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CONSULTING ENGINEERS

OTTAWA 1

CANADA

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REPORT ON THE FOUNDATION INVESTIGATION FOR THE PROPOSED QUEENSWAY EMBANKMENT BETWEEN STATIONS 358+00 AND 415+00 (BELL STREET TO ELGIN STREET, OTTAWA)

1. TERMS OF REFERENCE

We were requested by the Ottawa Office of De Leuw, Cather & Company of Canada Limited to carry out a subsurface investigation that would reveal the presence, location and depth of undesirable embankment foundation materials along the center town portion of the Queensway embankment. The report was to include recommendations on the type of remedial measures to follow, to ascertain the stability and limit the compressibility of the embankment foundation.

2. CONCLUSIONS AND RECOMMENDATIONS

General

The investigation was directed in a manner to provide sufficient information for submitting recommendations on embankment foundation stability, embankment foundation compressibility, embankment slope stability and for establishing the occurrence of fill and organic materials above natural soils. Frost susceptibility of the upper embankment materials was also considered.

2.1 Embankment Foundation Stability

A stability analysis made for the embankment at the Metcalfe Street and Queensway structure indicated that a critical slip circle exists through an existing fill layer above natural soils. A layer of organic materials underlying the fill layer in some areas along the center town portion of the Queensway added to the instability of the embankment foundation. The amount and location of existing fill and organic materials were determined as a result of our investigation. To insure the stability of the center town Queensway embankment we make the following recommendations:

Between Stations 358+00 and 371+00 (Bell St. to Bronson St.), where no organic layer is present but where unselected fill material is generally found to be 2 to 3 feet thick, the fill should be removed and reused for landscaping areas adjacent to the Queensway embankment in that section. However, the fill in the present railway rock cut could remain there and compacted selected fill, used as embankment subgrade, could be laid directly over this portion of the existing fill. This recommendation is made in view of the in-situ compaction of the existing fill, under the main railway tracks, that occurred during the years of railway operation.

Between stations 371+00 and 384+00 (Bronson St. to Lyon St.), where unselected fill is generally found to be 4 to 7 feet thick and underlain by organic materials generally 1 to 4 feet thick, this portion of the Queensway embankment should be handled with caution. The existing fill in this area could be removed and reused for adjacent Queensway embankment landscaping but the removal and the disposal of the underlying organic materials are recommended. The lack of local storage space for the organic deposits excavated here dictates the disposal of the layer at this location. Before any excavation work is begun in this area a drainage system should be installed to lower the groundwater table to natural soils underlying the organic materials, to avoid appreciable excavating difficulties of the organic deposits below the groundwater table. The proposed separate collector system required in this area for surrounding surface drainage could be installed prior to any excavating operations for this portion of the Queensway embankment.

Between stations 384+00 and 395+00 (Lyon St. to Bank St.), where a thin layer of organic materials was found in only one location but where unselected fill is generally found to be 4 to 5 feet thick over the area, the existing fill

could be removed and reused as borrow material for adjacent embankment slopes and surrounding Queensway landscape.

Between stations 395+00 and 415+00 (Bank St. to Elgin St.), where organic materials are found generally 1 to 1.5 feet thick underlying generally about 3 feet of unselected fill, the fill and organic deposits should be removed and reused as follows: the fill could be reused for regrading adjacent embankment areas while the organic materials could be reused for local landscaping of the Queensway right-of-way. This recommendation is made in view of the sufficiently large area of land adjacent to the embankment at this location which will allow temporary storage of fill and organic materials excavated from beneath the proposed embankment area. Provisions should be made for the reduction in volume of organic materials used for local landscaping; at least 50% reduction in height of organic fill placed in a new location and in a loose condition for landscaping purposes can be expected from the organic deposit.

2.2 Embankment Foundation Compressibility

Settlement studies made for the embankments of Queensway structures at Metcalfe Street and O'Connor Street indicated that long term total consolidation settlements

of the cohesive subsoil would be less than 0.5 feet and that long term differential consolidation movements of the cohesive subsoil would be of the order of 0.1 to 0.3 feet along the embankment centerline. Because the center town Queensway embankment will be built on similar cohesive subsoil from about station 384+00 (Lyon Street) to at least station 415+00 (Elgin Street) it is believed that long term total consolidation settlements of the embankment cohesive subsoil would be similarly acceptable. Long term differential consolidation movements of the embankment cohesive subsoil would also be of the order of a few tenths of a foot along the embankment centerline. Between station 358+00 (Bell Street) and about station 384+00 (Lyon Street) the embankment subsoil appears to be essentially granular and therefore long term consolidation settlements are not expected to occur in this section of the Queensway embankment.

The subsurface investigation revealed the presence of unselected fill layers of variable thickness usually underlain by deposits of highly compressible organic materials beneath most of the proposed Queensway embankment alignment in this area. To avoid unacceptable immediate settlements in the embankment subsoil the fill

and organic materials should all be removed prior to embankment construction. However, this same recommendation was necessary to ascertain the stability of the embankment foundation and consequently the details involving the removal of fill and organic deposits stated in para. 2.1 above are also applicable to eliminate immediate settlements.

2.3 Embankment Slope Stability

The stability of embankment slopes depends essentially on the angle of internal friction of granular soils used in the embankment and also on the degree and method of compaction which produces the density of the embankment soils. Calculations have indicated that a granular soil slope of 2 horizontal to 1 vertical, compacted to produce a total density of 120 p.c.f. and an angle of internal friction of 30° , would remain stable (even 20 feet high).

Experience has shown that the Queensway embankment at Kirkwood Avenue was successfully built under the direction of De Leuw, Cather & Company. We recommend, therefore, that if similar granular soils are used and a similar compaction method is followed for the construction of the center town Queensway embankment, then side slopes of 2 on 1 are satisfactory. In the event that other materials, such as a clay fill, are considered or in the event that the Queensway right-of-way is insufficient, in some center town

locations, to allow the erection of an embankment with side slopes of 2 horizontal to 1 vertical, a study to determine the properties of the proposed soil materials would be required. An analysis would also be required of the steepest slope that would remain stable and that would be adaptable to the restricted Queensway right-of-way locations.

2.4 Frost Susceptibility

Since the finished grade of the embankment along the center town portion of the Queensway will be at a considerably higher elevation than the present ground surface, frost susceptibility of the in-situ soils does not need to be considered. However, the embankment soils that would lie within 5 feet below the finished grade of the Queensway embankment need to be examined for frost susceptibility. As in previous subsurface investigation reports for various parts of the Queensway we have again adopted the Ontario Department criterion for the suitability of soils. The governing percentages are repeated as follows:

- Acceptable - less than 45% very fine sand and silt
- less than 40% silt

- Borderline - 45% to 60% very fine sand and silt
- 40% to 55% silt
- Unacceptable - more than 60% very fine sand and silt
- more than 55% silt.

2.5 Groundwater Control

A control of groundwater will be required wherever the groundwater levels are high and the soils encountered are silts, fine sands and organic materials. Between stations 371+00 and 384+00 the fill and organic deposits are thickest and are likely to be below the groundwater table at the time of excavation. Precautionary measures have been outlined in para. 2.1 above for this particular section of the Queensway embankment. The in-situ soils below the fill and organic materials west of station 384+00 are basically fine granular and we therefore recommend that groundwater control be accomplished by predraining by means of the installation of proposed storm sewers that would serve the Queensway and adjacent areas. The in-situ soils below the fill and organic materials east of station 384+00 are basically cohesive and we recommend that groundwater control be accomplished, if necessary at the time of excavation, by ditching and pumping when and where required.

3. SITE INVESTIGATION

3.1 Field Work

A total of 131 holes were made along the Queensway embankment route between Bell and Elgin Streets. The borehole and test pit locations were chosen to provide adequate information for the construction of the Queensway embankment itself along with the various ramps adjoining the main embankment, as indicated on revised plan dated May 16, 1961. The subsoil materials, down to natural soils, were examined and classified by means of hand dug test pits, power dug pits, hand auger boreholes, and power auger boreholes. The methods of subsurface investigation varied with site conditions and types of fill material overlying natural soils. However, test pits dug by power digger were, in general, used for the relatively shallow subsurface investigation. Classification of the subsoil was made from within the test pits to ascertain the nature of the fill present over most of the embankment area and to identify the presence and thickness of any organic materials generally found between the fill layer and natural soils.

3.2 Observations

The subsoil profiles as revealed by the boreholes, auger

holes and test pits are shown on the accompanying plates No. 2 to 103. The hole locations have been added to plans of De Leuw, Cather & Company and are shown on plates No. 1-A to 1-B included with this report. The geotechnical profile of the area investigated can be generalized as follows:

Between stations 358+00 and 371+00 unselected fill generally 2 to 3 feet thick, overlies about 3 feet of natural fine sands and till soils underlain by rock at an average depth of 4 feet below present ground surface.

Between stations 371+00 and 384+00 unselected fill generally 4 to 7 feet thick, overlies organic deposits generally 1 to 4 feet thick, underlain usually by natural fine sands and silts.

Between stations 384+00 and 395+00 unselected fill generally 4 to 5 feet thick is underlain by natural clay soils.

Between stations 395+00 and 415+00 unselected fill generally 3 feet thick, overlies organic deposits usually 1 to 1.5 feet thick, underlain by natural clay soils.

The fill throughout the area usually contains fine sands, silts, clays, cinders, glass, wood, brick and concrete pieces. Groundwater seepage during the test pit excavations has been noted and is recorded on the soil profile summaries.

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BACK TO O'CONNOR
JANUARY 1971

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 21.5' DATE June 2/63
REMARKS SEE 11.22 NO. 2

HOLE No.

12

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BAIT TO O'CONNOR
GUN CLUB BY EXCHANGE IT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.2' DATE MAY 30/61

REMARKS _____ 2

HOLE No.

13

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BANK TO O'CONNOR
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 221.3'

DATE June 8/61

HOLE NO.

REMARKS SEE PLATE NO. 2

16

HAND DIG TEST KIT

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BANK TO G'CONNOR
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.7' DATE May 31/61
REMARKS SEE PLATE NO. 2

HOLE NO.

REMARKS SEE PLATE NO. 2

HAND DOG TEST PIT

17

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BANK TO O'CONNOR
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 228.2 DATE Aug. 15/61

REMARKS SEE PLATE NO. 2

HOLE No.

19

DUG BY POWER DIGGER

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

O'CONNOR AND METCALFE
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 220.0

DATE 6/7/63

HOLE NO.

REMARKS SEE PLATE # 2

24

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

O'CONNOR AND METCALFE
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 21.2 DATE JULY 7/61
REMARKS SEE PLATE #2

HOLE No.

HAND DUG TEST PIT

26

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

O'CONNOR TO MITCALFE
QUEENSWAY EMBARKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 220.4 DATE JULY 10/61
REMARKS SEE PLATE #2

HOLE No.

29

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

O'CONNOR TO METCALE
CONFIDENTIAL

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 324.0 DATE JULY 10/61
REMARKS SEE PLATE #2

HOLE NO.

29

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY EMBANKMENT
METCALFE TO ELGIN

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.3 DATE JULY 12/61
REMARKS SEE PLATE # 2

HOLE NO.
32

HAND DUG TEST PIT

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

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QUEENSWAY DISARMMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.8

DATE JULY 12/61

HOLE NO.

REMARKS SEE PLATE #2

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY EMBANKMENT
METCALFE TO ELGIN

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.7
REMARKS SEE PLATE # 2

DATE JULY 12/61

HOLE No.
34

HAND DUG TEST PIT

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QUEENSWAY EMBANKMENT
METCALFE TO ELGIN

HOLE NO.

~~HAND DUG TEST PIT~~

25

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY EMBANKMENT
NETCALFE TO ELGIN

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.6 DATE JULY 12/61
REMARKS SEE PLATE # 2

HOLE No.
36

HAND DUG TEST PIT

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY EMBANKMENT
O'CONNOR TO METCALFE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.3'

DATE AUG. 15/61

HOLE NO.
38

REMARKS SEE PLATE # 2

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY EMBANKMENT
O'CONNOR TO METCALFE

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.2' DATE AUG. 15/61
REMARKS SEE PLATE # 2

HOLE No.
39

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

METCALFE & EUGIN
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.2' DATE AUG. 15/61
REMARKS SEE PLATE #2

HOLE No.

41

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

WENT TO BANK
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 228.2' DATE AUG. 16/61
REMARKS SEE PLATE #2

HOLE NO.
42

DUG BY POWER DIGGER

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LYON TO KENT
QUEENSWAY EMBANKMENT

DUG BY POWER DIGGER.

44

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

LYON TO KENT
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.0' DATE AUG. 16/61
REMARKS SEE PLATE #2

HOLE No.
47

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

LYON TO KENT
QUEENSWAY EMBARKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 224.7 DATE AUG. 16/61

HOLE NO.

REMARKS SEE PLATE #2

48

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

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ELEVATION OF GROUND SURFACE (ZERO DEPTH) 294.0 DATE APR. 16/67

HOLE NO.

REMARKS 202 12 17 02

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

PERCY TO LYON
QUEENSWAY EMBARKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.71 DATE 10/16/67

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QUEBECWAY EMBARKMENT

HOLE No.

DUG BY POWER DIGGER

54

BRONSON TO PERCY
QUEENSWAY EMBANKMENT

HOLE No.

58

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BRONSON TO PERCY
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.4' DATE AUG. 17/61
REMARKS SEE PLATE #2

DATE AUG. 17/61

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

HELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.6' DATE AUG. 17/61
REMARKS SEE PLATE #2

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62

REMARKS SEE PLATE #2

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 224.3 DATE AUG. 15/61 HOLE NO. _____
REMARKS SEE PLATE #2

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63

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.8' DATE AUG. 15/61

REMARKS SEE PLATE #2

HOLE NO.

HAND DUG PIT

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

WENT TO BANK
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 227.8' DATE AUG. 21/61 HOLE NO. 100
REMARKS SEE PLATE #2

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

WENT TO BANK
QUEENSWAY BREAKFAST

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 227.4' DATE AUG. 21/61

HOLE No.

REMARKS SEE PLATE #2

68

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

WENT TO BANK
QUEBECWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 226.0' DATE AUG. 21/61
REMARKS SEE PLATE #2

HOLE NO.

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69

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

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QUESTIONS AND ANSWERS

ELEVATION OF GROUND SURFACE (ZERO DEPTH)	224.8'	DATE	AUG. 21/51	HOLE NO.
REMARKS	SEE PLATE #2 DUG BY POWER DIGGER			71

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

LYON TO KENT
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 220.6' DATE AUG. 18/61
REMARKS SEE PLATE # 2

HOLE NO.

73

LUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

LYON TO KENT
QUEENSWAY FMBANKENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 221.01 DATE AUG. 21/61
REMARKS SEE PLATE #2

HOLE No.

DUG BY POLE DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

LYON TO ZENT
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 222.8' DATE APR. 18/61
REMARKS SEE PLATE #2

HOLE No.

75

DUG BY POWER DIGGER

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

PERCY TO LYON
SUNDAY EVENING

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 219.2' DATE AUG. 21/61
REMARKS SEE PLANS 82

HOLE No.

76

DOC BY POWER DIGGER

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

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QUERREYAI ENDANGERED

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 224.5'

DATE AUG. 21/61

HOLE NO.

REMARKS SEE PLANT #2

78

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[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

PERCY TO LYON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 218.0' DATE AUG. 21/61
REMARKS SBE PLATE #2

HOLE No.
79

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

NERCY TO LYON
GREENSWAY EMBARKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.2'

DATE 400. 18/61

HOLE No.

REMARKS SEE PLATE #2

DUG BY POWER DIGGER

82

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PERCY TO LYON
QUEENSWAY EMBANKMENT

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BRONSON TO PERCY
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 224.4' DATE AUG. 18/61
REMARKS SEE PLATE NO. 2 CAVING-IN AT 219.4'

HOLE No.

86

DUG BY POWER DIGGER

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BRONSON TO PERCEY
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 221.0' DATE AUG. 21/61
REMARKS SEE PLATE NO. 2

HOLE No.

87

DUG BY POWER DIGGER

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BROWSON TO PERCY
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.6' DATE AUG. 18/61
REMARKS SEE PLATE NO. 2 PIT CAVING-IN AT 221.6'

HOLE No.
91

DUG BY POWER DIGGER

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BRONSON TO PERCY
QUEENSWAY 30 JAN 1967

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.3'

DATE AUG. 17/61

HOLE No.

REMARKS SEE PLATE NO. 2

92

DIG BY POWER DIGGER

[illegible]

BRONSON TO PERCY
QUEENSWAY EMBANKMENT

93

EROWSON TO PERCY
QUEENSWAY EMBANKMENT

HOLE No.

REMARKS SEE PLATE NO. 2

006 BY LAND

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

ELL TO BRONSON
QUINNENAY ENGAGEMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 234.4

DATE SEPT. 5/61

HOLE No.

REMARKS 0000 PLATE 02

DEC BY POSTAL DIGIT

96

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBASSMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 236.5'

DATE SEPT. 5/61

HOLE NO.

REMARKS: 200 11/10/50

DIC BY POWER DIGGES

97

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

HELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 238.9' DATE SEPT. 5/61
REMARKS SEE PLATE #2

HOLE NO.
98

DOG EX POWER DIGGER

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BROUSE
QUEENSWAY ENBAKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 238.2' DATE SEPT. 5/61

REMARKS SEE PLATE #2

HOLE No.

99

DUG BY POWER DIGGER

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

HELL TO BRONSON
CURRISWAY EMBROIDERY

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 241.01

DATE SEPT. 5/62

HOLE No.

REMARKS SEE PLATE 42

100

DUG BY POWER DIGGER

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	PROBING OR VANE TEST	
							.....LB. HAMMER	NO CASING
							.....INCH DROP	.....INCH DIA. ROD
							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²
				GROUND SURFACE	0'	241.0'		
				Fill Sand, Crushed Stone and Boulders	1.5'			
				Fill Fine Sand with some pieces of rock and a few topsoil pockets	5.5'	235.5'		
				Fine Sand	9'	232.0'		
				Sand with some Gravel	11'			
				Sandy Till	12'	229.0'		
				BOTTOM OF PIT (ON ROCK)				
							% WATER CONTENT	PLATE
							NATURAL ○	92
							LIQUID LIMIT □	
							PLASTIC LIMIT △	
R - REMOULDED								

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

DELL TO BRONSON
QUEENSWAY EMEANION NT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 235.6' DATE SEPT. 5/61

HOLE NO.

REMARKS: SEC PLATE #2

105

DUG BY POWER DIGGER

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 236.5'

DATE SEPT. 5/61

HOLE No.

REMARKS SEE PLATE NO. 2

DOE DE POWER RECOVER

106

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BROOKSON
QUEENSWAY FIBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 238.2' DATE SEPT. 5/61
REMARKS CPT PLATE NO. 2

HOLE No.

107

DOG BY POWER DIGGER

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 238.5' DATE SEPT. 5/61

HOLE No.

REMARKS SEE PLATE NO. 2

Due BY POWER OF ATTORNEY

108

[illegible]

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 235.7'

DATE SEPT. 5/61

HOLE No.

REMARKS SEE PLATE NO. 2

109

DUG BY POWER DIGGER.

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

BELL TO BRONSON
QUEENSWAY EMBANKMENT

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 237.7' DATE SEPT. 5/61
REMARKS SEE PLATE NO. 2

HOLE No.

REMARKS SEE PLATE NO. 2

DUG BY POWER DIGGER

110

[illegible]

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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.
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W. J. MACLEAN, B.A., O.L.S., O.L.S.
R. W. MIDDLEMIS, B. ENG., P. ENG., J.E.I.C.

REPORT ON EXISTING PAVEMENT STUDY

1. TERMS OF REFERENCE

We were requested by De Leuw Cather and Company of Canada Limited to carry out a study on the existing condition of streets adjacent to the Ottawa Queensway. This report would aid in determining to what degree the existing streets would need to be reconstructed or rehabilitated, where they meet or are directly affected by the on and off ramps of the Ottawa Queensway.

2. CONCLUSIONS AND RECOMMENDATIONS

Our conclusions and recommendations are described in detail on Plate 16 of this report but in general are as follows:-

2.1 Bronson Avenue - Opposite Catherine Street to Opposite Coca-Cola Plant

Surface condition is borderline, road base course and sub-base material acceptable, backfill material for utility trenches would appear to be acceptable and properly compacted. Queensway contract would normally require reconstruction of this section of street to say Powell Avenue, where last major reconstruction started within the past few years to Dunbar Bridge on Riverside Drive. Work was done by Dibblee Construction Limited.

2.2 Isabella Street - Elgin to Bank Street

Surface conditions poor, base course, sub-grade, and trench backfill material heterogeneous, numerous and large size utility trenches, presence of "dump" fill and organic at the easterly end indicate that possibly

a small arm of the Rideau Canal Channel once extended to this area. Road subjected to significant amount of heavy traffic.

Street should be reconstructed and sidewalks reconstructed and maintained where necessary.

2.3 Chamberlain Street - Bank Street to Bronson Avenue

Surface, condition mostly good, fair in some spots. Little or no utility trenches particularly at westerly end. Subgrade and base course material appear acceptable and properly compacted except in an isolated area near Bay Street (Glendale?) where "dump" fill suggests that Patterson's Creek once extended to this area. Maintenance history indicates that the road has stood up well over the last 10 years in spite of the heavy traffic that exists on it.

Reconstruction of Chamberlain Street is not required at this time. Sidewalks should be installed or maintained where necessary. Resurfacing at ramp intersections would be required.

2.4 Catherine Street - Bronson Avenue to Elgin Street

Surface conditions poor, base course material mostly poor or deteriorated, road subgrade mostly from extensive utility trench backfills - backfill material heterogeneous and usually undesirable. Street frequently patched or resurfaced. Presence of "dump" fill, organic, and discussions with older civic employees suggest that part of Patterson's Creek once extended to the westerly section of this street.

Street should be reconstructed with sidewalks to be reconstructed or maintained where necessary.

3. SITE INVESTIGATIONS AND STUDY

3.1 General

This valuation study was carried out on the basis of:

- (i) Visual inspection of the surface conditions of the street and sidewalk.
- (ii) Subsurface investigation of the street by test pit examination, particularly at the future ramp intersections.
- (iii) Ascertaining the number, type, size, and depth of of utilities presently installed in the street.
- (iv) Obtaining all available information on the history of construction, performance, maintenance, and traffic of the street.

These observations were correlated and studied; and are the basis of our conclusions and recommendations.

3.2 Field Work

Test pits were dug at the centre of existing streets where they intersect with the proposed Queensway ramps. The pits were approximately 3 feet x 5 feet with long side parallel to the centreline of the streets examined. All test pits were excavated by small back hoe, and breakers were used when necessary. Detailed observations of the test pits were recorded by a soils technician under the close supervision of a soils engineer who made daily visits to the site. Field classifications were made on all materials encountered as they were logged. All test pits were referenced to existing structures and geodetic elevations taken at their surface.

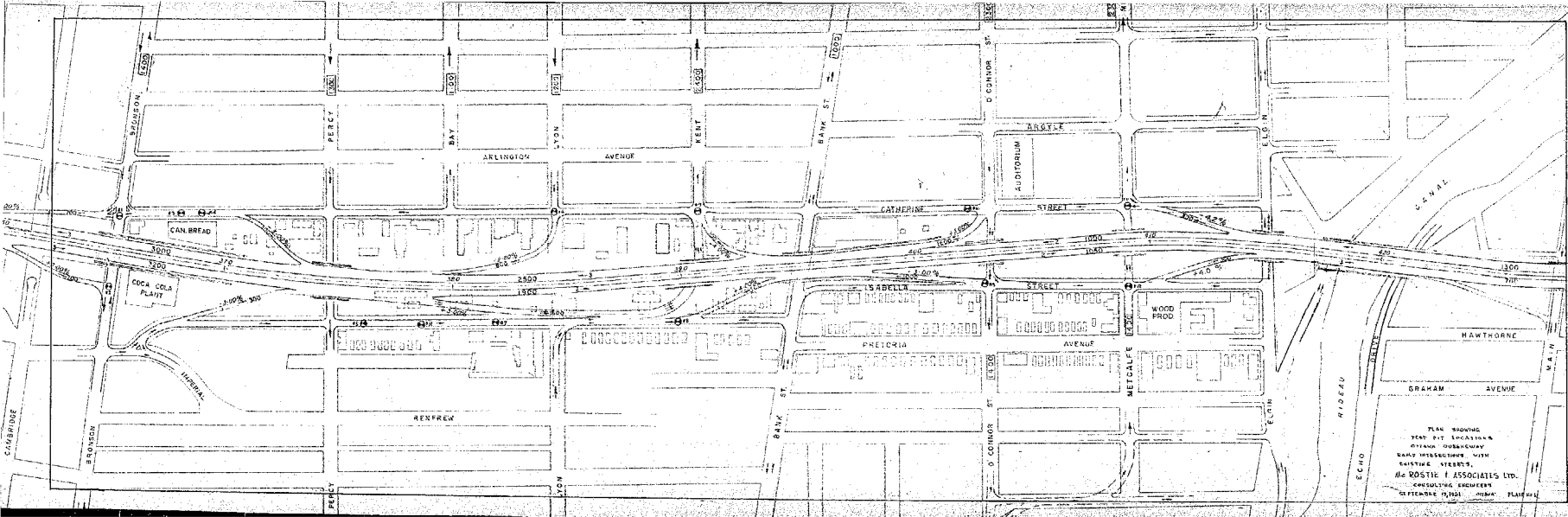
The surface conditions of the streets were examined in detail block by block. The degree of patching evident, the grade and shape, the existence and magnitude of potholes and cracks, the condition of the edges and sidewalks, and other significant features were observed and recorded.

The location of underground utilities were obtained through the Central Registry Office of the City of Ottawa as well as spot checking on the site whenever possible.

The history of the street construction was obtained through some records available from the Roadways Branch of the Department of Planning and Works, City of Ottawa. No records were kept on street maintenance. Discussions were held with the City Ward Foreman for this area and his comments on the maintenance history for the last 14 years were noted.

3.3 Observations

The detailed results are tabulated on Plate 16, and the test pit observation, shown on Plates 2 to 15 inclusive of this report.



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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

OTTAWA QUEENSWAY
RAMP INTERSECTIONS
WITH EXISTING STREETS

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 218.9 DATE 30/8/61

HOLE NO.

REMARKS & Chamberlain 270' + West & Lyon. Excavated by
small backhoe. Pit dry.

Pit 7

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	PROBING OR VANE TEST			
							.....LB. HAMMER	NO CASING		
							.....INCH DROP	.....INCH DIA. ROD		
							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²		
				GROUND SURFACE						
				Pit size approx. 3' x 5'. Long side parallel to street.						
				Asphalt	0	218.9				
				compacted	0.25					
				crushed stone	0.50	218.4				
				SUB BASE MATERIAL USED IN PREVIOUS ROAD CONSTRUCTION OR SERVICE TRENCH BACKFILL (sand, gravel, cobbles, some brick)	1.0					
					2.0	216.9				
				BACKFILL MATERIAL FOR SERVICE TRENCH OR FILL MATERIAL USED IN PREVIOUS ROAD CONSTRUCTION	3.0					
				(sand, gravel, cobbles, boulders, a little brick, ashes, glass and pieces of wood)	4.0	214.9				
					5.0					
					6.0	212.9	Pit started to cave in at depth 6.0'.			
					7.0					
					7.5	211.4				
				BOTTOM OF PIT						
R - REMOULDED							% WATER CONTENT			PLATE
							NATURAL	○		
							LIQUID LIMIT	□		
							PLASTIC LIMIT	△		
									8	

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

OTTAWA QUEENSWAY
RAMP INTERSECTIONS
WITH EXISTING STREETS

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 220.5 DATE 30/8/61

REMARKS 6 Chamberlain 505' + East 6 Lyon. Excavation by
breaker and small backhoe. Pit dry.

HOLE No.

548

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	PROBING OR VANE TEST	
							.....LB. HAMMER	NO CASING
							.....INCH DROP	.....INCH DIA. ROD
						BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT. ²		
Pit size approx. 3' x 5'. Long side parallel to street.				Asphalt	0	220.5		
				Concrete	0.4	220.1		
				SUB BASE MATERIAL USED IN PREVIOUS ROAD CONSTRUCTION (sand, gravel, cobbles)	1.0			
				SERVICE TRENCH BACKFILL MATERIAL (fine sand and silt with some cobbles)	3.5	217.0		
				BOTTOM OF PIT	5.5	215.0		
							% WATER CONTENT	PLATE
							NATURAL	O
							LIQUID LIMIT	□
							PLASTIC LIMIT	Δ

R - REMOULDED

9

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**SOIL PROFILE AND SUMMARY
 OF FIELD AND LABORATORY TESTS**

OTTAWA QUEENSWAY
 RAMP INTERSECTIONS
 WITH EXISTING STREETS

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 226.0 DATE 30/8/61

HOLE NO.

REMARKS At Catherine opposite A Kent. Excavation by breaker
and small backhoe. Pit dry.

Pit 9

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	PROBING OR VANE TEST				
							LB. HAMMER		NO CASING		
							INCH DROP		INCH DIA. ROD		
							BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT. ²				
				Road GROUND SURFACE	0	226.0					
				Asphalt	0.25						
				Concrete							
				SERVICE TRENCH BACKFILL MATERIAL	0.9	225.1					
				(sand, gravel and cobbles)	1.5	224.5					
				SERVICE TRENCH BACKFILL MATERIAL							
				(fine sand and							
				silt with some							
				gravel)							
					5.0	221.0					
				BOTTOM OF PIT							

R - REMOULDED

% WATER CONTENT
 NATURAL ☐
 LIQUID LIMIT ☐
 PLASTIC LIMIT ☐

PLATE

10

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

OTTAWA QUEENSWAY
RAMP INTERSECTIONS
WITH EXISTING STREETS

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.8' DATE 30/8/61

HOLE NO.

REMARKS & Catherine near West side O'Connor. Excavation
by breaker and small backhoe. Pit dry.

Pit 10

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	PROBING OR VANE TEST	
							.....LB. HAMMER.....INCH DROP	NO CASING.....INCH DIA. ROD SHEAR STRENGTH IN KIPS PER FT. ²
				Asphalt	0	225.8		
				deteriorated concrete	0.25			
					0.67			
				BACKFILL MATERIAL FROM SERVICE TRENCH				
				(sand, gravel,	2.0	223.8		
				gray clay,				
				some topsoil,				
				fine sandy	3.0			
				silt)				
					4.0	221.8		
					5.0			
					6.0	219.8		
					7.0			
					7.5	218.8		
				VOID FROM PREVIOUS SERVICE INSTALLATION				
				1 1/2'				
				BOTTOM OF PIT				

R - REMOULDED

% WATER CONTENT
NATURAL ☐
LIQUID LIMIT ☐
PLASTIC LIMIT ☐

PLATE

11

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

OTTAWA QUEENSWAY
RAMP INTERSECTIONS
WITH EXISTING STREETS

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 223.6 DATE 30/8/61

HOLE NO.

REMARKS & Cath line opposite & Metcalfe. Excavation by
break & by small backhoe. Pit dry.

Pit 11

UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ²	SMALL SCALE PENETROMETER K.PS/FT. ²	STANDARD PENETRATION BLOWS/FT.	SAMPLE NUMBER	DESCRIPTION OF SOIL	DEPTH IN FEET	ELEVATION	PROBING OR VANE TEST	
							LB. HAMMER INCH DROP	NO CASING INCH DIA. ROD
							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²
				Asphalt	0	223.6		
				Deteriorated concrete	0.25			
				Fill material (sand, gravel, cobbles, some cinders and ashes)	1.0	222.6		
				Topsoil with some organic	2.7			
				Gray clay	3.6	220.0		
				Fine sand and silt with some gravel	4.0			
				BOTTOM OF PIT	5.5	218.1		
							% WATER CONTENT	PLATE
							NATURAL <input type="radio"/>	12
							LIQUID LIMIT <input type="checkbox"/>	
							PLASTIC LIMIT <input type="checkbox"/>	

R - REMOULDED

OTTAWA QUEENSWAY
RAMP INTERSECTIONS
WITH EXISTING STREETS

Page 12

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OTTAWA CANADA

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

OTTAWA QUEENSWAY
RAMP INTERSECTIONS
WITH EXISTING STREETS

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 225.6' DATE 11/9/61

HOLE NO.

REMARKS & Chamberlain 100' + west of Bay St. produced

excavation by small backhoe. Pit dry. Possible former location Pit 14

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	PROBING OR VANE TEST	
							LB. HAMMER INCH DROP	NO CASING INCH DIA. ROD BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT. ²
				Asphalt	0	225.6		
				Grushed stone and cobbles.	0.25			
				SUB BASE USED IN PREVIOUS ROAD CONSTRUCTION (fine sand, some gravel)	1.0	224.6		
				Fill Material (sawdust)	3.0			
				Fill material (pieces of wood, glass, cinders, ashes, garbage material)	3.5	222.1		
					7.0	218.6		
				BOTTOM OF PIT				

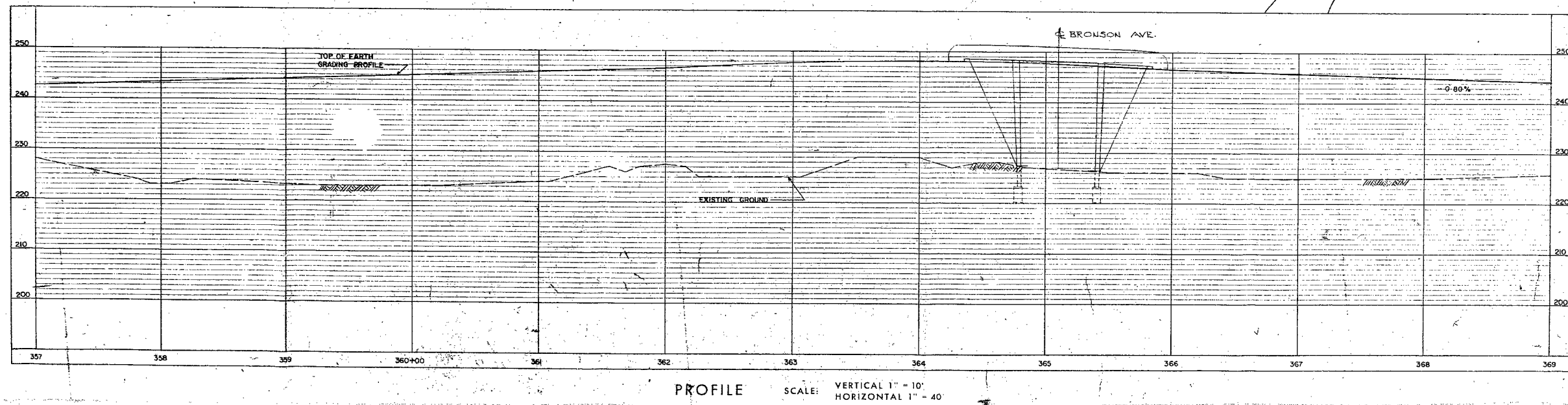
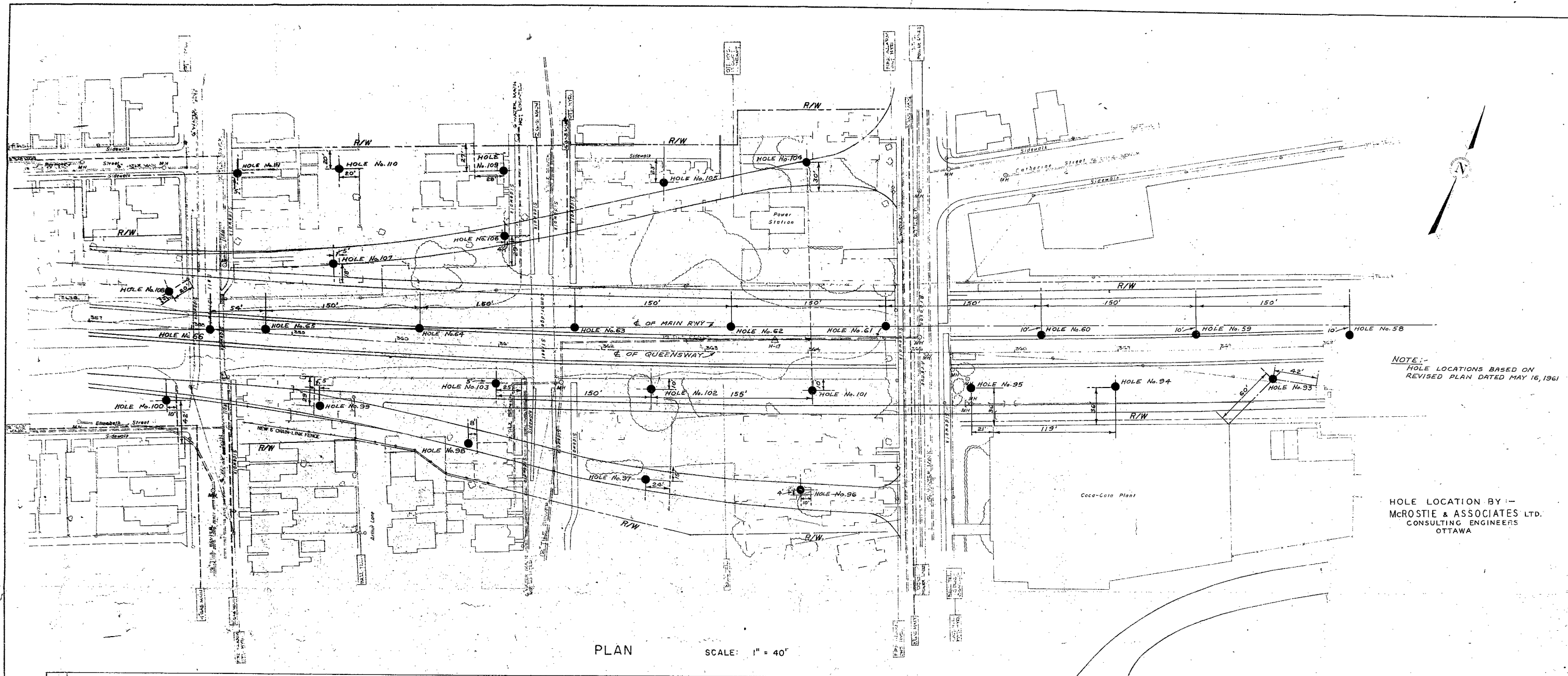
R - REMOULDED

% WATER CONTENT
NATURAL ☐
LIQUID LIMIT ☐
PLASTIC LIMIT ☐

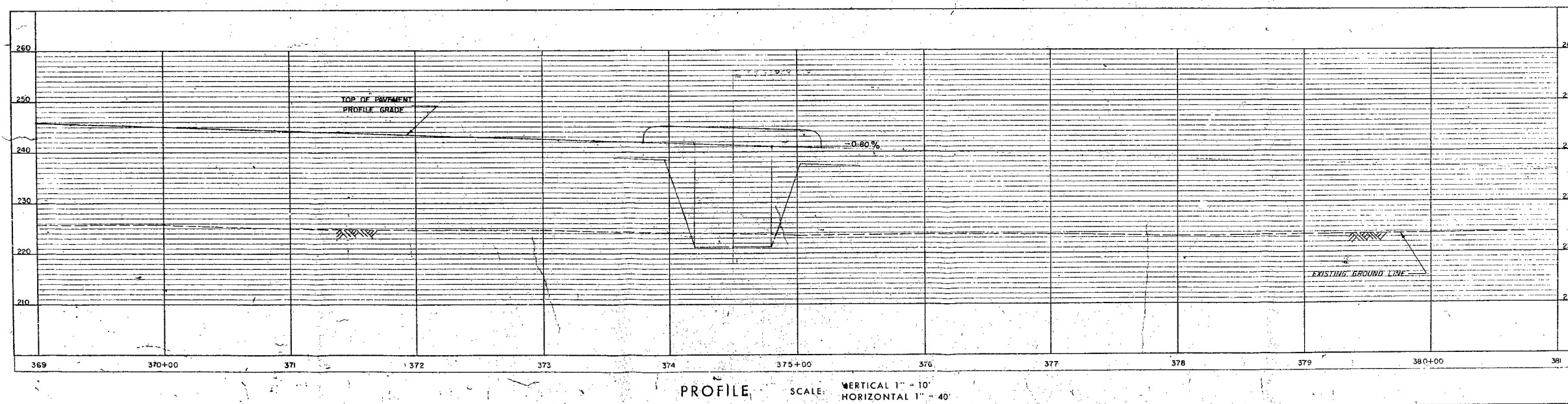
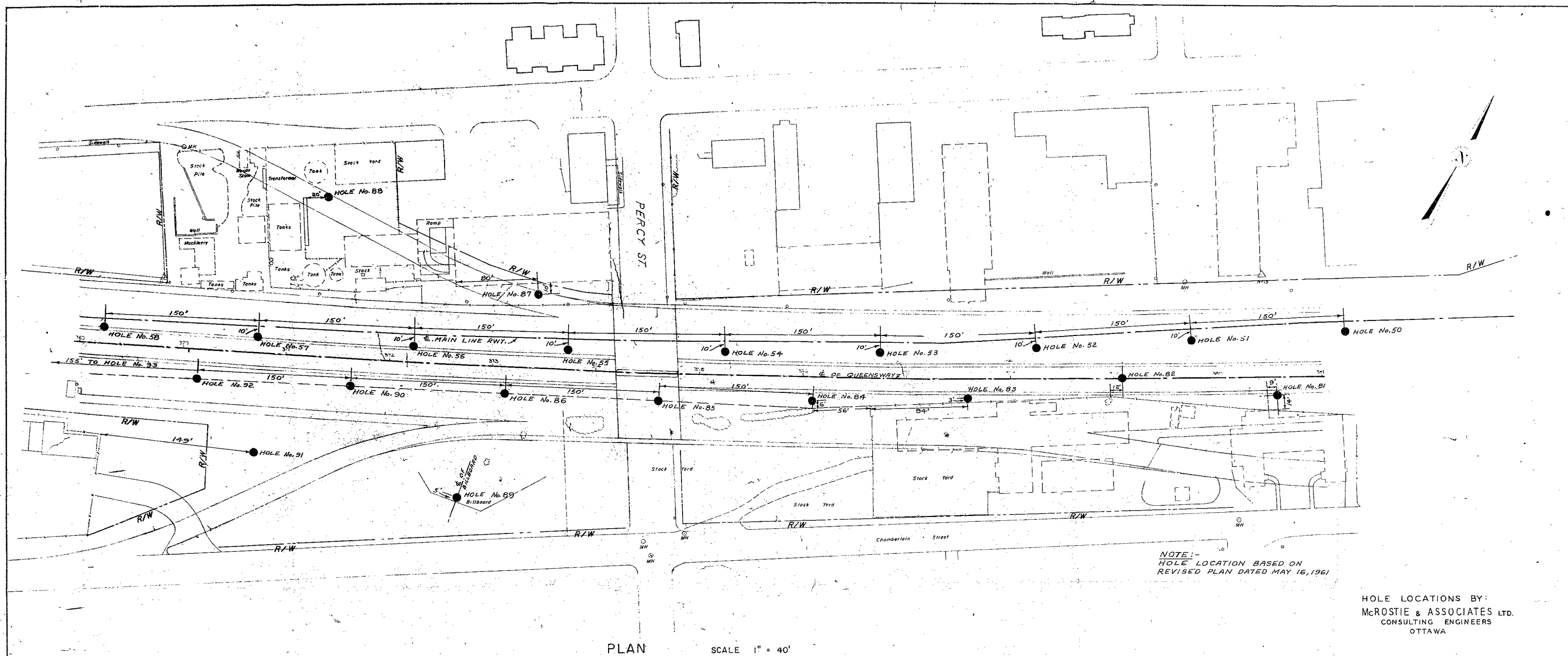
PLATE

15

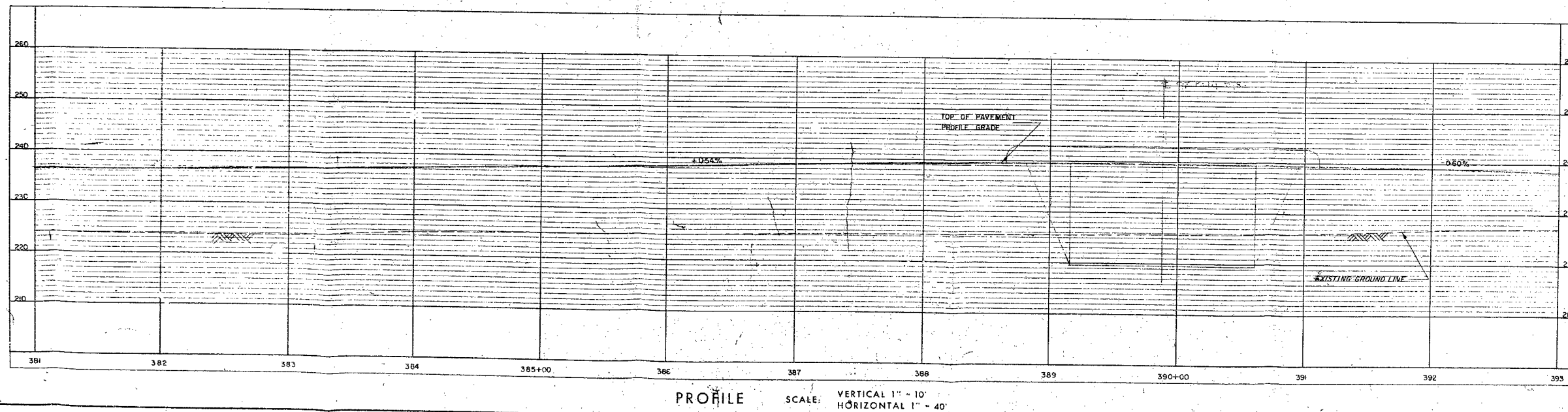
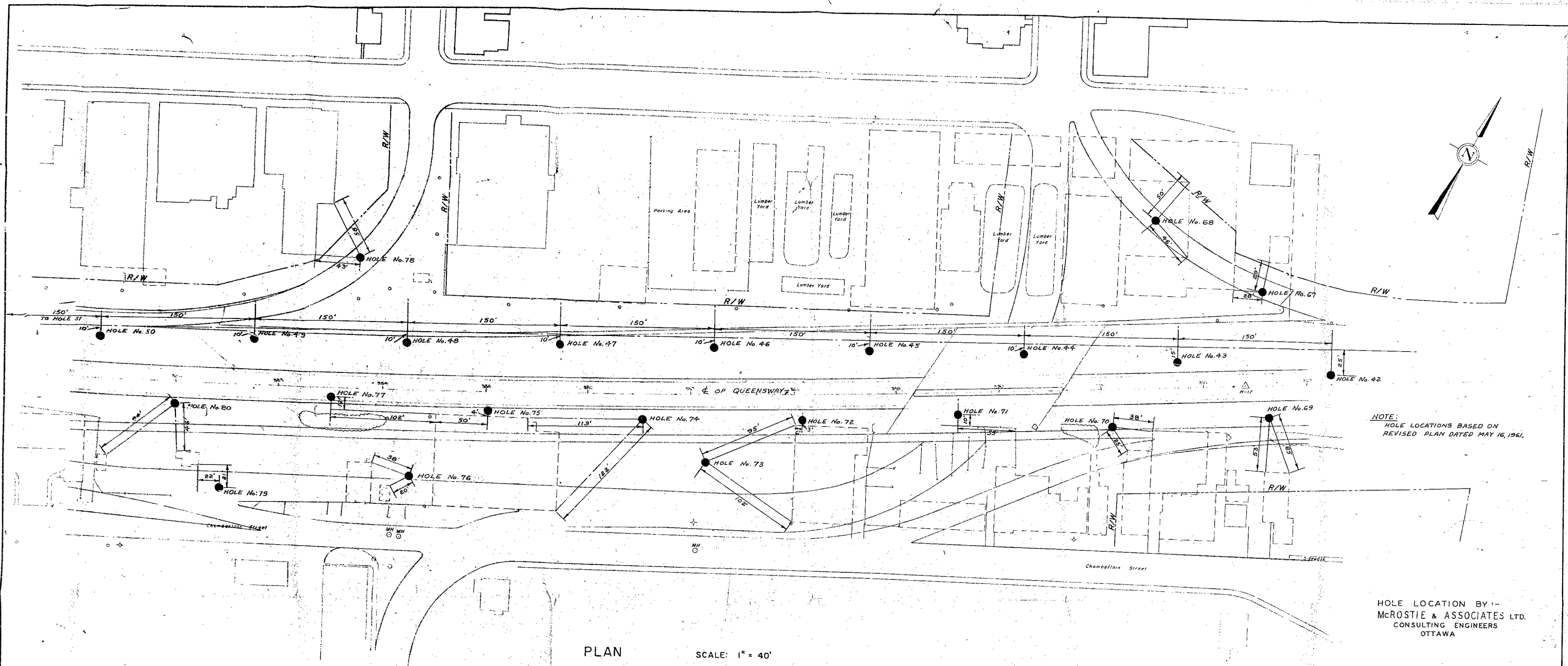
#61-F-232C
QUEENSWAY
& BELL ST.
TO ELGIN ST.
OTTAWA



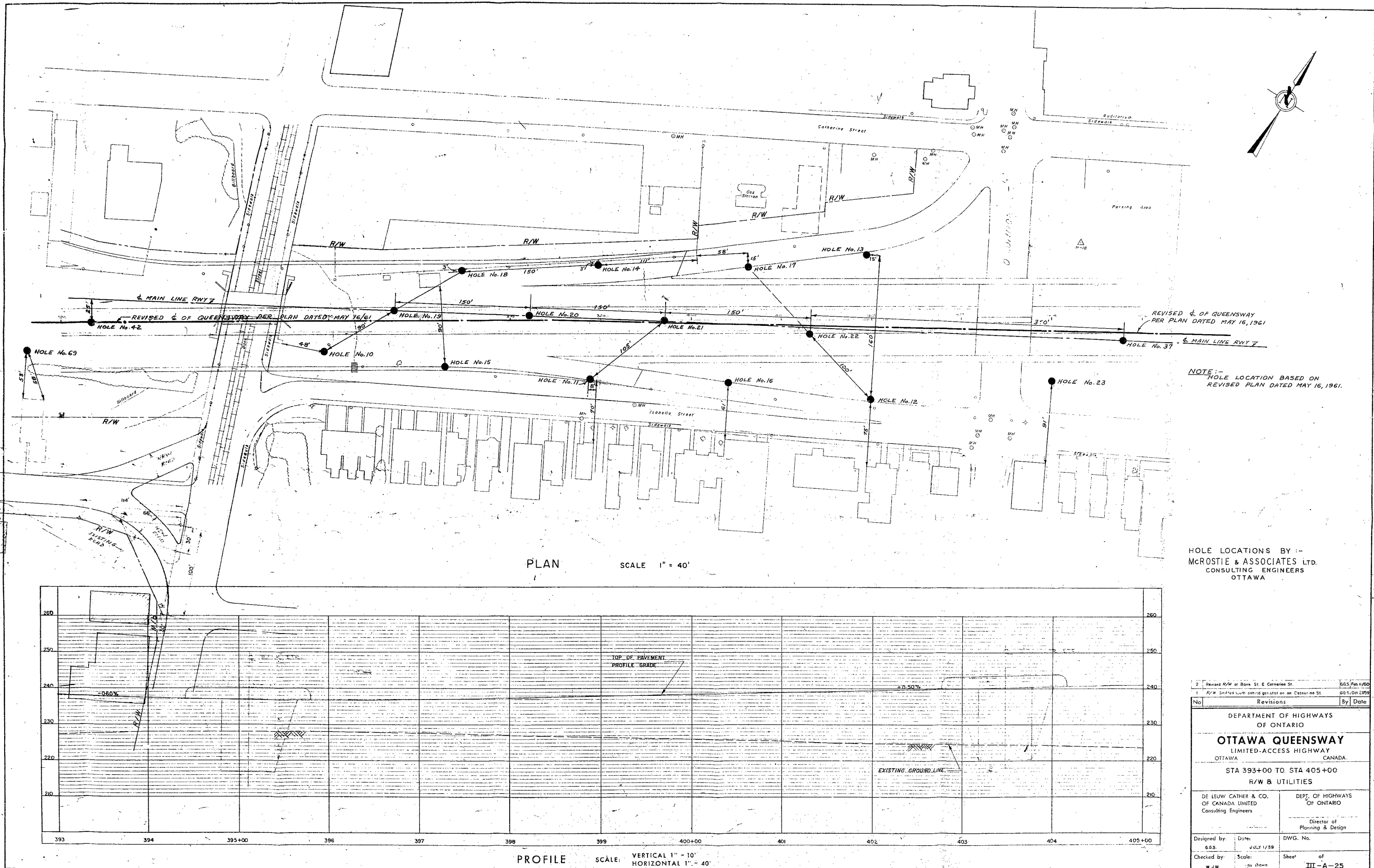
3	R/W adjusted at north end of Arthur Lane to save 2 car garages on Lot 22	SGS Mar 12/60	
2	R/W adjusted at S.W. corner of Bell St & Raymond St. to eliminate use of retaining wall. Two houses to be removed.	SGS Feb 1/60	
1	R/W adjusted to allow for the Raymond St. Extension between Bell St. & Cambridge St. R/W adjusted to show 1st. Houses on the S.W. corner of Bell St. & Raymond St.	SGS Oct 22/59	
No	Revisions	By	Date
DEPARTMENT OF HIGHWAYS OF ONTARIO			
OTTAWA QUEENSWAY LIMITED-ACCESS HIGHWAY OTTAWA CANADA			
STA. 357+00 TO STA. 369+00 R/W & UTILITIES			
DE LEUW CATHAR & CO. OF CANADA LIMITED Consulting Engineers		DEPT. OF HIGHWAYS OF ONTARIO Director of Planning & Design	
Designed by: G.S.	Date: JULY 1/59	DWG. No. PLATE 1-A	Sheet of
Checked by: W.J.M.	Scale: as shown	HI-A-22	

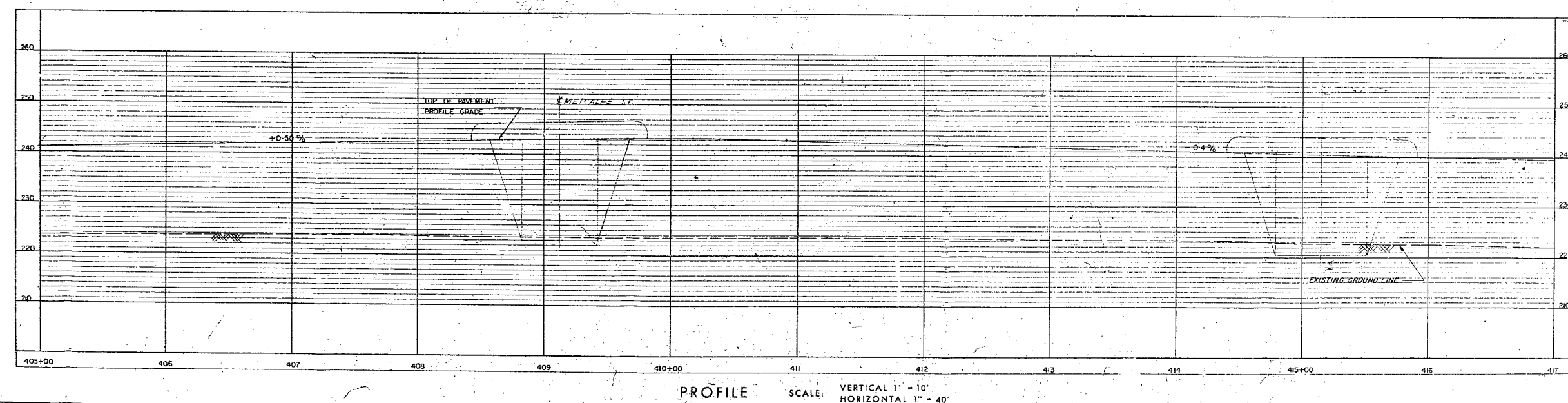
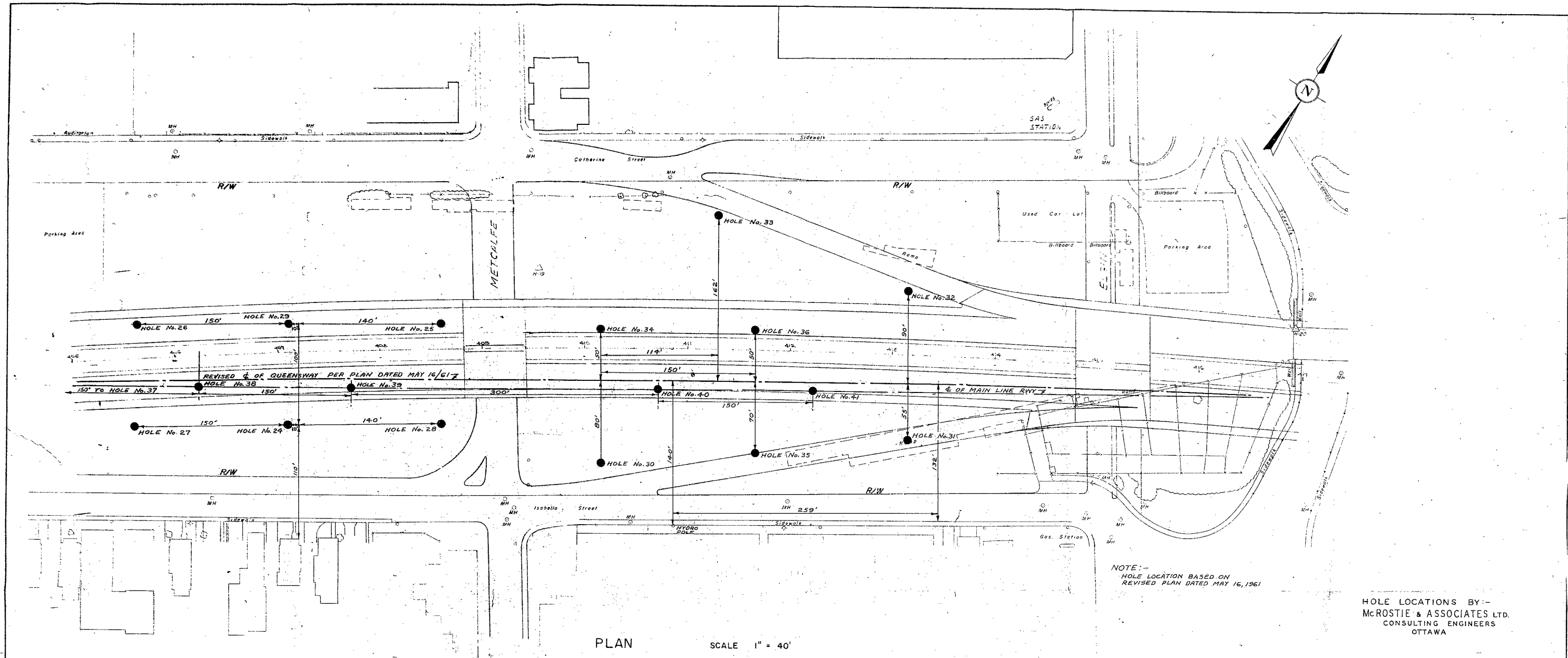


No.	Revisions	By	Date
DEPARTMENT OF HIGHWAYS OF ONTARIO			
OTTAWA QUEENSWAY LIMITED ACCESS HIGHWAY OTTAWA CANADA			
STA 369+00 TO STA 381+00 R/W & UTILITIES			
DESIGNED BY: G.S.S. Checked by: W.J.M.		DEPT. OF HIGHWAYS OF ONTARIO Director of Planning & Design	
Date: JULY 1/59		DWG. No. Sheet of III-A-23	
Scale: as shown			



No.	Revisions	By	Date
DEPARTMENT OF HIGHWAYS OF ONTARIO			
OTTAWA QUEENSWAY LIMITED-ACCESS HIGHWAY			
OTTAWA CANADA			
STA 381+00 TO STA 393+00			
R/W & UTILITIES			
DE LEUW CATHIER & CO. OF CANADA LIMITED Consulting Engineers		DEPT. OF HIGHWAYS OF ONTARIO Director of Planning & Design	
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HOLE LOCATIONS BY:-
McROSTIE & ASSOCIATES LTD.
CONSULTING ENGINEERS
OTTAWA

No.	Revisions	By	Date
DEPARTMENT OF HIGHWAYS OF ONTARIO OTTAWA QUEENSWAY LIMITED-ACCESS HIGHWAY OTTAWA CANADA STA. 405+00 TO STA. 417+00 R/W & UTILITIES			
DE LEUW CATHY & CO. OR CANADA LIMITED Consulting Engineers		DEPT. OF HIGHWAYS OF ONTARIO Director of Planning & Design	
Designed by:	CGS	Date:	JULY 17/59
Checked by:	W.J.M.	Scale:	as shown
DWG. No.		Sheet	III - A-26A

EXISTING	STREET	VALUATION
100	100	100
200	200	200
300	300	300
400	400	400
500	500	500
600	600	600
700	700	700
800	800	800
900	900	900
1000	1000	1000
1100	1100	1100
1200	1200	1200
1300	1300	1300
1400	1400	1400
1500	1500	1500
1600	1600	1600
1700	1700	1700
1800	1800	1800
1900	1900	1900
2000	2000	2000
2100	2100	2100
2200	2200	2200
2300	2300	2300
2400	2400	2400
2500	2500	2500
2600	2600	2600
2700	2700	2700
2800	2800	2800
2900	2900	2900
3000	3000	3000
3100	3100	3100
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4600	4600	4600
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4800	4800	4800
4900	4900	4900
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5100	5100	5100
5200	5200	5200
5300	5300	5300
5400	5400	5400
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EXISTING STREET VALUATION

SUMMARY OF OBSERVATIONS & RECOMMENDATIONS SEPTEMBER 1961

STREET	FROM	TO	SURFACE INSPECTION OF EXISTING CONDITIONS <small>(DATA GENERAL ONLY)</small>	SUBSURFACE INSPECTION <small>(DATA GENERAL ONLY)</small>	UTILITY SIZE & DEPTH <small>(CITY OF OTTAWA RECORDS)</small>	HISTORY OF MAINTENANCE <small>(MOSTLY FROM CITY OF OTTAWA RECORDS)</small>	REMARKS	CONCLUSIONS & RECOMMENDATIONS
BROWSON	OPR & CATHERINE	OPR & COCA COLA	SMALL PATCHING, GRADE FAIR TO GOOD, SMALL CRACKS IN EDGES SIDEWALK FAIR.	3" ASPHALT 3" REINFORCED CONCRETE SUB BASE AS DESCRIBED BACKFILL MATERIAL - GRAVEL, SAND, COBBLES, ROCK FRAGMENTS	3" WATER - 5' 12" SEWER - 10' 24" WATER - 7'	LAST MAJOR CONSTRUCTION IN 1929 WHEN ASPHALT PAVEMENT ON A CONCRETE BASE AND ASPHALT PAVEMENT LAID DOWN. SURFACE MAINTAINED PERIODICALLY.	ROAD SUBJECT TO HEAVY TRAFFIC.	RECONSTRUCTION OR MAINTENANCE BORDERLINE. QUEENSWAY CONTRACT CALLS FOR COMPLETE RECONSTRUCTION OF BROWSON FOR THIS AREA TO PROCEED WITHIN THE LAST 3-5 YEARS (DISCLOSED CHART).
CATHERINE	BROWSON	PERCY	EXTENSIVE PATCHING, GRADE POOR TO FAIR, BUT CRACKS IN EDGES SOUTH SIDEWALK POOR, NORTH SIDEWALK FAIR.	3" ASPHALT 3" REINFORCED CONCRETE TERMINAL BACKFILL MATERIAL - ORGANIC, FINE SAND, SILT, COBBLES, ROCK FRAGMENTS	4" GAS - 4' 12" GAS - 6' 12" SEWER - 6' 6" WATER - 6'	LAST MAJOR CONSTRUCTION IN 1912 WHEN ASPHALT PAVEMENT ON A CONCRETE BASE WAS LAID DOWN. SURFACE MAINTAINED PERIODICALLY.	OLDER CITY EMPLOYEES CLAIM PATTERSON'S CEASE TO BE EXTENDED TO THIS AREA. ROAD SUBJECT TO HEAVY TRAFFIC.	SURFACE CONDITION POOR, SUBSURFACE MATERIAL POOR AND UNCOMPACTED. ROAD SHOULD BE RECONSTRUCTED. UNUSUAL UTILITIES TRENCHES POSSIBLY INTERFERING WITH REPAIRS. LITTLE MAINTENANCE HISTORY SINCE 1912-1920. BATHING MAINTENANCE HISTORY. CRACKS SUGGEST THIS WAS PART OF PATTERSON'S CREEK. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. BOTH SIDEWALKS SHOULD BE RECONSTRUCTED. NORTH SIDEWALK RECONSTRUCTED OR REPAIRED.
	PERCY	RAY	EXTENSIVE PATCHING, GRADE POOR, EDGES ROUGH, SIDEWALKS POOR TO FAIR.	NIL	24" TELEPHONE CABLES - ? 4" GAS - 5' 12" SEWER - 10' 6" WATER - 5'	LAST MAJOR CONSTRUCTION IN 1920 WHEN ASPHALT PAVEMENT ON TOP OF CONCRETE BASE LAID DOWN. SURFACE MAINTAINED PERIODICALLY.	SAME AS ABOVE	SAME AS ABOVE EXCEPT SIDEWALKS ON BOTH SIDES SHOULD BE RECONSTRUCTED.
	RAY	LYON	SAME TO EXTENSIVE PATCHING, GRADE POOR, SOME MINOR CRACKS IN PUT HOLES SOUTH SIDEWALK POOR, NORTH SIDEWALK FAIR TO GOOD.	3"-5" ASPHALT 3" SOUND TO DEGRADED CONCRETE TERMINAL BACKFILL MATERIAL - SAND, SILT, GRAVEL, COBBLES, BRICKS, CLAY, ASHES WOOD	3" WATER - 6' 24" SEWER - 12' 10" GAS - 6' 2" GAS - 5'	AS ABOVE	AS ABOVE	SAME AS ABOVE EXCEPT SIDEWALKS ON BOTH SIDES SHOULD BE RECONSTRUCTED. PRESENCE OF BRICKS, GRASS, PIECES OF WOOD - EVIDENCE THAT THIS WAS PART OF PATTERSON'S CREEK AND THESE UNSUITABLE MATERIALS USED AT "BUMP" FILL. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. SIDEWALKS ON BOTH SIDES NEED NOT BE REPAIRED.
	LYON	KENT	SMALL PATCHING, GRADE POOR, SOME CRACKS, EDGES ROUGH, SIDEWALKS FAIR TO GOOD.	3"-5" ASPHALT 3" SOUND TO DEGRADED CONCRETE TERMINAL BACKFILL MATERIAL - SAND, SILT, GRAVEL, BRICK, WOOD, ASHES.	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	AS ABOVE	ROAD SUBJECT TO HEAVY TRAFFIC. AREA POSSIBLY ONCE LOW AND WET. SURFACE ON KENT STREET FAIR TO GOOD.	SAME AS ABOVE
CATHERINE	KENT	BANK	EXTENSIVE PATCHING, GRADE POOR, SMALL CRACKS IN PUT HOLES, EDGES SIDEWALKS FAIR TO GOOD.	NIL	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	AS ABOVE	ROAD SUBJECT TO HEAVY TRAFFIC.	SURFACE CONDITION POOR, EXTENSIVE UTILITY TRENCHES, BACKFILL MATERIAL APPARENTLY POOR AND UNCOMPACTED. NO MAJOR WORKS ON THIS SECTION SINCE 1920. BATHING MAINTENANCE HISTORY. PRESENCE OF BRICKS, GRASS, PIECES OF WOOD - EVIDENCE THAT THIS WAS PART OF PATTERSON'S CREEK AND THESE UNSUITABLE MATERIALS USED AT "BUMP" FILL. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. SIDEWALKS ON BOTH SIDES NEED NOT BE REPAIRED.
	BANK	O'CONNOR	EXTENSIVE PATCHING, GRADE POOR, SMALL CRACKS, EDGES ROUGH, SIDEWALKS GOOD, SOUTH SIDEWALK POOR.	3" ASPHALT 3" REINFORCED CONCRETE TERMINAL BACKFILL MATERIAL - SAND, GRAVEL, CLAY, PUT SOIL, SILT.	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	LAST MAJOR CONSTRUCTION IN 1924 WHEN ASPHALT PAVEMENT ON A CONCRETE BASE WAS LAID DOWN. SURFACE MAINTAINED PERIODICALLY.	ROAD SUBJECT TO HEAVY TRAFFIC. SURFACE ON O'CONNOR STREET FAIR.	SURFACE CONDITION POOR, SUBSURFACE MATERIALS ARE, EXTENSIVE UTILITY TRENCHES, BACKFILL MATERIAL APPARENTLY POOR AND UNCOMPACTED. NO MAJOR WORKS ON THIS SECTION SINCE 1924. BATHING MAINTENANCE HISTORY. PRESENCE OF BRICKS, GRASS, PIECES OF WOOD - EVIDENCE THAT THIS WAS PART OF PATTERSON'S CREEK AND THESE UNSUITABLE MATERIALS USED AT "BUMP" FILL. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. SIDEWALKS ON BOTH SIDES NEED NOT BE REPAIRED.
	O'CONNOR	METCALFE	EXTENSIVE PATCHING, GRADE POOR, EXTENSIVE CRACKS IN PUT HOLES, EDGES FAIR SOUTH SIDE NO SIDEWALK. NORTH SIDEWALK FAIR TO GOOD.	3" ASPHALT 3" REINFORCED CONCRETE 18" FILL, SAND, GRAVEL, COBBLES, BRICKS, CHUNKS OF LIMESTONE, CLAY, FINE SAND SILT, GRAVEL	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	LAST MAJOR CONSTRUCTION IN 1924 WHEN ASPHALT PAVEMENT ON A CONCRETE BASE WAS LAID DOWN. SURFACE MAINTAINED PERIODICALLY.	ROAD SUBJECT TO HEAVY TRAFFIC. AREA POSSIBLY ONCE LOW AND WET.	SURFACE CONDITION POOR, EXTENSIVE UTILITY TRENCHES, BACKFILL MATERIAL APPARENTLY POOR AND UNCOMPACTED. NO MAJOR WORKS ON THIS SECTION SINCE 1924. BATHING MAINTENANCE HISTORY. PRESENCE OF BRICKS, GRASS, PIECES OF WOOD - EVIDENCE THAT THIS WAS PART OF PATTERSON'S CREEK AND THESE UNSUITABLE MATERIALS USED AT "BUMP" FILL. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. SIDEWALKS ON BOTH SIDES NEED NOT BE REPAIRED.
	METCALFE	ELGIN	EXTENSIVE PATCHING, GRADE POOR, EXTENSIVE CRACKS, EDGES FAIR TO GOOD NORTH SIDEWALK FAIR TO GOOD, SOUTH SIDE NO SIDEWALK.	NIL	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	AS ABOVE	ROAD SUBJECT TO HEAVY TRAFFIC. AREA POSSIBLY ONCE LOW AND WET.	SURFACE CONDITION POOR, EXTENSIVE UTILITY TRENCHES, BACKFILL MATERIAL APPARENTLY POOR AND UNCOMPACTED. NO MAJOR WORKS ON THIS SECTION SINCE 1924. BATHING MAINTENANCE HISTORY. PRESENCE OF BRICKS, GRASS, PIECES OF WOOD - EVIDENCE THAT THIS WAS PART OF PATTERSON'S CREEK AND THESE UNSUITABLE MATERIALS USED AT "BUMP" FILL. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. SIDEWALKS ON BOTH SIDES NEED NOT BE REPAIRED.
	ISABELLA	ELGIN	EXTENSIVE PATCHING, GRADE POOR, DOUGH EDGES, NORTH SIDE NO SIDEWALK SOUTH SIDEWALK FAIR.	3" ASPHALT 3" COMPACTED CRUSHED STONE / STONE FRAGMENTS 18" SUB BASE MATERIAL - SAND, GRAVEL, COBBLES BACKFILL MATERIAL FOR SERVICE TRENCH - CLAY SILT, FINE SAND, MEDIUM TOPSOIL.	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	LAST MAJOR CONSTRUCTION IN 1907 OR THEREABOUTS. ASPHALT PAVEMENT LAID DOWN. SURFACE MAINTAINED PERIODICALLY.	AREA ONCE POSSIBLY LOW AND WET AN ARM OF THE RIDEAU CANAL CHANNEL?	SURFACE CONDITION POOR, SERVICE TRENCHES BACKFILLED WITH LITTLE COMPACTION AND WITH POOR QUALITY SUBGRADE MATERIAL - QUESTIONABLE QUALITY. NO MAJOR WORKS ON THIS SECTION SINCE 1907. BATHING MAINTENANCE HISTORY. THIS SECTION OF ROAD SHOULD BE RECONSTRUCTED. SIDEWALK RECONSTRUCTED OR MAINTAINED.
	METCALFE	O'CONNOR	EXTENSIVE PATCHING, GRADE POOR, SMALL CRACKS IN PUT HOLES, EDGES FAIR NORTH SIDE NO SIDEWALK, SOUTH SIDEWALK POOR.	3" ASPHALT 3" COMPACTED CRUSHED STONE / STONE FRAGMENTS 18" SUB BASE MATERIAL - SAND, GRAVEL, COBBLES BACKFILL MATERIAL FOR SERVICE TRENCH - CLAY SILT, FINE SAND, MEDIUM TOPSOIL.	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	AS ABOVE	AREA ONCE POSSIBLY LOW AND WET AN ARM OF THE RIDEAU CANAL CHANNEL?	SAME AS ABOVE EXCEPT SIDEWALK NEED TO BE RECONSTRUCTED ON THE RIDEAU CANAL CHANNEL.
	O'CONNOR	BANK	EXTENSIVE PATCHING, GRADE POOR, SMALL CRACKS, DOUGH EDGES. NORTH SIDEWALK GOOD, SOUTH SIDEWALK POOR.	NIL	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6' 12" SEWER - 10'	AS ABOVE	NIL	SAME AS ABOVE EXCEPT SIDEWALK NORTH SIDE N.E., SOUTH SIDE SHOULD BE RECONSTRUCTED.
CHAMBERLAIN	BANK	LYON	LITTLE PATCHING, GRADE FAIR TO GOOD, NO CRACKS, EDGES GOOD, NO SIDEWALK ON NORTH SIDE, SIDEWALK PARTLY ON SOUTH SIDE FAIR.	4" ASPHALT 3" CONCRETE SUB BASE MATERIAL - SAND, GRAVEL, COBBLES SERVICE TRENCH BACKFILL - FINE SAND AND SILT WITH SOME COBBLES.	6" WATER - 5' 12" SEWER - 10' 10" GAS - 6'	LAST MAJOR CONSTRUCTION 1927. ASPHALT PAVEMENT FROM BANK TO 232 WEST FROM 232 WEST OF BANK TO 232, BEYOND THIS POINT HISTOR		
	LYON	RAY (GLENDALE)?	NO PATCHES, GRADE GOOD, NO CRACKS OR PUT HOLES, EDGES FAIR TO GOOD, NO SIDEWALKS.	3" ASPHALT 3" COMPACTED CRUSHED STONE 24" SUB BASE MATERIAL - SAND, GRAVEL, COBBLES SERVICE TRENCH BACKFILL - SAND, GRAVEL, COBBLES, Boulders, A LITTLE ASH, BRICK, GLASS OR PIECES OF WOOD.	6" WATER 12" SEWER (PART OF THE WAY) 4" GAS - 5' 12" SEWER - 6'	LAST MAJOR CONSTRUCTION 1927-28 ASPHALT PAVEMENT. SURFACE MAINTAINED PERIODICALLY.	ROAD SUBJECT TO HEAVY TRAFFIC. WARD FOREMAN CLAIMS THAT ROAD WAS STOOD UP EXCEPTIONALLY WELL IN HIS EXPERIENCE (UNRECORDED) THAT ABOUT 1927-28. ROAD WAS STOOD UP BY WARD FOREMAN WHEN IN HIS EXPERIENCE (UNRECORDED) THAT ABOUT 1927-28. ROAD WAS STOOD UP BY WARD FOREMAN WHEN IN HIS EXPERIENCE (UNRECORDED) THAT ABOUT 1927-28. ROAD WAS STOOD UP BY WARD FOREMAN WHEN IN HIS EXPERIENCE (UNRECORDED) THAT ABOUT 1927-28. ROAD WAS STOOD UP BY WARD FOREMAN WHEN IN HIS EXPERIENCE (UNRECORDED) THAT ABOUT 1927-28. 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