | | 900' | | | |
| | | | | | 910' | | | |
| | | | | | 920' | | | |
| | | | | | 930' | | | |
| | | | | | 940' | | | |
| | | | | | 950' | | | |
| | | | | | 960' | | | |
| | | | | | 970' | | | |
| | | | | | 980' | | | |
| | | | | | 990' | | | |
| | | | | | 1000' | | | |

% WATER CONTENT

PLATE

8

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QWY, ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 290.0'

REMARKS See: plate #2, See: Mech. Properties Summary S. 6

HOLE NO.

8

DATE Sept. 29/58

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | | | | |
|--|--|--------------------------------------|------------------|---|---------------|-----------|------------------|--|---------------|--|--|
| | | | | | | | LB. HAMMER | | NO CASING | | |
| | | | | | | | INCH DROP | | INCH DIA. ROD | | |
| | | | | | | | BLOWS PER FOOT | | | | |
| | | | | GROUND SURFACE | | | | | | | |
| | | | | | 0' | 290.0' | | | | | |
| | | | | Fine Sand | | | | | | | |
| 6.3 | 23.92 R. 5.0 | | 8-1 | HARD BROWNISH GRAY CLAY | | | | | | | |
| 4.9 | 89.71 R. 3.0 | | 8-2 | with some silt | | | | | | | |
| 2.0 | 56.52 R. 0.5 | | 8-3 | Very Stiff BROWNISH GRAY CLAY with some silt | | | | | | | |
| | | | 8-4 | Sand pockets | 10' | 280.0' | | | | | |
| | | 23 | 8-5 | Loose Till / Silty Clay in 12-15' to 15' | | | | | | | |
| | | 31 | 8-6 | | | | | | | | |
| | | 13 | 8-7 | Medium Dense Sandy Till | | | | | | | |
| | | 11 | 8-8 | | 20' | 270.0' | | | | | |
| | | 24 | 8-9 | | | | | | | | |
| | | 23 | 8-10 | | 25' | | | | | | |
| | | 56 | 8-11 | Dense Sandy Till | | | | | | | |
| | | 125-127 | 8-12 | Shaley Limestone | 27.0' | | | | | | |
| | | | | CORE RECOVERY - 100% / 299' | 30' | 210.0' | | | | | |
| | | | | Shaley Limestone | | | | | | | |
| | | | | CORE RECOVERY - 100% | 32.6' | 207.4' | | | | | |
| | | | | Bottom of Hole | | | | | | | |
| | | | | | | | % WATER CONTENT | | | | |
| | | | | | | | PLATE | | | | |
| | | | | | | | 9 | | | | |

Revised = R

McROSTIE & ASSOCIATES

CONSULTING ENGINEERS

OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF LABORATORY TESTS

QWY. #1 ISLAND PARK DRIVE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 241.3'

REMARKS See: plate #2

HOLE NO.

9

DATE Sept 23/58

| UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ² | SMALL SCALE PENETROMETER KIPS/FT. ² | STANDARD PENETRATION BLOWS/FT. | SAMPLE NUMBER | DESCRIPTION OF SOIL | DEPTH IN FEET | ELEVATION | PENETRATION TEST | | | | |
|--|--|--------------------------------------|------------------|--|---------------|-----------|------------------|--|---------------|--|-----------------------------|
| | | | | | | | LB. HAMMER | | NO CASING | | |
| | | | | | | | INCH DROP | | INCH DIA. ROD | | |
| | | | | | | | BLOWS PER FOOT | | | | |
| | | | | GROUND SUR. FACE | | | | | | | |
| | | | | Topsoil | 12 | 241.3 | | | | | |
| | 87 | 4 for 26 15 | 9-1 | Loose Fine Sand | 32 | | | | | | |
| | | | | | | | | | | | Over-Night Water Level - 32 |
| 2.7 | 67.9, 2 72 R-24 | | 9-2 | Very Stiff Fissured Brownish | | | | | | | |
| | | | | GRAY CLAY | | | | | | | |
| 2.9 | 61.6, 4 R-2.0 | | 9-3 | | | | | | | | |
| 1.5 | 36.3, 6 20 R-34 | | 9-4 | Stiff Fissured Brownish GRAY CLAY with trace of Sand | 12.5 | 231.5 | | | | | |
| 0.7 | 16.2, 0 R-0.0 | | 9-5 | Medium Soft Fissured | | | | | | | |
| | | | | Silty GRAY CLAY | | | | | | | |
| 1.5 | 17.1, 5 16.1, 4 | | 9-6 | with Sand layers | | | | | | | |
| | | | | | 13.5 | | | | | | |
| | | | 9-7 | | | | | | | | |
| | | | 7 | Loose Till | 20' | 221.5 | | | | | |
| | | | 13 | | 23.0 | | | | | | |
| | | | 17 | Medium Dense Till | | | | | | | |
| | | | 29 | | 26.5 | | | | | | |
| | | | | Shaley Limestone | 30' | 211.5 | | | | | |
| | | | | CORE RECOVERY - 57% | | | | | | | |
| | | | | Shaley Limestone | 33.0 | | | | | | |
| | | | | CORE RECOVERY - 100% | | | | | | | |
| | | | | Bottom of Hole | 35' | 206.5 | | | | | |
| | | | | | | | % WATER CONTENT | | | | |
| | | | | | | | PLATE | | | | |
| | | | | | | | 10 | | | | |

Remoulded = R.

QWY, ISLAND PARK DRIVE

10

QWY, ISLAND PARK DRIVE

12

DATE Oct. 16 / 58

QWY, ISLAND PARK DRIVE

13

DATE Oct. 16 / 58

L.M. CO.—A28553

QWY, ISLAND PARK DRIVE

14

DATE Oct. 17/58

QWY, ISLAND PARK DRIVE

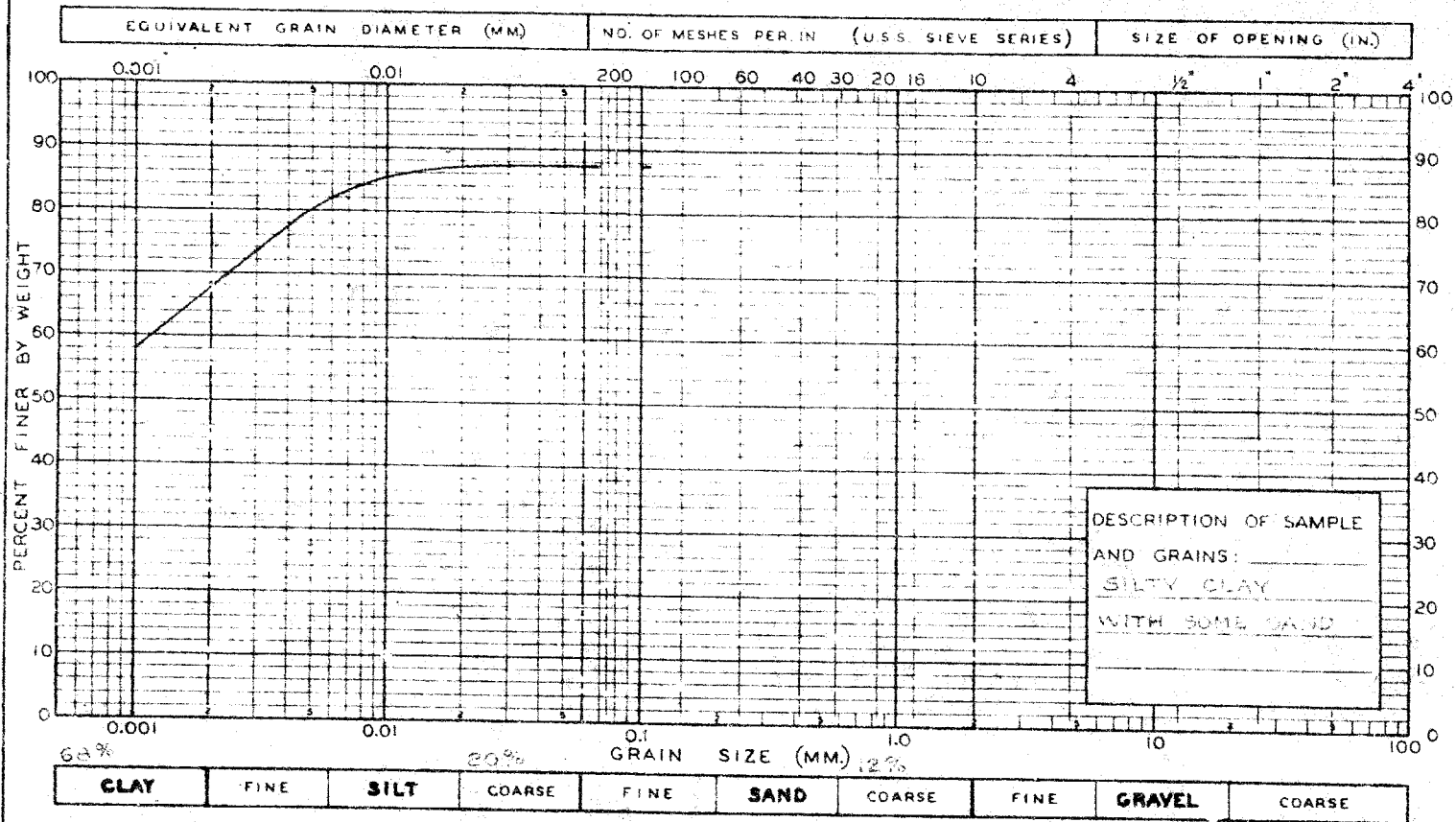
HOLE NO.

15

DATE Oct. 14/58

L.-M. CO.—A26553

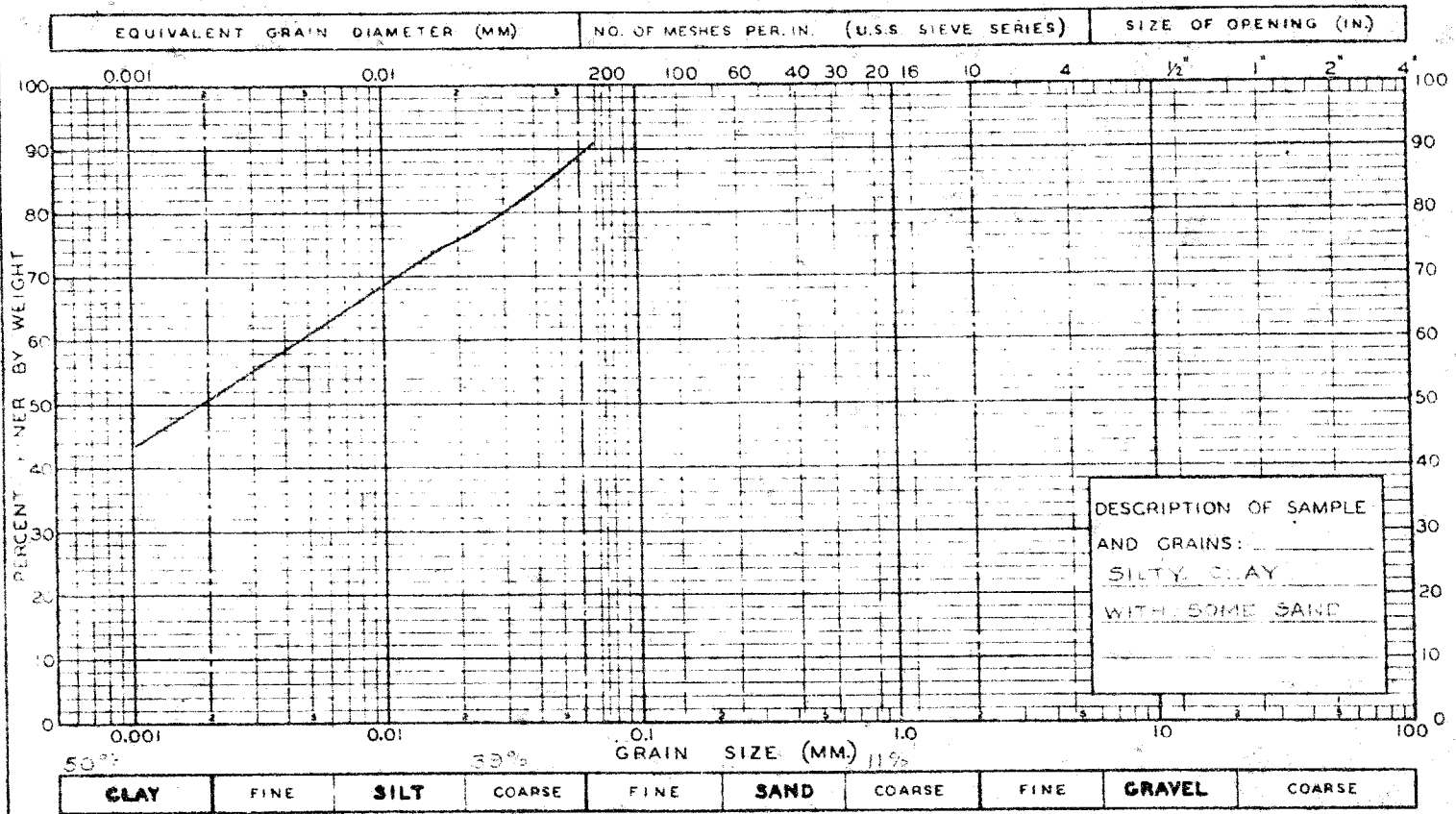
MECHANICAL ANALYSIS OF SOILS



| | | |
|---|----------------|------------------------------|
| PROJECT: QUEENSWAY DE ISLAND PARK DRIVE | | SAMPLE NO. 1-3 |
| PLOTTED: D.M. | DATE: 25-10-58 | REMARKS: 005 TO 005 SIZE 30% |
| CHECKED: A.G. | DATE: 26-10-58 | |

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

MECHANICAL ANALYSIS OF SOILS



M.I.T. GRAIN SIZE CLASSIFICATION

PROJECT: QUEENSWAY & ISLAND PARK DRIVE

SAMPLE NO. 1-6

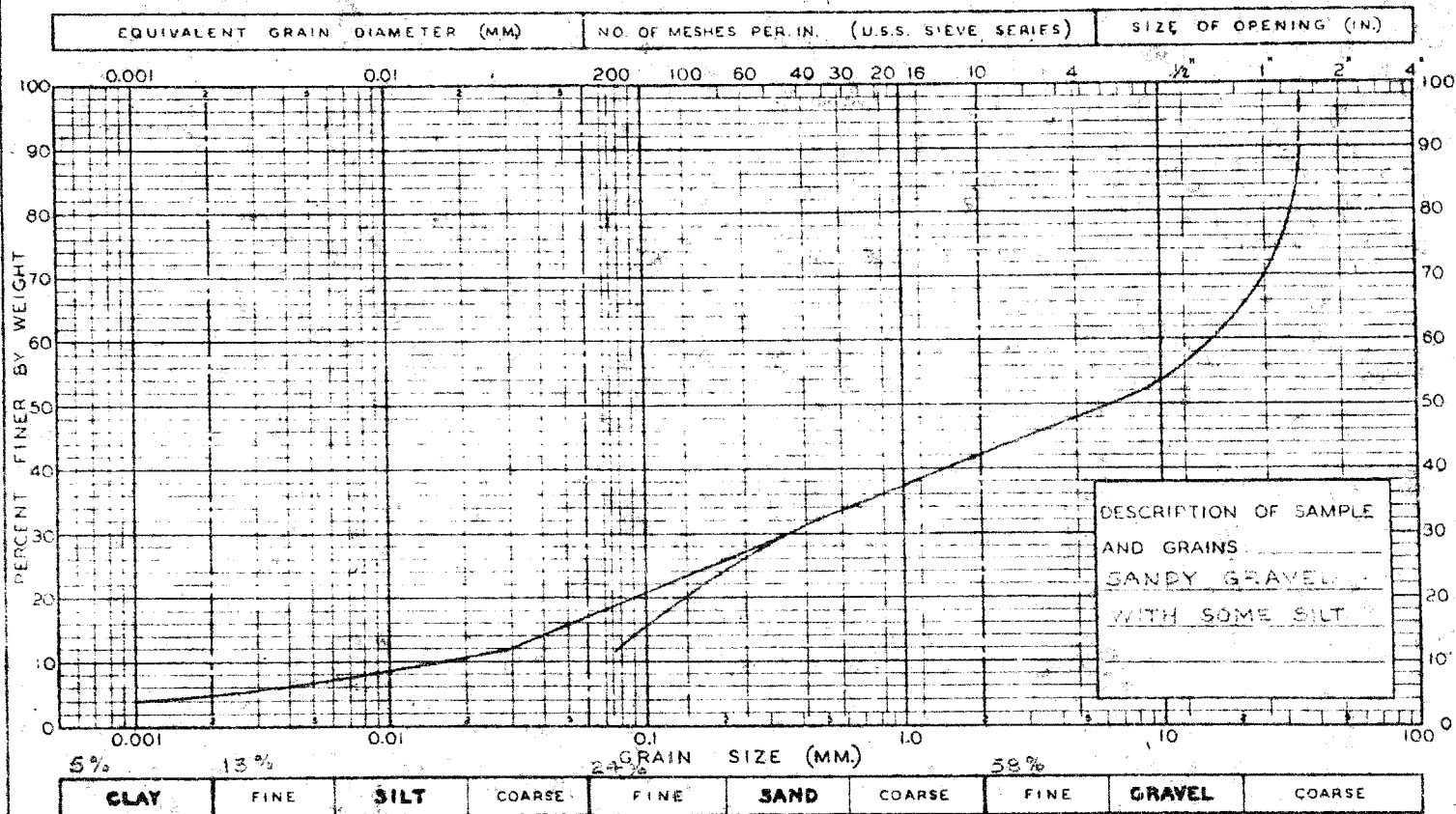
PLOTTED: D.M. DATE: 25-10-55

REMARKS: 0.02 TO 0.05 SIZE = 57%

CHECKED: A.G. DATE: 26-10-55

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

MECHANICAL ANALYSIS OF SOILS



M.I.T. GRAIN SIZE CLASSIFICATION

PROJECT: QUEENSWAY & ISLAND PARK DRIVE

SAMPLE NO. 5-6

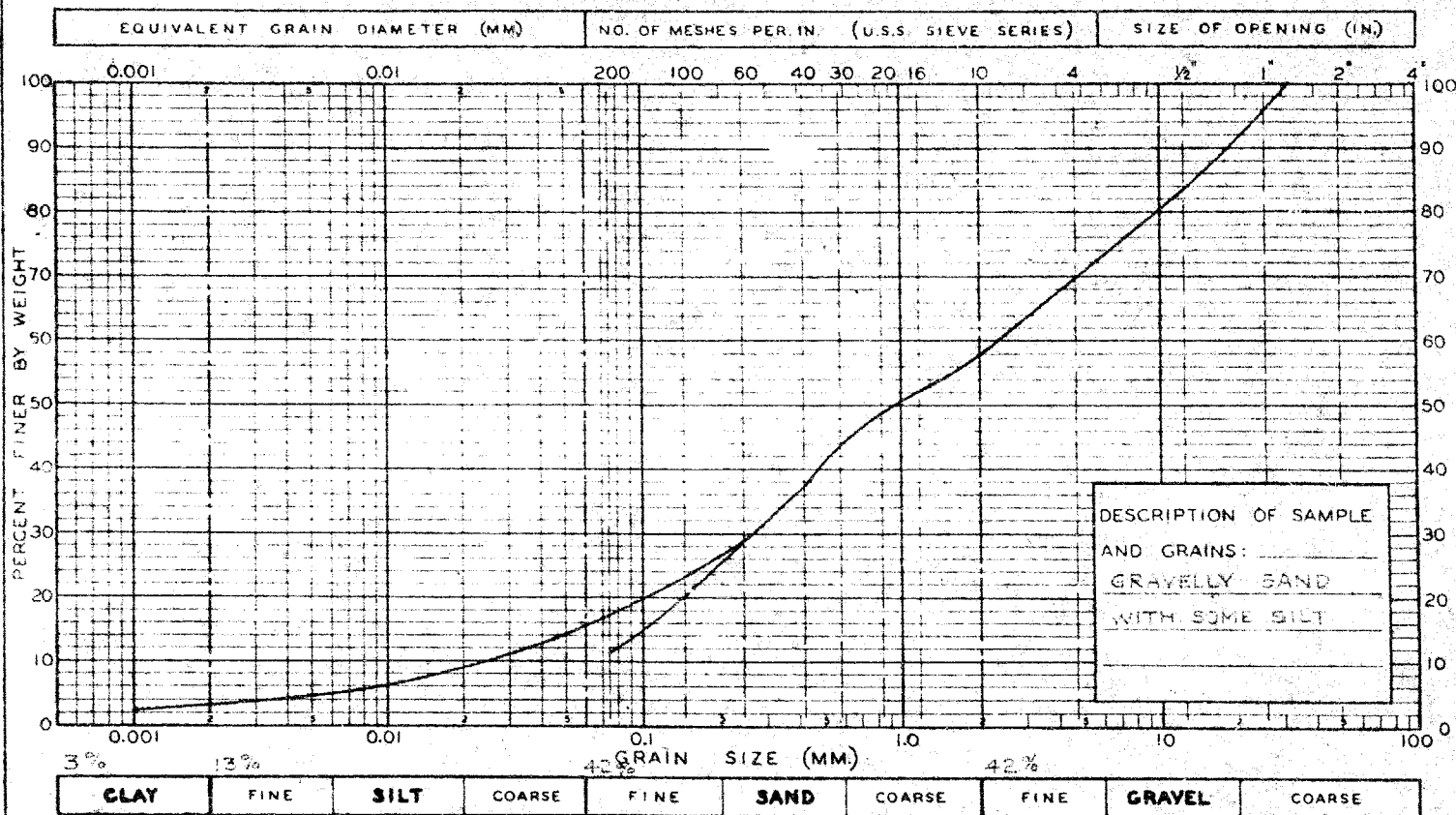
PLOTTED: J.B. DATE: 22-10-58

REMARKS:

CHECKED: C.J. DATE:

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

MECHANICAL ANALYSIS OF SOILS

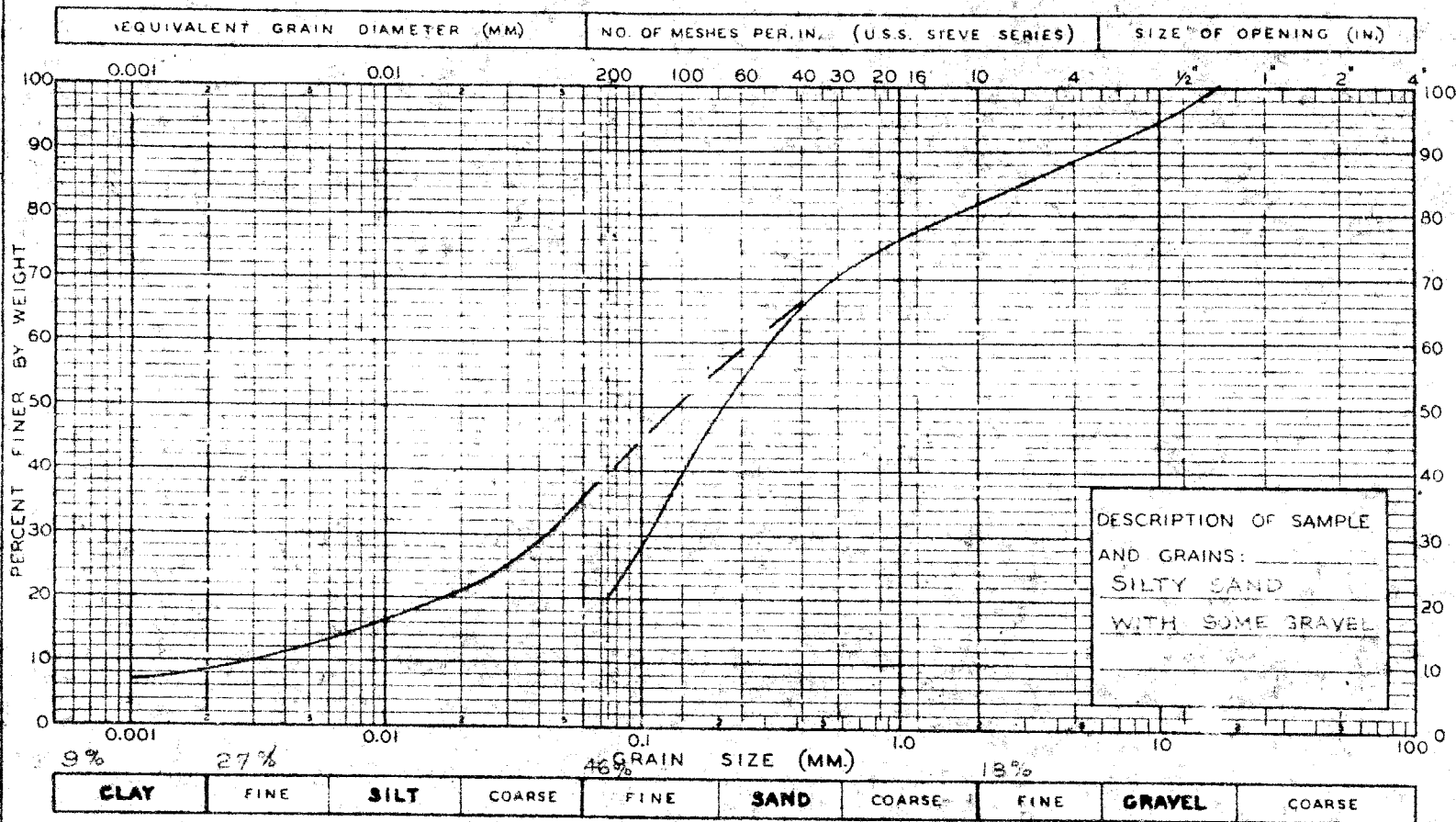


M.I.T. GRAIN SIZE CLASSIFICATION

| | | |
|--|----------------|----------------|
| PROJECT: QUEENSWAY & ISLAND PARK DRIVE | | SAMPLE NO. 3-B |
| PLOTTED: J.B. | DATE: 23-10-58 | REMARKS: |
| CHECKED: J.J. | DATE: | |

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

MECHANICAL ANALYSIS OF SOILS



M.I.T. GRAIN SIZE CLASSIFICATION

PROJECT: QUEENSWAY & ISLAND PARK DRIVE

SAMPLE NO. 7-3

PLOTTED: D.M.

DATE: 22-10-58

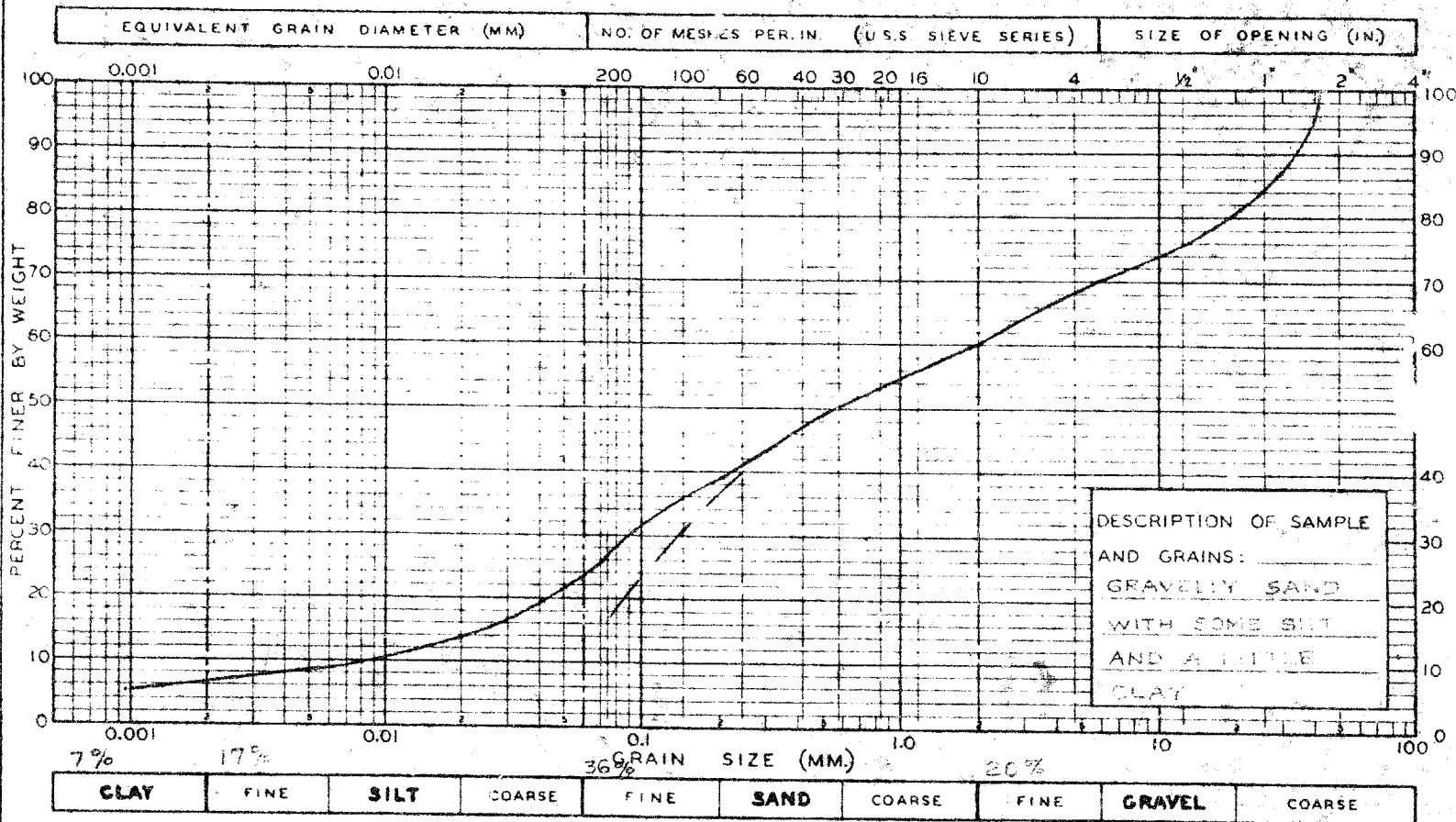
REMARKS:

CHECKED: C.J.

DATE:

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

MECHANICAL ANALYSIS OF SOILS



M.I.T. GRAIN SIZE CLASSIFICATION

PROJECT: QUEENSWAY & ISLAND PARK DRIVE

SAMPLE NO. 8-6

PLOTTED: J.P. DATE: 22-10-58

REMARKS:

CHECKED: D.M. DATE: 22-10-58

McROSTIE & ASSOCIATES
CONSULTING ENGINEERS

SAMPLE NO.

