

MEMORANDUM

TO: Mr. T. C. Kingsland, (2)
Regional Structural Planning Eng.,
Eastern Region,
Kingston, Ontario.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: December 11, 1972.

OUR FILE REF.

IN REPLY TO

DEC 14 1972

SUBJECT:

3165-86

FOUNDATION INVESTIGATION REPORT

For

Proposed Structures (Bridges 1, 2 and 3) at the
Intersection of the Ottawa Queensway
With Eastern Parkway and Hwy. 417
Twp. of Gloucester, Reg. Mun. Ottawa-Carleton
District #9 (Ottawa)

W.O. 72-11083 - W.P. 13-68-02 (Bridge Site #1) SITE # 3-304A
13-68-03 (Bridge Site #2) SITE # 3-304B
13-68-08 (Bridge Site #3) SITE # 3-303

CONT 73-192

Attached we are forwarding to you our detailed
foundation investigation report on the subsoil conditions
existing at the above-mentioned site.

We believe that the factual data and recommendations
contained therein will prove adequate for your design
requirements. Should additional information be required,
please do not hesitate to contact our Office.

A. G. Stermac

AGS/ao
Attach.

A. G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

cc: E. J. Orr
B. R. Davis
A. Rutka
S. J. Markiewicz
J. E. Callaghan
B. J. Giroux
E. R. Saint
G. A. Wrong
B. A. Singh

2.2 Lewis - Rachev to Rtd
Foundations Files
Documents

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7. MISCELLANEOUS.

FOUNDATION INVESTIGATION REPORT
For
Proposed Structures (Bridges 1, 2 and 3) at the
Intersection of the Ottawa Queensway
With Eastern Parkway and Hwy. 417
Twp. of Gloucester, Reg. Mun. Ottawa-Carleton
District #9 (Ottawa)
W.O. 72-11083 - W.P. 13-68-02 (Bridge Site #1)
13-68-03 (Bridge Site #2)
13-68-08 (Bridge Site #3)

1. INTRODUCTION:

The Foundations Office was requested to carry out a subsurface investigation for the three proposed structures required for the Hwy. 417 - O.Q.W. - E.P.W. interchange complex. The request was contained in a memo from Mr. T. C. Kingsland, Regional Structural Planning Engineer, Eastern Region, dated July 5, 1972. An investigation was subsequently carried out by this Office to determine the subsoil, bedrock and groundwater conditions in this area. Later, as stated in a letter from DeLeuw, Cather & Company of Canada Ltd., dated October 6, 1972, the original alignment was changed. Due to alignment changes and the difficulty in obtaining permission to enter private property, the completion of the field investigation was delayed until November, 1972.

This report contains the factual results obtained at each of the proposed structure locations, together with recommendations pertaining to foundation design of the structures, as well as the stability and settlement considerations associated with the approach fills.

2. DESCRIPTION OF THE SITE AND GEOLOGY:

The area under investigation extends from 600 to 1,400 ft. east of Cyrville Rd. along the Ottawa Queensway, in the Township of Gloucester, Regional Municipality of Ottawa-Carleton. The terrain

is flat to gently undulating in relief between about elevations 219 and 229. The land beside the Ottawa Queensway is undeveloped, covered with grass or having a sparse tree cover.

The present physical features of the region are of varied origin and are the result of erosion and deposition by various agencies. During a long period of time, previous to Pleistocene or Glacial time, the region was above sea level.* During this time the major features of the bedrock topography were formed by processes of weathering and stream erosion. During Pleistocene time the region was invaded by one or more ice sheets advancing from the north. The pre-glacial land surface was modified by glacial erosion and by deposition, in places, by the material eroded by the ice sheets.

Near the close of Pleistocene time, when the ice sheet began to retire, the area was, in large part, below sea level so that as the ice retired or melted back, the sea entered and over-spread the Ottawa Valley to a depth, in places, of several hundred feet. In this Champlain Sea, thick deposits of sand, silt and clay were laid down. As the ice sheet retired still further, uplift took place and the land gradually emerged from the sea. This area is now commonly called "The Ottawa Valley Clay Plain."** Here, extensive sensitive clay deposits are interrupted by ridges of sand and/or bedrock. In the area under investigation one of these ridges exists. The clay is generally underlain by glacial till which in turn is followed by shale of the Collingwood formation, Ordovician Period.

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*Johnston, W.A. "Pleistocene and Recent Deposits in the Vicinity of Ottawa, with a Description of the Soils," Geological Surveys #101, Department of Mines.

**Chapman, L.J. and Putnam, D.F. "Physiography of Southern Ontario," University of Toronto Press, 1966.

3. FIELD AND LABORATORY WORK:

Sixteen sampled boreholes, fifteen of which were accompanied by a dynamic cone penetration test were put down at the structure sites during the period of the field investigation, using conventional diamond drill rigs adapted for soil sampling purposes.

Samples of the overburden were obtained by using a 2-inch O.D. split-spoon sampler, which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests. Bedrock was proven in fourteen of the boreholes by obtaining BX size rock core samples. The groundwater level conditions across the site were obtained by recording the water levels in the open boreholes during the period of investigation.

The soil, bedrock and groundwater conditions encountered at the boring locations are presented on the Record of Borehole sheets appended to this report. The locations and elevations of the boreholes were provided by personnel from the Eastern Region Engineering Surveys Section. The elevations in this report are referenced to a Geodetic datum. The boring locations and elevations are shown on Drawings No. 72-11083 A, B and C (Bridge Sites 1, 2 and 3, respectively). Stratigraphical profiles, inferred from this data, are also presented on the aforementioned drawings.

All the samples were subjected to a careful visual examination in the field, and subsequently in the laboratory. Following these examinations, laboratory testing was carried out on selected representative samples to determine the following physical properties of the overburden:

- Natural Moisture Content
- Atterberg Limits
- Grain-Size Distribution
- Organic Content

The results of this testing are plotted on the Record of Borehole sheets and summarized on Figures #1 and 2, all of which are contained in Appendix I of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

The different soil strata encountered at the site are plotted on the Record of Borehole sheets appended to this report.

The predominant stratum across the area under investigation is a loose to very dense granular deposit varying in composition from a sandy silt to sand and gravel. The thickness of this deposit ranges from 9 to 18 ft. In the eastern part of the area, this granular stratum is overlain by 1 to 2.5 feet of organic silt. In B.H. #7 which is within the limits of the Ottawa Queensway, the granular deposit was overlain by 4.5 feet of granular fill material.

Underlying the granular stratum and immediately above the shale bedrock, at certain locations in the central and western part of the area, there is a 1 to 5 feet thick deposit of granular glacial till.

From ground surface downward the soil types and bedrock encountered are as follows:

4.2) Surficial Deposits:

4.2.1) Fill Material:

A 4.5 feet thick layer of fill material, composed of silty sand with gravel and a trace of clay, used for the embankment construction of the Ottawa Queensway was encountered at B.H. #7. A standard penetration test carried out within the fill material gave an 'N' value of 15 blows/ft. Based on this, it is estimated that the fill has been subjected to a moderate degree of compaction

4.2.2) Organic Material:

At the eastern portion of the site, namely, Boreholes #1, 2 and 3, a 1 to 2.5 ft. deposit of organic silt was encountered. In situ undrained shear strength testing carried out within this organic material gave values of 480 and 720 p.s.f. Based on these values, it is estimated that the consistency of the organic deposit ranges from soft to firm.

4.2.3) Clayey Silt:

At the south-eastern portion of the site, namely at B.H.'s #6, 9, 10, 11 and 12, a 2.5 to 4.5 ft. thick deposit of clayey silt was encountered. Based on the Standard Penetration Tests carried out in the field, the consistency of this surficial deposit varies from stiff to very stiff.

4.3) Granular Deposit (Sandy Silt to Sand and Gravel):

Underlying the organic silt or the fill material or a nominal layer of topsoil (6 in. or less) there is a granular deposit which varies from sandy silt to sand and gravel. The thickness of this deposit ranges from 9 ft. to 18 ft. Occasional clayey silt seams, up to 1 inch thick, were encountered at a few of the boring locations. Boulders up to 2 ft. in size were encountered in the lower portion of this stratum at B.H. #14, 15 and 16. Grain-size Distribution tests carried out within this deposit are presented in envelope form on Fig. 1 which is appended to this report.

Standard Penetration Tests conducted in this material gave 'N' values which ranged from 6 to 81 blows/ft. Based on these values it is estimated that the relative density of the granular stratum varies from loose to very dense.

4.4) Glacial Till (Heterogeneous Mixture of Silt, Sand and Gravel, Trace of Clay):

Underlying the granular stratum of sandy silt to sand and gravel, at B.H. #5, 6, 7, 8, 11 and 13, is a glacial till deposit composed of a heterogeneous mixture of silt, sand and gravel, with a trace of clay. The thickness of the granular glacial till varies from 1 ft. at B.H. #6 to 5 ft. at B.H. #7, 8 and 13. Grain-size Distribution Curves for this deposit are plotted on Fig. 2 of the Appendix.

Standard Penetration Tests carried out within the deposit gave 'N' values which range from 29 blows/ft. to 100 blows for 4 inches. Based on these values, it is estimated that the relative

density of the glacial till ranges from compact to very dense.

4.5) Shale Bedrock:

Underlying the glacial till where it exists, or directly under the granular deposit elsewhere, is shale bedrock. The bedrock surface varies from elevations 204 to 211. Generally the bedrock appears to be in a sound state, as evidenced by the high percentage of rock core recovered. However, at B.H. #8, 10 and 14, there is a 1 to 3 ft. thick layer of weathered shale overlying the lower sound portion of the bedrock, and at B.H. #11 and 12 the bedrock is fissured.

The bedrock core samples were examined by Mr. K. Ingham, Geologist, Ministry of Transportation and Communications.

5. GROUNDWATER CONDITIONS:

The groundwater level conditions across the site were observed during the period of investigation by taking readings in the open boreholes. The results of the readings are plotted on the Record of Borehole sheets and on Drawings 72-11083 A, B and C appended to this report.

The observations indicate that the groundwater level is located between elevations 214 and 223, which corresponds to levels which range from 3 ft. to as much as 7 ft. below existing ground surface.

6. DISCUSSIONS AND RECOMMENDATIONS:

6.1) General:

The design and construction of the rural portion of Hwy. #417, south-easterly of the Village of Ramsayville, in the Township of Gloucester, Regional Municipality of Ottawa-Carleton, to the Quebec border will be completed by 1974. The Ministry and the Regional Municipality have undertaken a study to determine the most appropriate alignment for the urban portion of Hwy. #417, specifically from Ramsayville northerly to the Ottawa Queensway

located within the City of Ottawa. A preliminary Foundation Report, W.O. 70-11115, for various possible corridors of Hwy. #417, from Ramsayville northerly was submitted on March 23, 1971. The finalized alignment required interchanges at Hunt Club Rd., the Walkley Rd. extension, Innes Rd. and the Ottawa Queensway. Structures will be required at the crossings of Baseline Rd., Canadian National Railway, Cyrville Rd. and Canadian Pacific Railway. In addition, a number of creeks (Green, McEwen, Borthwick, etc.) will have to be crossed.

This discussion deals with the three proposed structures at the Hwy. 417 - Ottawa Queensway - Eastern Parkway complex, in the Township of Gloucester, Regional Municipality of Ottawa-Carleton. Discussions with regard to other structures on this portion of Hwy. #417 will be presented in separate foundation reports.

The Hwy. #417 - Ottawa Queensway - Eastern Parkway complex consists of the following components:

- 1) Hwy. #417 (W.B.L.) and E.P.W. (N.B.L.) over the O.Q.W. (E.B.L.) (Bridge #1).
- 2) E.P.W. (N.B.L.) over the O.Q.W. (W.B.L.) Bridge #2)
- 3) E.P.W. (S.B.L.) over O.Q.W. (E.B.L. & W.B.L.) and Hwy. 417 (W.B.L. & E.B.L.) (Bridge #3).

The predominant stratum across the area under investigation is a 9 to 18 feet thick loose to very dense granular deposit varying in composition from sandy silt to sand and gravel. This granular deposit is overlain by 4.5 feet of fill material, or 1 to 2.5 feet of organic silt, or 2.5 to 4.5 ft. of clayey silt. At certain locations, the granular deposit is underlain by 1 to 5 ft. of glacial till, which in turn is underlain by shale bedrock. At other locations, the granular deposit is directly underlain by shale bedrock.

The three bridges will be discussed separately in the following subsections.

- 6.2) Bridge No. 1 (Hwy. 417 W.B.L. and Eastern Parkway N.B.L. Over Ottawa Queensway E.B.L.) (Refer to Drawing No. 72-11083A):

6.2.1) Design Details:

It is proposed to construct three-span twin structures at the aforementioned location. The span lengths of the Hwy. #417 W.B.L. structure will be 110' - 130' - 80' and for the Eastern Parkway N.B.L. the spans will be 90' - 120' - 65'. The two structures will be connected by a 220 ft. long triangular deck. The width of the combined structures will be of the order of 90 feet. The proposed profile grade of Hwy. #417 W.B.L. in the vicinity of the structure will vary from elevation 241 to 246. The proposed profile grade of Eastern Parkway N.B.L. will vary from elevation 247 to 250. The profile grade of Ottawa Queensway E.B.L. will range between elevations 220 and 222. Based on these grades the maximum height of the approach fills will be of the order of 30 feet in both longitudinal and transverse directions.

6.2.2) Pier Foundations:

The proposed piers can be founded on shallow spread footings located in the granular deposit. A minimum of 4 feet of earth cover should be provided to the underside of the footing for frost protection purposes. Taking this into account the base of the pier foundations can be located as high as elevation 214, in the loose to compact silty sand to sand and gravel stratum. Footings founded at this level can be designed using an allowable bearing pressure of 2.0 t.s.f.

The base of the foundations will be 1 to 3 feet below the groundwater level, therefore, some groundwater seepage can be expected into the excavation. In addition, some boiling and loosening of the base of the foundations can be expected. These, however, could be handled using conventional techniques such as pumping from perimetric sumps maintained at a level at least 2 ft. below the footing founding level.

A total settlement of 1 to 1-1/2 inches, is anticipated to occur under the piers. This settlement will be elastic in nature and will occur during or shortly after the completion of the loading.

Consideration should also be given to two alternative foundations:

- i) Spread footings on the surface of sound bedrock,
- ii) Foundations supported on end-bearing piles driven to bedrock.

Spread footings could be carried down to bear on the surface of sound bedrock at elevations ranging from 204 to 210. In this case, footings could be designed using an allowable bearing value of up to 10.0 t.s.f. The base of the foundations would be 8 to 11 feet below the groundwater level, therefore, excessive groundwater seepage into the excavations is anticipated. A positive dewatering scheme should be employed in order to maintain reasonably dry working conditions and prevent the collapsing of the excavation slopes.

Alternatively, the foundations may be supported on end-bearing piles driven to bedrock (tip elevation 204 to 210). These piles may be designed for the maximum capacity of the pile section chosen; e.g., 12 BP 74 steel H-piles could be designed for 95 tons/pile.

6.2.3) Abutments:

The proposed abutments will be "perched" within the approach fills. The abutments may be supported on spread footings placed within the fills. The fill material, below the tops of the footings, should consist of well compacted granular 'A' material, and should extend for a horizontal distance of at least 10 feet from the footing edges in the plane of the footing tops. This portion of the fill should be constructed with side slopes no steeper than 2:1. The remainder of the fill should be completed to about profile grade for a distance of 50 feet behind the abutments before re-excavating for the abutment footings. An allowable bearing pressure of 2.5 t.s.f. may be used in design.

As an alternative, the abutments may be supported on end-bearing piles, driven to bedrock and designed for the maximum allowable capacity for the pile section chosen; e.g., 12 BP 74 steel H-piles could be designed for 95 tons/pile.

No rock or bouldery material should be placed in areas

where piles are to be driven.

6.2.4) Approach Embankments:

As mentioned before, the maximum height of approach fills will be of the order of 30 feet. The surficial deposits of organic silt will adversely affect the stability of the approach fills. It is, therefore, recommended that all the localized surficial organic material be removed in the area where fills are to be placed, prior to the construction of approach embankments. If such measures are complied with, no stability problems are anticipated with regard to the proposed approaches constructed with the standard 2:1 slopes.

The settlements induced by the surcharge loading will be elastic in nature and about 2 inches in magnitude, occurring during or shortly after the completion of the fills.

It would be advantageous to construct the approach embankments to its final grade and leave in place for as long a period as possible prior to the construction of the structure foundations.

6.2.5) Differential Settlement Considerations:

The anticipated settlements for the different foundation alternatives for Bridge #1 are as follows:

Spread Footings in Granular Deposit

| | |
|--|-------------------|
| Total settlement of the pier foundations | 1 to 1-1/2 inches |
| Differential settlements between piers and | |
| 1) Abutments on spread footings | 1/2 to 1 inch |
| 2) Abutments on end-bearing piles | 1 to 1-1/2 inches |

Spread Footing on Bedrock or End-Bearing Piles Driven to Bedrock

| | |
|--|----------|
| Total settlement of the pier foundations | Nil |
| Differential settlements between piers and | |
| 1) Abutments on spread footings | 1/2 inch |
| 2) Abutments on end-bearing piles | Nil |

These settlements will occur during or shortly after the completion of the loading.

6.3) Bridge No. 2 (Eastern Parkway N.B.L. Over Ottawa Queensway W.B.L.) (Refer to Drawing No. 72-11083B):

6.3.1) Design Details:

It is proposed to construct a 35 ft. wide three span bridge (60' - 135' - 60') at the crossing of Eastern Parkway N.B.L. and Ottawa Queensway W.B.L. The profile grade of the Ottawa Queensway W.B.L. in the vicinity of the structure is approximately at elevation 223. The profile grade elevation of Eastern Parkway N.B.L. in the same area varies between elevations 242 and 247. Based on these results it is estimated that the maximum height of approach fills will be of the order of 22 ft. in the longitudinal direction and 28 feet in the transverse direction.

6.3.2) Pier Foundations:

The two proposed piers can be founded on shallow spread footings located in the granular deposit. The base of the pier foundations can be located as high as elevation 217, with an allowable load of 2.0 t.s.f. Groundwater seepage and settlement considerations are similar to those discussed in Subsection 6.2.2) (Bridge No. 1).

Consideration should also be given to two alternative foundations:

- i) Spread footings on the surface of the glacial till stratum,
- ii) Foundation supported on end-bearing piles driven to bedrock.

Spread footings could be carried down to bear on the surface of the dense glacial till stratum at approximate elevation 210 at the east pier to elevation 213 at the west pier. In this case, footings could be designed using an allowable bearing value of 5.0 t.s.f. The base of the foundations would be 8 to 12 feet below the groundwater level, therefore, groundwater seepage is expected into the excavation. Measures should be provided to prevent softening of the foundation base by surface runoff or seepage water. A granular pad or a lean concrete slab should be placed immediately after the end of the excavation.

Alternatively, the foundations may be supported on end-bearing piles driven to bedrock (tip elevation 210). These piles may be designed for the maximum capacity of the pile section chosen; e.g., 12 BP 74 steel H-piles could be designed for 95 tons/pile.

6.3.3) Abutments:

Abutment foundation considerations are similar to those discussed in Subsection 6.2.3.

6.3.4) Approach Embankments:

As mentioned before, the height of the approach fills will be of the order of 22 feet in the longitudinal direction and 28 feet in the transverse direction. No stability problems are anticipated with regard to the proposed approaches constructed with the standard 2:1 slopes.

The settlements induced by the surcharge loading will be elastic in nature and about 2 inches in magnitude, occurring during or shortly after the completion of the fills.

6.3.5) Differential Settlement Considerations:

The anticipated settlements for the different foundation alternatives for Bridge #2 are as follows:

Spread Footings in Granular Deposit

| | |
|--|-------------------|
| Total settlement of the pier foundations | 1 to 1-1/2 inches |
| Differential settlement between piers and: | |
| 1) Abutments on spread footings | 1/2 to 1 inches |
| 2) Abutments on end-bearing piles | 1 to 1-1/2 inches |

Spread Footings on Dense Glacial Till

| | |
|--|------------|
| Total settlement of the pier foundations | Negligible |
| Differential settlement between piers and: | |
| 1) Abutments on spread footings | 1/2 inch |
| 2) Abutments on end-bearing piles | Negligible |

Foundations on End-Bearing Piles Driven to Rock

| | |
|--|-----|
| Total settlement of the pier foundations | Nil |
| Differential settlement between piers and: | |

- 1) Abutments on spread footings 1/2 inches
- 2) Abutments on end-bearing piles Nil

These settlements will occur during or shortly after the completion of the loading.

6.4) Bridge Site #3 (Eastern Parkway S.B.L. Over Ottawa Queensway E.B.L. & W.B.L. and Hwy. 417 W.B.L. & E.B.L.):

6.4.1) Design Details:

It is proposed to construct a 40 ft. wide six span (55' - 118' - 123' - 143' - 160' - 100') bridge. The profile grades of Hwy. 417 E.B.L. and O.Q.W. ramp to Hwy. 417 E.B.L. under the structure, will be at elevations 221 and 224 respectively. The profile grade of Eastern Parkway S.B.L. in the same area varies between elevations 242 and 253. These indicate that the approach fills will be of the order of 29 feet in the longitudinal direction and 32 feet in the transversal direction.

6.4.2) Pier Foundations:

The proposed piers can be founded on spread footings located in the granular deposit. A minimum of 4 feet of earth cover should be provided to the underside of the footings for frost protection purposes. Taking this into account, the base of the pier foundations can be located at the following elevations:

| | |
|---------|------------------|
| Pier #1 | At Elevation 216 |
| Pier #2 | At Elevation 221 |
| Pier #3 | At Elevation 214 |
| Pier #4 | At Elevation 219 |
| Pier #5 | At Elevation 218 |

Spread footings founded at these elevations can be designed using an allowable bearing pressure of up to 3.0 t.s.f.

In Piers #4 and #5 the base of the foundations will be above the groundwater level. In the other three piers the groundwater level will be 1 to 3 feet above the base of the foundations, and groundwater considerations are similar to those discussed in Section 6.2.2.

The footing of Pier #3 is very close to the creek flow. If the pier is to be founded at elevation 214, the creek should be diverted away from the footing; otherwise, encroaching of the granular material and subsequent undermining of the foundation could take place. If the creek is not diverted, the pier should be founded at or below elevation 211. If such is the case, a positive dewatering scheme should be provided for the foundation excavations. For example, a scheme utilizing sheet piling cofferdam driven to bedrock may be used.

A 1 inch total settlement is anticipated under the piers. This settlement will occur during or shortly after the completion of the loading.

Consideration should also be given to two alternative foundations:

- i) Spread footings on the surface of sound bedrock,
- ii) Foundations supported on end-bearing piles driven to bedrock.

Spread footings could be carried down to bear on the surface of sound bedrock at elevations ranging from 207 to 208. In this case, footings could be designed using an allowable bearing value of 10.0 t.s.f. The base of the foundations would be 8 to 11 feet below the groundwater level, therefore, excessive groundwater seepage into the excavations is anticipated. A positive dewatering scheme should be required in order to maintain reasonably dry working conditions and prevent the collapsing of the excavation slopes.

Alternatively, the foundations may be supported on end-bearing piles driven to bedrock (tip elevation 207 to 211). These piles may be designed for the maximum capacity of the pile section chosen; e.g., 12 BP 74 steel H-piles could be designed for 95 tons/pile.

6.4.3) Abutments:

Abutment foundation considerations are similar to those discussed in Subsection 6.2.3.

6.4.4) Approach Embankment:

As mentioned before, the maximum height of the approach fills will be of the order of 32 feet. No stability problems are

anticipated with regard to the proposed approaches constructed with the standard 2:1 slopes.

The settlements induced by the surcharge loading will be elastic in nature and about 2 inches in magnitude, occurring during or shortly after the completion of the fills.

6.4.5) Differential Settlement Considerations:

The anticipated settlements for the different foundation alternatives for Bridge #3 are as follows:

Bridge #3, Spread Footings in Granular Deposit

| | |
|---|----------|
| Total settlement of the pier foundations | 1 inch |
| Differential Settlements between piers and: | |
| 1) Abutments on spread footings | 1/2 inch |
| 2) Abutments on end-bearing piles | 1 inch |

Bridge #3, Solid Bedrock or End-Bearing Piles Driven to Bedrock

| | |
|--|----------|
| Total settlement of the pier foundations | Nil |
| Differential settlements: | |
| 1) Abutments on spread footings | 1/2 inch |
| 2) Abutments on end-bearing piles | Nil |

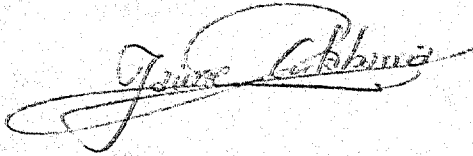
These settlements will occur during or shortly after the completion of the loading.

7. MISCELLANEOUS:

The field work, performed during the period of July 26, 1972, to August 3, 1972, was carried out under the supervision of Mr. S. A. Ahmad, Project Foundations Engineer. The field work performed during the period of October 25, 1972 to October 30, 1972 was carried out by Mr. J. Cortabarría, Student Technician, who also prepared this report.

In the period of July 26, 1972, to August 3, 1972, equipment was owned and operated by Johnston Drilling Co. Ltd., Ottawa, Ontario. In the period of October 25, 1972 to October 30, 1972, equipment was owned and operated by Master Soil Investigation Ltd., Toronto, Ontario.

The entire project was under the general supervision of Mr. M. Devata, Supervising Foundations Engineer, who also reviewed this report.

A handwritten signature in cursive script, appearing to read "J. Cortabarría", with a long horizontal flourish extending to the right.

J. Cortabarría

A handwritten signature in cursive script, appearing to read "M. Devata", with a large, stylized initial "M".

M. Devata, P. Eng.

JC/ao

Dec. 5, 1972.

APPENDIX

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 1

FOUNDATIONS OFFICE

JOB 72-11063

LOCATION Co-ords. 16,508,046 N; 1,226,328 E.

W.P. 13-68-02

BORING DATE Aug. 1, 1972

ORIGINATED BY SAA

COMPILED BY EGB

DATUM Geodetic

BOREHOLE TYPE Flight Auger, BXL Rock Core; Cone Test

CHECKED BY S.

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 | LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P W W_L | BULK DENSITY γ P.C.F. GR. SA. SI. CL. | REMARKS |
|--------------|--|-------------|---------|------|--------------|-------------|---|---|--|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLAT | NUMBER | TYPE | BLOWS / FOOT | | | | | |
| 219.1 | Ground Level | | | | | | | | | |
| 216.6 | Organic Silt Black Soft to Firm | | | | | | | | | |
| 215.5 | Sand and gravel, trace of fines Grey | | 1 | SS | 12 | | | | | |
| | | | 2 | SS | 45 | | | | | |
| 207.6 | Compact to Dense | | 3 | SS | 22 | | | | | |
| 11.5 | Sound | | | | | | | | | |
| 202.6 | Shale Bedrock Grey | | 4 | RC | 100% | | | | | |
| 16.5 | End of Borehole | | | | | | | | | |

20
15 5 % STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 2

JOB 72-11083

LOCATION Co-ords. 16,507,973 N; 1,226,210 E.

W.P. 13-68-02

BORING DATE August 2, 1972

ORIGINATED BY SAA

COMPILED BY ECB

DATUM Geodetic

BOREHOLE TYPE Washboring, BIL Rock Core and Cone Test

CHECKED BY JP

| SOIL PROFILE | | STRAT. PLT | SAMPLES | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 | LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P — W — W_L WATER CONTENT % 20 40 60 | BULK DENSITY γ P.C.F. GR SA. SI. CL | REMARKS |
|---------------|-----------------------------------|------------|---------|------|-------------|---|--|--|-----------------------|
| ELEV. / DEPTH | DESCRIPTION | | NUMBER | TYPE | | | | | |
| 219.7 | Ground Level | | | | | | | | |
| 218.5 | Organic Silt | | | | | | | | |
| 1.2 | Sand and gravel, trace of clay | | 1 | SS | 10 | | | | 1.5 1.5 (10) 215.0 |
| | | | 2 | SS | 15 | | | | |
| | | | 3 | SS | 14 | | | | |
| 205.7 | Compact to Dense | | 4 | SS | 1.2 | | | | |
| 14.0 | Sound | | | | | | | | |
| 200.0 | Shale Bedrock | | 5 | RC | 1005 | | | | |
| 19.7 | End of Borehole | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

ORIGINATED BY SAA

COMPILED BY ECB

CHECKED BY CA.

15 ϕ 5 % STRAIN AT FAILURE

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 4

JOB 72-11033

LOCATION Co-ords. 16,503,058 N; 1,226,037 E.

ORIGINATED BY SAA

W.P. 13-68-02

BORING DATE July 31, 1972

COMPILED BY ECB

DATUM Geodetic

BOREHOLE TYPE Washboring, BX Rock Core; Cone Test

CHECKED BY [Signature]

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 | LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W | BULK DENSITY P.C.F. | REMARKS |
|--------------|--|-------------|---------|------|------------|-------------|---|--|------------------------|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | | | | |
| 220.5 | Ground Level | | | | | | | | | |
| 219.7 | Topsoil | | | | | | | | | |
| 0.7 | Silty sand to sand, traces of gravel and clay. | | 1 | SS | 7 | | | | | |
| | | | 2 | SS | 6 | | | | | |
| | | | 3 | SS | 20 | | | | | |
| | Loose to Very Dense | | 4 | SS | 18 | | | | | |
| 204.0 | | | 5 | SS | 78 | | | | | |
| 17.2 | Weathered | | 6 | SA | 90% | | | | | |
| 17.0 | Sound | | | | | | | | | |
| | Shale Bedrock | | 7 | BX | 100% | | | | | |
| 197.6 | Grey | | 8 | BX | 100% | | | | | |
| 22.9 | End of Borehole | | | | | | | | | |

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 5

JOB 72-1108? LOCATION Co-ords. 16,507,995 N; 1,225,889 E.
 W.P. 13-68-0? BORING DATE July 28, 1972
 DATUM Geodetic BOREHOLE TYPE Washboring, BX Rock Core and Cone Test

ORIGINATED BY SAA
 COMPILED BY ECB
 CHECKED BY [Signature]

| SOIL PROFILE | | | SAMPLES | | | DYNAMIC PENETRATION RESISTANCE | | LIQUID LIMIT w_L | | BULK DENSITY | REMARKS |
|--------------|--|-------------|---------|------|------------|---------------------------------|---------------------|--------------------|--|--------------|------------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | BLOWS / FOOT 20 40 60 80 100 | PLASTIC LIMIT w_p | WATER CONTENT w | | | |
| 222.6 | Ground Level | | | | | | | | | | |
| 0.0 | Sand, some gravel, occasional clayey silt seams. | | 1 | SS | 19 | | | | | | 4 88 (8) |
| 213.6 | Compact Grey Glac. Till. V. Dense | | 2 | SS | 27 | | | | | | 215.3 |
| 9.0 | | | 3 | SS | 100.5 | | | | | | 37 43 14 6 |
| 209.3 | Bouldery Zone | | 4 | BK | 25% | | | | | | |
| 13.3 | Fractured | | 5 | BK | 33% | | | | | | |
| 203.1 | Shale Bedrock | | 6 | BK | 70% | | | | | | |
| 19.5 | Sound | | 7 | BK | 95% | | | | | | |
| 19.5 | End of Borehole | | | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE No 6

FOUNDATIONS OFFICE

JOB 72-11083

LOCATION Co-ords. 16,508,115 N; 1,225,651 E.

ORIGINATED BY SAA

W.P. 13-68-03

BORING DATE July 27/72

COMPILED BY ECB

DATUM Geodetic

BOREHOLE TYPE Washboring, BX Rock Core; Cone Test

CHECKED BY

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 | LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W W _P — W — W _L | BULK DENSITY γ | REMARKS |
|--------------|-------------------------|-------------|---------|------|------------|-------------|---|---|-------------------|------------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | | | | |
| 225.1 | Ground Level | | | | | | | | | |
| 0.0 | Clayey silt, some sand | | 1 | SS | 12 | | | | | 0 11 66 23 |
| 220.6 | Stiff | | 2 | SS | 70 | | | | | 218.1 |
| 4.5 | Silty sand with gravel. | | 3 | SS | 22 | | | | | July 27/72 |
| | Compact to Very Dense | | 4 | SS | 33 | | | | | (8 89 (3)) |
| 210.1 | Glac. Till. V Dense | | 5 | SS | 100% | | | | | 18 52 25 5 |
| 15.0 | Shale Bedrock | | 6 | BX | 30% | | | | | |
| 16.0 | Weathered Sound | | 7 | BX | 70% | | | | | |
| 199.0 | Grey | | 8 | BX | 100% | | | | | |
| 26.1 | End of Borehole | | | | | | | | | |

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 7

JOB 72-11083

LOCATION Co-ords. 16,508,195 N; 1,226,535 E.

ORIGINATED BY SAA

W.P. 13-68-03

BORING DATE July 27, 1972

COMPILED BY ECB

DATUM Geodetic

BOREHOLE TYPE Washboring, BXL Rock Core; Cone Test

CHECKED BY *ECB*

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE | | | LIQUID LIMIT w_L | | | BULK DENSITY | REMARKS | | |
|--------------|-------------|-------------|---------|------|------------|-------------|--------------------------------|----|----|---------------------|-----|-------------------|--------------|---------|--|--|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | BLOWS / FOOT | | | PLASTIC LIMIT w_p | | | | | | |
| | | | | | | | 20 | 40 | 60 | 80 | 100 | WATER CONTENT w | | | | |
| | | | | | | | SHEAR STRENGTH P.S.F. | | | w_p w w_L | | | | | | |
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OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 8

JOB 72-11083

LOCATION Co-ords. 16,508,201 N; 1,225,420 E.

ORIGINATED BY SA

W.P. 13-58-03

BORING DATE July 26, 1972

COMPILED BY AT

DATUM Geodetic

BOREHOLE TYPE Washboring, BXL Rock Core; Cone

CHECKED BY

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE | | | | | LIQUID LIMIT — WL | | | BULK DENSITY | REMARKS |
|--------------|---|-------------|---------|------|--------------|-------------|--------------------------------|----|----|----|----|-------------------|--------------------|-------------------|--------------|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS / FOOT | | BLOWS / FOOT | 20 | 40 | 60 | 80 | 100 | PLASTIC LIMIT — WP | WATER CONTENT — W | | |
| 222.8 | Ground Level | | | | | | | | | | | | | | | |
| 0.0 | Silty sand, some gravel, Loose to Compact Gray | | 1 | SS | 14 | | | | | | | | | | | |
| 213.8 | | | 2 | SS | 9 | | | | | | | | | | | |
| 9.0 | Het. mix. of silt, sand & gravel. (Glacial Till). Compact to Very Dense | | 3 | SS | 29 | | | | | | | | | | | |
| 208.6 | | | 4 | SS | 100 | | | | | | | | | | | |
| 14.2 | Weathered | | 5 | BXL | 0% | | | | | | | | | | | |
| | | | 6 | BXL | 15% | | | | | | | | | | | |
| | Shale Bedrock | | | RC | | | | | | | | | | | | |
| 200.2 | Sound | | 7 | BXL | 90% | | | | | | | | | | | |
| 22.6 | End of Borehole | | | | | | | | | | | | | | | |

RECORD OF BOREHOLE No 9

JOB 72-11083

LOCATION Co-ord. 16,507,706 N; 1,225,729 E.

ORIGINATED BY JC

W.P. 13-68-08

BORING DATE Oct. 30, 1972

COMPILED BY JC,

DATUM Geodetic

BOREHOLE TYPE Flight auger and Cone Test

CHECKED BY CE

| SOIL PROFILE | | | SAMPLES | | | DYNAMIC PENETRATION RESISTANCE | | | LIQUID LIMIT — w_L | | | BULK DENSITY γ P.C.F. | REMARK | | |
|--------------|-------------------------------------|-------------|---------|------|------------|--------------------------------|----------------------------------|----|----------------------|-------------------------------------|-----|------------------------------------|--------|-----------------|---------------------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | ELEV. SCALE | BLOWS / FOOT | | | PLASTIC LIMIT — w_p | | | | WATER CONTENT % | |
| | | | | | | | 20 | 40 | 60 | 80 | 100 | | | | WATER CONTENT — w |
| | | | | | | | SHEAR STRENGTH: P.S.F. | | | WATER CONTENT % | | | | | |
| | | | | | | | ○ UNCONFINED + FIELD VANE | | | W _p — W — W _L | | | | | |
| | | | | | | | ● QUICK TRIAXIAL x LAB VANE | | | | | | | | |
| 223.6 | Ground Level | | | | | | | | | | | | | | |
| 0.0 | Clayey silt and sand. | | 1 | SS | 22 | | | | | | | | | | |
| 220.1 | Very Stiff | | 2 | SS | 81 | | | | | | | | | | |
| 3.5 | Sand and Gravel | | 3 | SS | 26 | | | | | | | | | | |
| | | 4 | SS | 28 | | | | | | | | | | | |
| | | 5 | SS | 22 | | | | | | | | | | | |
| 205.6 | Compact | | | | | | | | | | | | | | |
| 18.0 | End of Borehole Probably Bedrock | | | | | | | | | | | | | | |

20
15 5 % STRAIN AT FAILURE
10

OFFICE REPORT • SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 10

JOB 72-11083

LOCATION Co-ords. 16,507,739 N; 1,225,639 E.

ORIGINATED BY JC

W.P. 13-68-C8

BORING DATE Oct. 27, 1972

COMPILED BY JC

DATUM Geodetic

BOREHOLE TYPE Flight Auger, BXL Rock Core; Cone Test

 CHECKED BY *JP*

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT | | | | | LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w | | | BULK DENSITY γ | REMARKS |
|--------------|---------------------------------|-------------|---------|--------|------------|-------------|--|----|----|----|-----|--|-----|-------|--------------------------|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | 20 | 40 | 60 | 80 | 100 | w_p | w | w_L | | |
| 223.2 | Ground Level | | | | | | | | | | | | | | | |
| 0.0 | Clayey silt with sand | | 1 | SS | 17 | 220 | | | | | | 10-1 | | | | |
| 219.7 | Very Stiff | | 2 | SS | 31 | | | | | | | | | | | |
| 3.5 | Sand and gravel, trace of silt. | | 3 | SS | 17 | | | | | | | | | | | |
| | | | 4 | SS | 30 | | | | | | | | | | | |
| 208.7 | Compact to Dense | | 5 | SS | 25 | 210 | | | | | | | | | | |
| 19.2 | weathered | | 6 | SS | 100 | 7" | | | | | | | | | | |
| 16.5 | Shale Bedrock | | 7 | RC BXL | 90% | 200 | | | | | | | | | | |
| 199.2 | Sound | | | | | | | | | | | | | | | |
| 24.0 | End of Borehole | | | | | | | | | | | | | | | |
| | | | | | | 190 | | | | | | | | | | |

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 11

JOB 72-11083

LOCATION Co-ords. 16,507,799 N; 1,225,502 E.

ORIGINATED BY JC

W.P. 13-68-08

BORING DATE Oct. 26, 1972

COMPILED BY JC

DATUM Geodetic

BOREHOLE TYPE Flight Auger and BXL Rock Core

CHECKED BY [Signature]

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT | | | | LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W | | | BULK DENSITY γ | REMARKS | |
|--------------|---|-------------|---------|------|------------|-------------|---|--|--|--|--|--|--|--------------------------|---------|--|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE | | | | WATER CONTENT % W_P W W_L | | | | | |
| 223.3 | Ground Level | | | | | | | | | | | | | | | |
| 0.0 | Clayey silt. | | 1 | SS | 18 | 220 | | | | | | | | | | |
| 220.3 | Very Stiff | | 2 | SS | 24 | | | | | | | | | | | |
| 3.0 | Sand and gravel. | | 3 | SS | 24 | | | | | | | | | | | |
| | | | 4 | SS | 28 | 210 | | | | | | | | | | |
| 210.3 | Compact | | 5 | SS | 100 | | | | | | | | | | | |
| 13.0 | Het. mix. of sand, gravel, silt, tr. of clay (Gla.) | | 6 | BXL | 100 | | | | | | | | | | | |
| 206.8 | Till Very Dense | | 7 | BXL | 100 | | | | | | | | | | | |
| 16.5 | Shale Bedrock Numerous fissures throughout. | | | | | | | | | | | | | | | |
| 200.8 | Sound | | | | | | | | | | | | | | | |
| 22.5 | End of Borehole | | | | | 200 | | | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 12

JOB 72-11083

LOCATION Co-ords. 16,507,844 N; 1,225,420 E.

ORIGINATED BY JC

W.P. 13-68-08



BORING DATE Oct. 25, 1972

COMPILED BY JC

DATUM Geodetic

BOREHOLE TYPE Flight Auger, BXL Rock Core and Cone Test

CHECKED BY 

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE | | | | | LIQUID LIMIT ——— w_L | | | BULK DENSITY γ | REMARKS |
|--------------|-------------------------------------|-------------|---------|------|------------|---|---|--|--|--|-----------------|-------------------------|--|------------------------|--------------------------|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | BLOWS / FOOT 20 40 60 80 100 | | | | | PLASTIC LIMIT ——— w_p | | | | |
| | | | | | | SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE | | | | | WATER CONTENT % | | | P.C.F. GR. SA. SI. CL. | | |
| 223.5 | Ground Level | | | | | | | | | | | | | | | |
| 221.0 | Clayey silt. Stiff | | 1 | SS | 13 | 220 |  | | | | | | | | | |
| 2.5 | Sand and Gravel | | 2 | SS | 19 | | | | | | | | | | | |
| | | 3 | SS | 8 | | | | | | | | | | | | |
| | Loose to Very Dense | | | | | | | | | | | | | | | |
| 208.2 | Fragments of shale | | 4 | SS | 20 | 210 |  | | | | | | | | | |
| | | | 5 | SS | 69 | | | | | | | | | | | |
| 15.3 | Shale Bedrock | | | RC | | | | | | | | | | | | |
| 203.2 | Numerous fissures throughout. Sound | | 6 | BXL | 95 | | | | | | | | | | 30 56 13 1 | |
| 20.3 | End of Borehole | | | | | 200 | | | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 13

JOB 72-11083

LOCATION Co-brds. 16,507,862 N; 1,225,347 E.

ORIGINATED BY SA

W.P. 13-68-08

BORING DATE July 28, 1972

COMPILED BY AT

DATUM Geodetic

BOREHOLE TYPE Washboring, BXL Rock Core; Cone Test

CHECKED BY

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 | LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W W _P — W — W _L | BULK DENSITY | REMARKS |
|--------------|--|-------------|---------|--------|------------|-------------|---|---|--------------|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | | | | |
| 219.8 | Ground Level | | | | | | | | | |
| 0.0 | Sand and Gravel | | | | | | | | | |
| | Trace of fines. | | 1 | SS | 14 | | | | | |
| | Compact to Dense | | 2 | SS | 30 | | | | | |
| 210.8 | | | | | | | | | | |
| 9.0 | Het. mix. of silt, sand & gravel. (Glacial Till) | | 3 | SS | 72 | | | | | |
| 205.7 | Grey. Very Dense | | 4 | SS | 57 | | | | | |
| 14.1 | Shale Bedrock | | | | | | | | | |
| 200.2 | Sound Grey | | 5 | RC BXL | 100% | | | | | |
| 19.6 | End of Borehole | | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 14

JOB 72-11083 LOCATION Co-ords. 16,507,967 N; 1,225,300 E. ORIGINATED BY SA
 W.P. 13-68-08 BORING DATE Aug. 1, 1972 COMPILED BY AT
 DATUM Geodetic. BOREHOLE TYPE Washboring, BX Rock Core; Cone Test CHECKED BY 9

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT | | | | | LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w | | | BULK DENSITY γ | REMARKS |
|--------------|---|-------------|---------|-------|------|-------------|--|----|----|----|-----|--|-----|-------|--------------------------|-------------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NO. | TYPE | FOOT | | 20 | 40 | 60 | 80 | 100 | w_p | w | w_L | | |
| 229.3 | Ground Level | | | | | | | | | | | | | | | |
| 0.0 | Silty sand, some gravel (occ. clayey silt seams). | | 1 | SS | 41 | | | | | | | | | | | 16 58 20 6 |
| | | | 2 | SS | 21 | | | | | | | | | | | 222.7 |
| | Compact to Dense Sand and gravel (boulders up to 18" in size) | | 3 | SS | 100 | 5" | | | | | | | | | | 18 45 27 10 |
| | | | 4 | RC | 55 | | | | | | | | | | | |
| | | | 5 | SS | 13 | | | | | | | | | | | |
| | | | 6 | RC | 55 | | | | | | | | | | | |
| | Compact to Very Dense | | 7 | RC | 28 | | | | | | | | | | | 51 45 (4) |
| 211.1 | | | 8 | SS | 28 | | | | | | | | | | | |
| 18.2 | Weathered | | 9 | RC | 40 | | | | | | | | | | | |
| | | | 10 | RC | 50 | | | | | | | | | | | |
| 203.1 | Shale Bedrock Sound Grey | | 11 | EX RC | 90 | | | | | | | | | | | |
| 26.2 | End of Borehole | | | | | | | | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 15

JOB 72-11083

LOCATION Co-ords. 36,508,018 N; 1,225,141 E.

ORIGINATED BY SAA

W.P. 13-68-08

BORING DATE July 26, 1972

COMPILED BY SAA

DATUM Geodetic

BOREHOLE TYPE Washboring, BX Rock Core and Cone Test

CHECKED BY 

| SOIL PROFILE | | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT | | | | LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w | | | BULK DENSITY γ P.C.F. | REMARKS |
|--------------|---|-------------|---------|------|------------|-------------|--|----|----|----|--|-------|-----|------------------------------------|-------------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | BLOWS/FOOT | | 20 | 40 | 60 | 80 | 100 | w_p | w | w_L | |
| 223.7 | Ground Surface | | | | | | | | | | | | | | |
| 0.0 | Silty sand with some clay. Very Dense | | 1 | SS | 55 | 220 | | | | | | | | | 1 40 39 20 |
| | Sand & gravel, trace of fines | | 2 | SS | 64 | | | | | | | | | | 217.5 |
| | occ. boulders up to 9" in size below El. 218.5) | | 3 | RC | 30% | | | | | | | | | | 61 37 (2) |
| | | | 3A | SS | 22 | | | | | | | | | | |
| | | | 4 | SS | 22 | | | | | | | | | | |
| | | | 5 | SS | 37 | 210 | | | | | | | | | 63 34 (3) |
| 207.3 | Compact to Very Dense | | 6 | SS | 100% | | | | | | | | | | |
| 16.0 | Weathered | | 7 | RC | 25% | | | | | | | | | | |
| 17.5 | Shale Bedrock | | | RC | | | | | | | | | | | |
| 200.7 | Sound | | 8 | BX | 100% | | | | | | | | | | |
| 23.0 | End of Borehole | | | | | 200 | | | | | | | | | |

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 10

JOB 72-11083

LOCATION Co-ord. 16,508,078 N; 1,225,112 E.

ORIGINATED BY JC

W.P. 13-68-08

BORING DATE Oct. 30, 1972

COMPILED BY JC

DATUM Geodetic

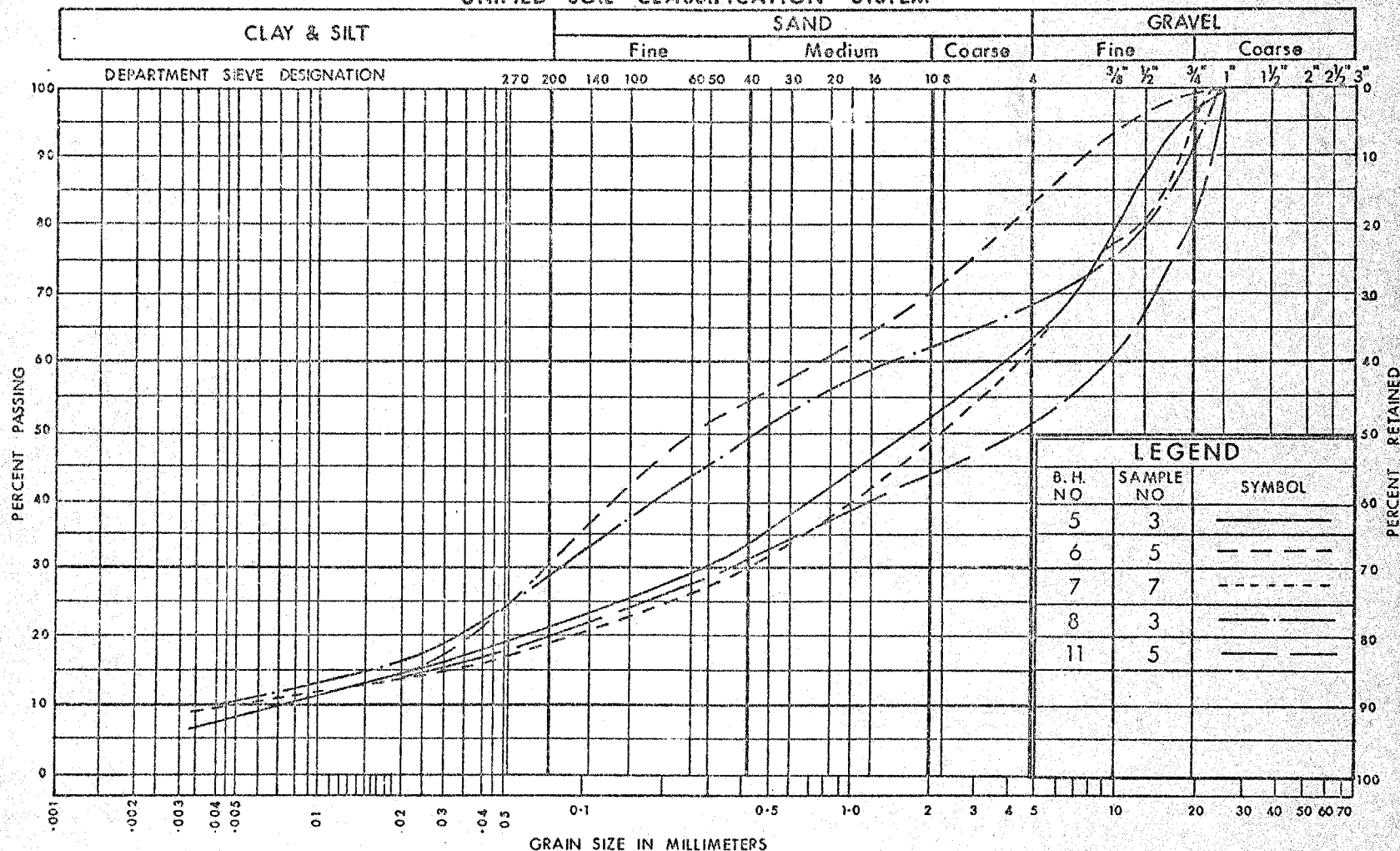
BOREHOLE TYPE Flight Auger, Washboring and Cone Test

CHECKED BY *JS*

| SOIL PROFILE | | SAMPLES | | | ELEV. SCALE | DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 | LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P — W — W_L WATER CONTENT % | BULK DENSITY γ P.C.F. GR. SA. SI. CL. | REMARKS |
|--------------|--|-------------|--------|------|-------------|---|--|--|---------|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | | | | | |
| 222.1 | Ground Level | | | | | | | | |
| 0.0 | Silty sand. Compact | | 1 | SS | 30 | | | | |
| 219.1 | | | 2 | SS | 73 | | | | |
| 3.0 | Sand and gravel. | | 3 | SS | 72 | | | | |
| | Very Dense | | 4 | SS | 36 | | | | |
| | Bouldery Zone (boulders up to 2h in size). | | | | | | | | |
| 206.9 | Dense to Very Dense | | 5 | SS | 100 | | | | |
| 15.2 | End of Borehole Probably Bedrock | | | | | | | | |



UNIFIED SOIL CLASSIFICATION SYSTEM



ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

| <u>CONSISTENCY</u> | <u>'N' BLOWS / FT.</u> | <u>c LB. / SQ. FT.</u> | <u>DENSENESS</u> | <u>'N' BLOWS / FT.</u> |
|--------------------|------------------------|------------------------|------------------|------------------------|
| VERY SOFT | 0 - 2 | 0 - 250 | VERY LOOSE | 0 - 4 |
| SOFT | 2 - 4 | 250 - 500 | LOOSE | 4 - 10 |
| FIRM | 4 - 8 | 500 - 1000 | COMPACT | 10 - 30 |
| STIFF | 8 - 15 | 1000 - 2000 | DENSE | 30 - 50 |
| VERY STIFF | 15 - 30 | 2000 - 4000 | VERY DENSE | > 50 |
| HARD | > 30 | > 4000 | | |

TYPE OF SAMPLE

| | | | |
|------|-----------------------|-------------------------------|-------------------|
| S.S. | SPLIT SPOON | T.W. | THINWALL OPEN |
| W.S. | WASHED SAMPLE | T.P. | THINWALL PISTON |
| S.B. | SCRAPER BUCKET SAMPLE | O.S. | OESTERBERG SAMPLE |
| A.S. | AUGER SAMPLE | F.S. | FOIL SAMPLE |
| C.S. | CHUNK SAMPLE | R.C. | ROCK CORE |
| S.T. | SLOTTED TUBE SAMPLE | | |
| | P.H. | SAMPLE ADVANCED HYDRAULICALLY | |
| | P.M. | SAMPLE ADVANCED MANUALLY | |

SOIL TESTS

| | | | |
|-----|---------------------------------|------|-----------------|
| Qu | UNCONFINED COMPRESSION | L.V. | LABORATORY VANE |
| Q | UNDRAINED TRIAXIAL | F.V. | FIELD VANE |
| Qcu | CONSOLIDATED UNDRAINED TRIAXIAL | C | CONSOLIDATION |
| Qd | DRAINED TRIAXIAL | S | SENSITIVITY |

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

| | |
|------------|--|
| γ | UNIT WEIGHT OF SOIL (BULK DENSITY) |
| γ_s | UNIT WEIGHT OF SOLID PARTICLES |
| γ_w | UNIT WEIGHT OF WATER |
| γ_d | UNIT DRY WEIGHT OF SOIL (DRY DENSITY) |
| γ' | UNIT WEIGHT OF SUBMERGED SOIL |
| G | SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$ |
| e | VOID RATIO |
| n | POROSITY |
| w | WATER CONTENT |
| S_r | DEGREE OF SATURATION |
| w_L | LIQUID LIMIT |
| w_p | PLASTIC LIMIT |
| I_p | PLASTICITY INDEX |
| s | SHRINKAGE LIMIT |
| I_L | LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$ |
| I_C | CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$ |
| e_{max} | VOID RATIO IN LOOSEST STATE |
| e_{min} | VOID RATIO IN DENSEST STATE |
| I_D | DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$ |
| | RELATIVE DENSITY D_r IS ALSO USED |
| h | HYDRAULIC HEAD OR POTENTIAL |
| q | RATE OF DISCHARGE |
| v | VELOCITY OF FLOW |
| i | HYDRAULIC GRADIENT |
| k | COEFFICIENT OF PERMEABILITY |
| j | SEEPAGE FORCE PER UNIT VOLUME |
| m_v | COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$ |
| c_v | COEFFICIENT OF CONSOLIDATION |
| C_c | COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$ |
| T_v | TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH) |
| U | DEGREE OF CONSOLIDATION |
| τ_f | SHEAR STRENGTH |
| c' | EFFECTIVE COHESION |
| ϕ' | EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION |
| c_u | APPARENT COHESION |
| ϕ_u | APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION |
| μ | COEFFICIENT OF FRICTION |
| S_t | SENSITIVITY |

GENERAL

| | |
|---------------------------|-----------------------------------|
| π | = 3.1416 |
| e | BASE OF NATURAL LOGARITHMS 2.7183 |
| $\log_e a$ OR $\ln a$ | NATURAL LOGARITHM OF a |
| $\log_{10} a$ OR $\log a$ | LOGARITHM OF a TO BASE 10 |
| t | TIME |
| g | ACCELERATION DUE TO GRAVITY |
| V | VOLUME |
| W | WEIGHT |
| M | MOMENT |
| F | FACTOR OF SAFETY |

STRESS AND STRAIN

| | |
|------------|--|
| u | PORE PRESSURE |
| σ | NORMAL STRESS |
| σ' | NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED) |
| τ | SHEAR STRESS |
| ϵ | LINEAR STRAIN |
| γ | SHEAR STRAIN |
| ν | POISSON'S RATIO (μ IS ALSO USED) |
| E | MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS) |
| G | MODULUS OF SHEAR DEFORMATION |
| K | MODULUS OF COMPRESSIBILITY |
| η | COEFFICIENT OF VISCOSITY |

EARTH PRESSURE

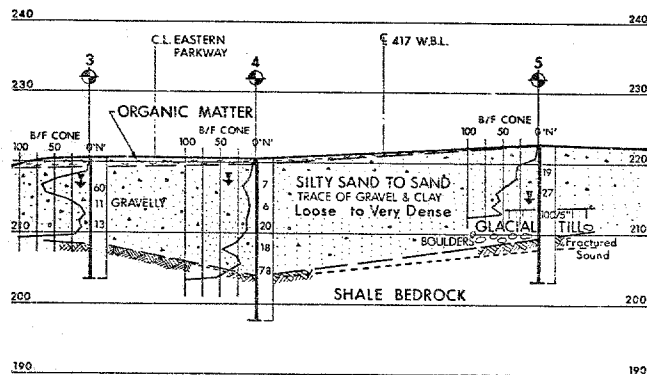
| | |
|----------|---|
| d | DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE |
| δ | ANGLE OF WALL FRICTION |
| K | DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS |
| K_0 | COEFFICIENT OF EARTH PRESSURE AT REST |

FOUNDATIONS

| | |
|-------|--|
| B | BREADTH OF FOUNDATION |
| L | LENGTH OF FOUNDATION |
| D | DEPTH OF FOUNDATION BENEATH GROUND |
| N | DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY |
| k_s | MODULUS OF SUBGRADE REACTION |

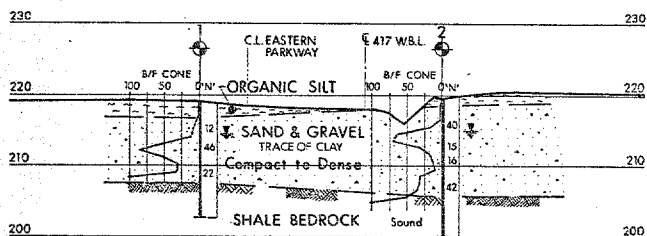
SLOPES

| | |
|---------|--|
| H | VERTICAL HEIGHT OF SLOPE |
| D | DEPTH BELOW TOE OF SLOPE TO HARD STRATUM |
| β | ANGLE OF SLOPE TO HORIZONTAL |



SECTION A-A

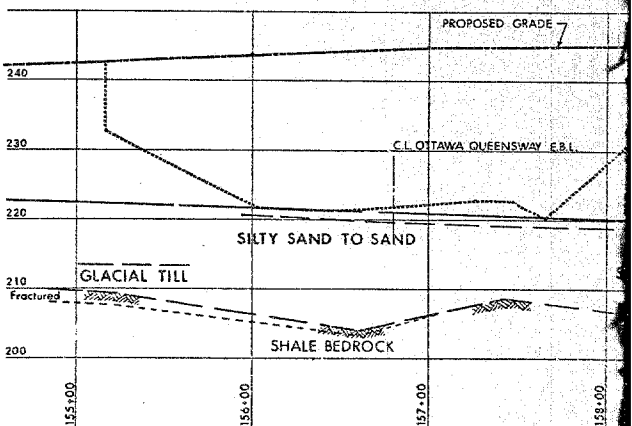
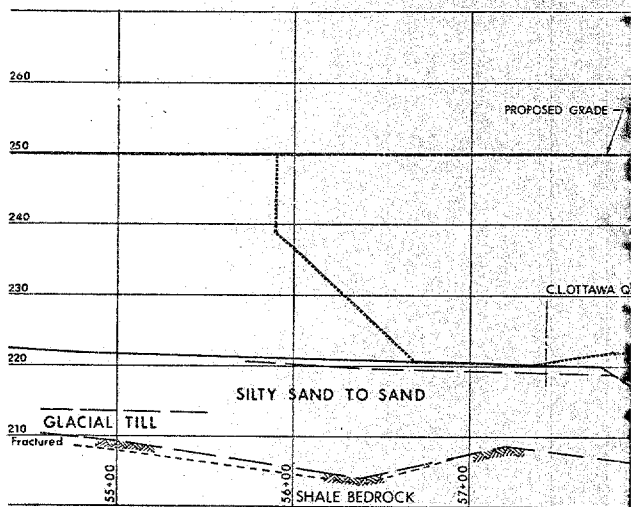
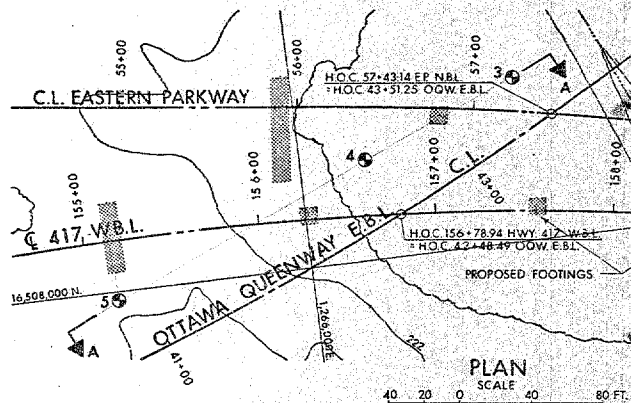
HORIZ. 40 20 0 SCALE 80 FT.
VERT. 10 5 0 10 20 FT.



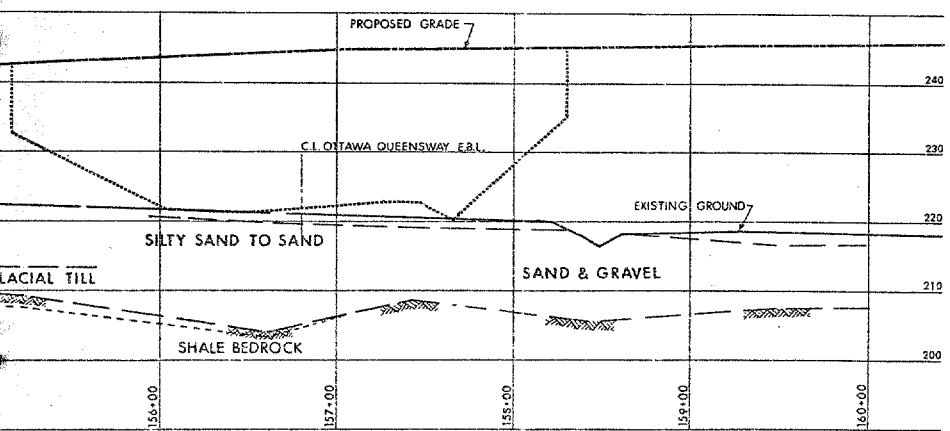
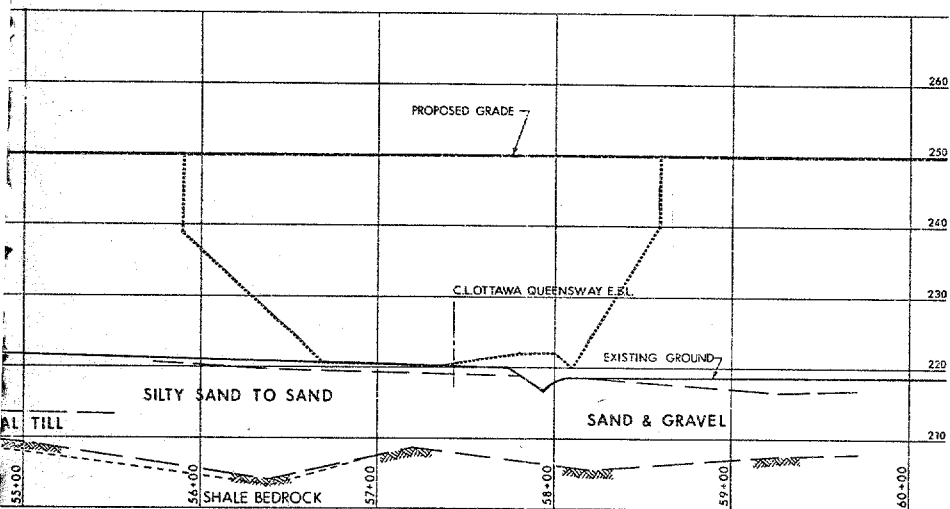
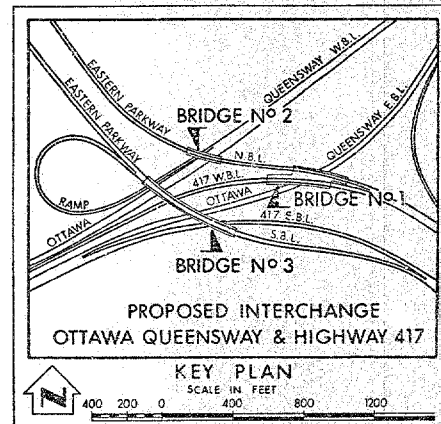
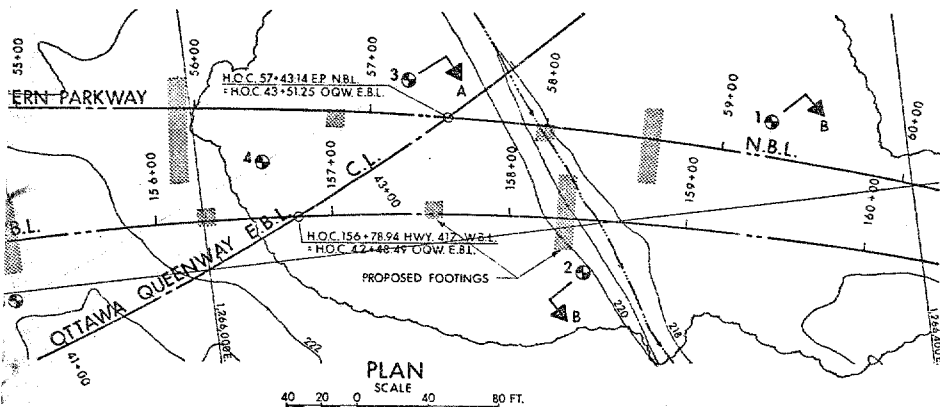
SECTION B-B

HORIZ. 40 20 0 SCALE 80 FT.
VERT. 10 5 0 10 20 FT.

SCALE FOR PROFILES
HORIZ. 40 20 0 SCALE 80 FT.
VERT. 10 5 0 10 20 FT.



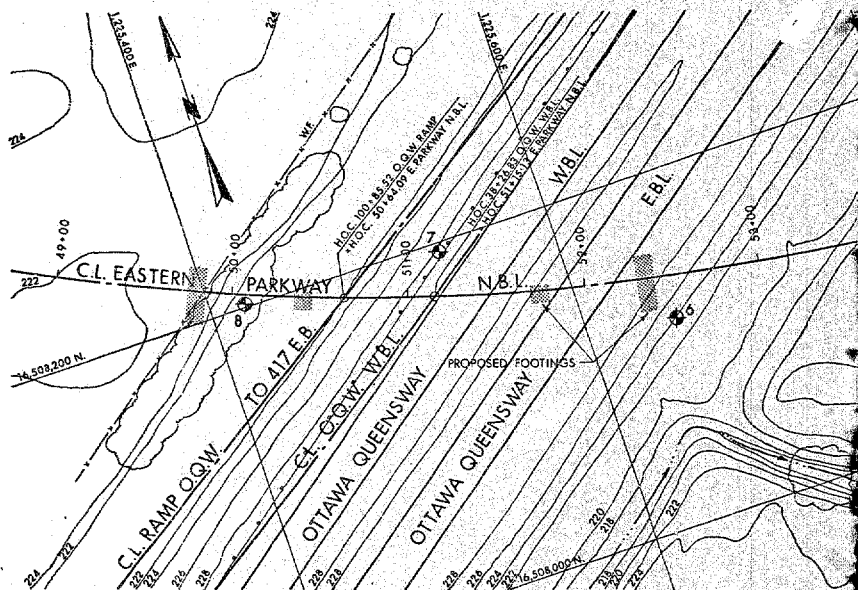
PROFILE C.L. OTTAWA QUEENSWAY E.B.L.



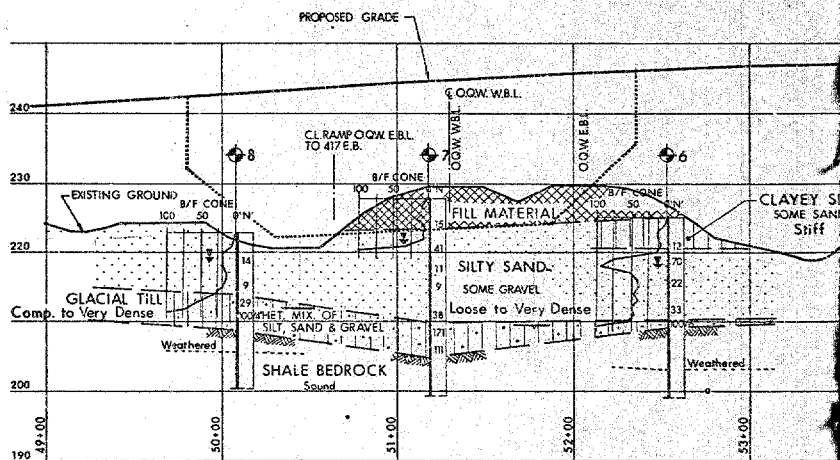
| LEGEND | | | | |
|--------|--|--------------|-----------|--|
| | Bore Hole | | | |
| | Cone Penetration Test | | | |
| | Bore Hole & Cone Test | | | |
| | Water Levels established at time of field investigation, July & August 1972. | | | |
| NO. | ELEVATION | CO-ORDINATES | | |
| | | NORTH | EAST | |
| 1 | 219.1 | 16,505,046 | 1,224,328 | |
| 2 | 219.7 | 507,973 | 226,210 | |
| 3 | 220.7 | 508,094 | 226,126 | |
| 4 | 220.5 | 508,058 | 226,037 | |
| 5 | 222.6 | 507,995 | 225,889 | |

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

| | | | |
|--|---|--|-------------|
| MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE | | | |
| BRIDGE No 1 | | | |
| EASTERN PARKWAY N.B. & HWY. 417 W.B. OVER OTTAWA QW.E.B. | | DIST. NO. 9 | |
| HIGHWAY NO. 417 | | CO. REGIONAL MUNICIPALITY OF OTTAWA—CARLETON | |
| LOT 24 | | CON. II | |
| BORE HOLE LOCATIONS & SOIL STRATA | | | |
| SUBWD. S.A. | CHECKED <input checked="" type="checkbox"/> | W.P. NO. 13-68-02 | DRAWING NO. |
| DRAWN J.L.G. | CHECKED <input checked="" type="checkbox"/> | W.O. NO. 72-11083 | 72-11083A |
| DATE NOV 21, 1972 | SITE NO. | BRIDGE DRAWING NO. | |
| APPROVED <i>[Signature]</i> | CONT. NO. | | |

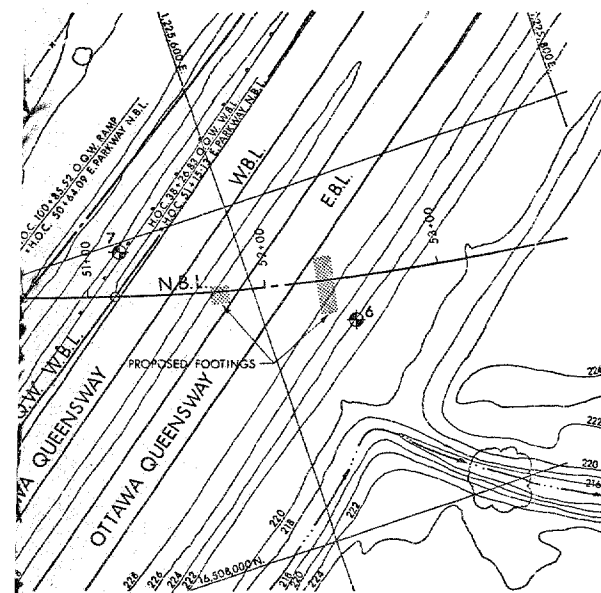


PLAN
SCALE
40 20 0 40 80 FT.



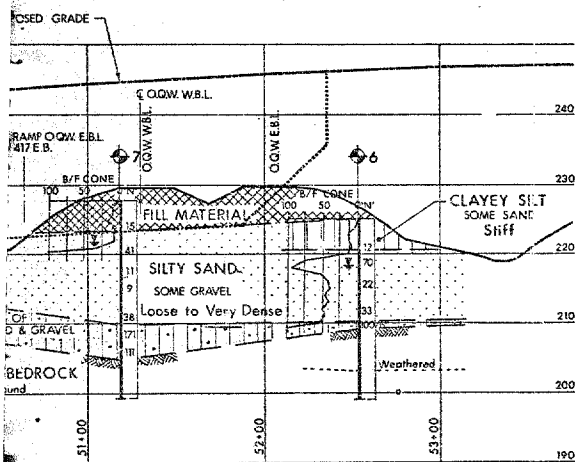
PROFILE C.L. EASTERN PARKWAY N.B.L.

HORIZ. SCALE 40 20 0 40 80 FT.
VERT. SCALE 10 5 0 10 20 FT.



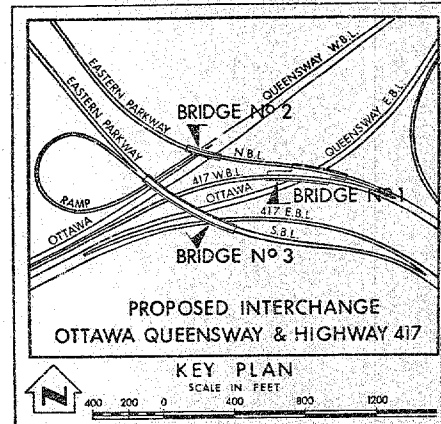
PLAN

SCALE 40 20 0 40 80 FT.



C.L. EASTERN PARKWAY N.B.L.

SCALE 40 20 0 40 80 FT.
RT. 10 5 0 10 20 FT.



PROPOSED INTERCHANGE
OTTAWA QUEENSWAY & HIGHWAY 417

KEY PLAN

SCALE IN FEET

400 200 0 400 800 1200

LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation July 1972

| NO. | ELEVATION | CO-ORDINATES | |
|-----|-----------|--------------|-----------|
| | | NORTH | EAST |
| 6 | 225.1 | 16,508,115 | 1,225,651 |
| 7 | 227.8 | 508,195 | 225,535 |
| 8 | 222.8 | 508,201 | 225,420 |

NOTE

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

| REVISIONS | | DESCRIPTION |
|-----------|----|-------------|
| DATE | BY | |
| | | |
| | | |
| | | |

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE

BRIDGE NO. 2

EASTERN PARKWAY N.B. OVER OTTAWA QUEENSWAY W.B.

HIGHWAY NO. 417 DIST. NO. 9

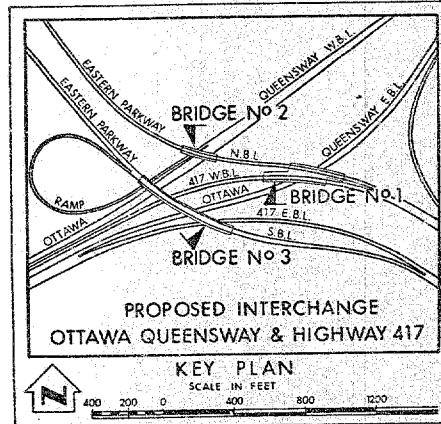
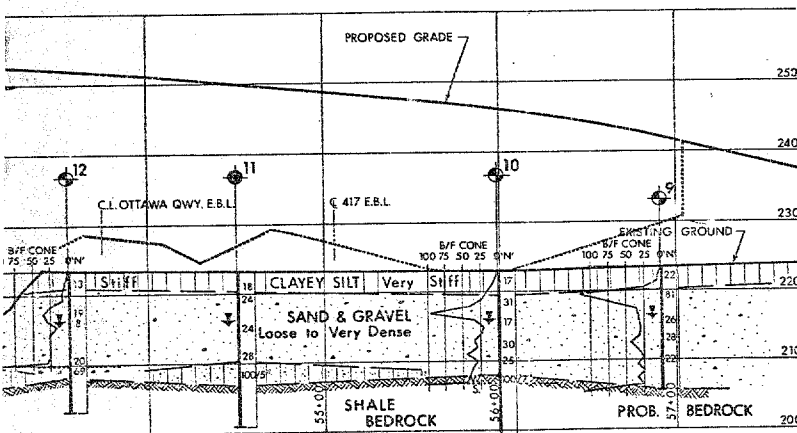
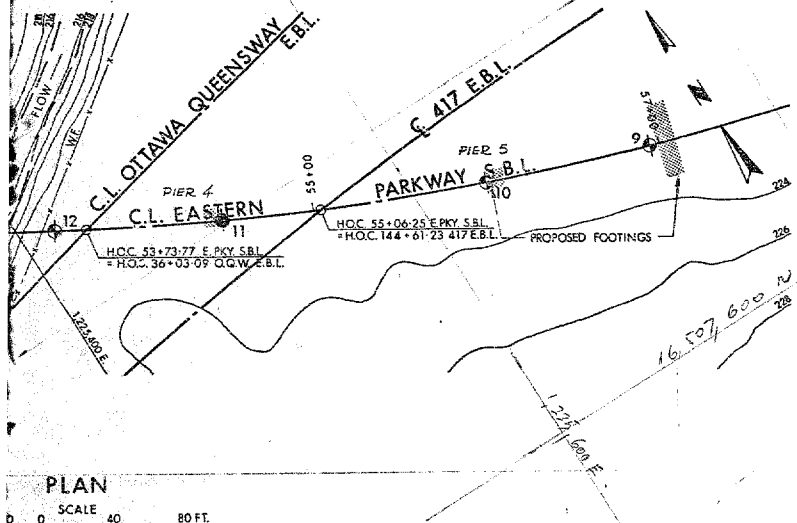
CO. REGIONAL MUNICIPALITY OF OTTAWA - CARLETON

TWP. GLOUCESTER LOT 25 CON. II

BORE HOLE LOCATIONS & SOIL STRATA

| | | |
|--|-------------------|--------------------|
| SUBMD. S.A. CHECKED <input checked="" type="checkbox"/> | W.P. NO. 13-68-03 | DRAWING NO. |
| DRAWN J.I.G. CHECKED <input checked="" type="checkbox"/> | W.O. NO. 72-11083 | 72-11083B |
| DATE NOV. 21, 1972 | SITE NO. | BRIDGE DRAWING NO. |
| APPROVED | CONT. NO. | |

REF. N° B-56-28
REF. N° E-5240-1



| LEGEND | | | |
|--------|---|--------------------|----------|
| | Bore Hole | | |
| | Cone Penetration Test | | |
| | Bore Hole & Cone Test | | |
| | Water Levels established at time of field investigation Aug. & Oct. 1972. | | |
| NO. | ELEVATION | CO-ORDINATES NORTH | EAST |
| 9 | 223.6 | 16,507.706 | 1225.729 |
| 10 | 223.2 | 507.739 | 225.639 |
| 11 | 223.3 | 507.799 | 225.309 |
| 12 | 223.3 | 507.844 | 225.478 |
| 13 | 219.6 | 507.862 | 225.347 |
| 14 | 229.3 | 507.967 | 225.300 |
| 15 | 223.7 | 508.018 | 225.141 |
| 16 | 222.1 | 508.078 | 225.112 |

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

| | | |
|--|-------------------|--------------------|
| MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE | | |
| BRIDGE No 3 EASTERN PARKWAY S.B. OVER OTTAWA QUEENSWAY & HWY. 417 | | |
| HIGHWAY NO. 417 | | DIST. NO. 2 |
| CO. REGIONAL MUNICIPALITY OF OTTAWA—CARLETON | | |
| "V.P." GLOUCESTER | | LOT 25 CON. II |
| BORE HOLE LOCATIONS & SOIL STRATA | | |
| SUBMIT S.A. CHECKED | W.P. NO. 13-68-08 | DRAWING NO. |
| DRAWN J.G. CHECKED | W.D. NO. 72-11083 | 72-11083C |
| DATE NOV. 22, 1972 | SITE NO. | BRIDGE DRAWING NO. |
| APPROVED <i>[Signature]</i> | CONT. NO. | |
| PRINCIPAL FOUNDATION ENGINEER | | |

MEMORANDUM

TO: Mr. T. C. Kingsland (2)
Reg. Structural Plann. Engr.,
Eastern Region,
Kingston, Ontario.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: January 4, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT:

Foundation Investigation 72-11083; Ottawa
Queensway, Eastern Parkway and Highway 417
Interchange

We are herewith enclosing a copy of the report prepared by Mr. K. W. Ingham, Geologist. Please include this along with a Foundation Report W.O. 72-11083 -- W.P. 13-68-02, 13-68-03, 13-68-08.

MD/ck
Encl.

M. Devata
M. Devata,
Supervising Foundations Engr.

c.c. E. J. Orr
B. R. Davis
A. Rutka
S. J. Markiewicz
J. E. Callaghan
B. J. Giroux
E. R. Saint
G. A. Wrong
B. A. Singh
DeLeuw Cather & Co. Ltd.

Foundations Files ✓
Documents

MEMORANDUM

TO: Mr. M. Iwata,
Sup. Foundation Engineer.

FROM: Ken W. Ingham

ATTENTION:

DATE: December 29, 1972

OUR FILE REF.

IN REPLY TO

SUBJECT:

Foundation Investigation 72-11083; Ottawa
Queensway, Eastern Parkway and Highway 417
Interchange

The area is underlain by the Carlsbad formation, a dark grey shale somewhat calcareous with more or less fossil debris and thin vertical but irregular calcite veins throughout. Thin bedding is prominent; there are, however, medium bedded and also platy bedded sections. The shale parts readily parallel to the bedding planes imparting a general platy character to weathered or fractured zones.

Subordinate to the shale but nonetheless conspicuous are: layers of limey shale, shaley limestone and limestone. The limestone is for the most part silty, however, beds of pure light grey limestone are occasionally present. In general, the shaley beds range from 0.1 to 0.9 ft. in thickness and the bands of limestone from 0.1 to 0.5 ft.

A brief description of the rock encountered in each hole is given below together with the appropriate bedrock elevation.

Hole No. 1

Bedrock at 207.6

11.5 - 16.5 Dark grey calcareous shale,
 minor shaley limestone,
 moderately weathered and
 fractured in the upper 1.0 ft.

Hole No. 2

Bedrock at 205.7

14.0 - 19.7 Dark grey shale, medium
 bedded, some vertical
 fractures.

Hole No. 3

Bedrock at 208.4

11.5 - 11.8 Dolomite; possible boulder.
11.8 - 16.7 Dark grey shale; medium bedded.

Hole No. 5

Bedrock at 209.3

10.5 - 13.3 Boulders; shale, shaley
limestone and limestone.

13.3 - 19.5 Dark grey shale; thin to
platy bedded, moderately
fractured throughout.

Hole No. 6

Bedrock at 209.1

16.0 - 22.0 Dark grey shale; thin to
platy bedded, moderately
fractured and weathered
throughout.

22.0 - 22.1 Dark grey shale.

Hole No. 7

Bedrock at 204.7

23.1 - 28.6 Dark grey shale; medium to
thin bedded.

Hole No. 8

Bedrock at 208.3

14.5 - 16.0 Dark grey shale; platy bedded,
badly fractured and weathered
throughout.

16.0 - 22.5 Dark grey shale; thin to
medium bedded.

Hole No. 10

Bedrock at 206.7

16.5 - 22.0 Dark grey shale; medium bedded,
some vertical fractures.

22.0 - 24.0 Dark brownish grey shale; thin
bedded, soft. (Possibly upper
beds of the Billings formation.)

Hole No. 11

Bedrock at 206.8

16.5 - 22.5 Dark grey shale; thin to
medium bedded.

Hole No. 12

Bedrock at 208.2

15.3 - 20.3 Dark grey shale; thin to medium
bedded, minor thin bands of
limey shale and shaley limestone.

Hole No. 13

14.1 - 19.5

Dark grey shale with minor thin layers of soft dark brownish grey shale; generally medium bedded.

Bedrock at 205.7

Hole No. 14

10.3 - 21.9

Boulders; limestone, shaley limestone, sandstone and granite.

Bedrock at 207.4

21.9 - 26.2

Dark grey shale; thin to medium bedded.

Hole No. 15

5.0 - 16.3

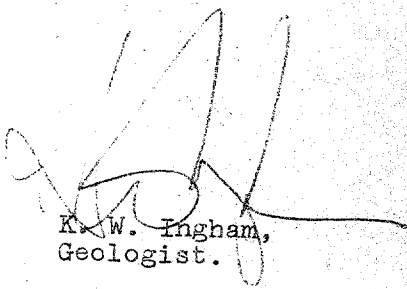
Boulders; limestone, sandstone and some granite.

Bedrock at 207.4

16.3 - 23.0

Dark grey shale; thin to medium bedded, moderately fractured and weathered in the upper 1.0 ft.

KWI:mv



K.W. Ingham,
Geologist.

71-11128

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
Downsview, Ontario.

FROM: Bridge Section,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: October 22, 1971.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 13-68 and W.P. 10-69,
Ramsayville Road to Ottawa Queensway,
Highway 417, District 9 - Ottawa

With reference to our recent discussions concerning the above project, I should be pleased if you will make arrangements for the foundation investigations to be carried out at the structure sites, the Foundation Report date for which is March 29, 1972. The structure sites to be investigated are as follows:

W.P. No.

Location

71-11128
13-68-02

13-68-03

13-68-04

13-68-05

13-68-06

13-68-07

10-69-02

10-69-03

10-69-04

10-69-05

10-69-06

10-69-07

10-69-08

10-69-09

O.Q.W. Interchange Overpass - N.B.L.

-do- - S.B.L.

Cyrville Rd. Underpass (0.5 mi. S of OQW)

Innes Rd. Interchange Underpass (1.0 mi.
South of OQW)

C.P.R. Overhead - S.B.L. (0.5 mi. South
of Innes Rd.)

C.P. R. Overhead - N.B.L. -do-

Ridge Road Underpass (1.8 mi. South of
Innes Rd.)

C.N.R. Overhead - S.B.L. (2.2 mi. South
of Innes Rd.)

C.N.R. Overhead - N.B.L. -do-

Russell Road Underpass (2.8 mi. South of
Innes Rd.)

Baseline Road Underpass (4.0 mi. South of
Innes Rd.)

Ramsay Creek Bridge - W.B.L.

Walkley Rd. Interchange Underpass (1.5 mi.
South of Innes Rd.)

Hunt Club Rd. Interchange Underpass
(3.1 mi. South of Innes Rd.)

As agreed at our recent meeting, the foundation investigations will be commenced on the basis of the 200' : 1" photo mosaic, two copies of which are enclosed for your use. Further information will be given to you as it becomes available.

I shall be glad to attend a field meeting as soon as it can be arranged with you and representatives of Regional Engineering Surveys Section to discuss the proposed methods of carrying out the investigations.



T. C. Kingsland
Regional Bridge Planning Engineer

TCK/hl
Encls.

c.c.-

M. M. Dillon & Company Ltd. (Attn. Mr. J. Kearney)
280 Metcalfe Street, Ottawa.

Mr. P. D. Billings
Mr. A. J. Percy
Mr. S. J. Markiewicz
Mr. E. R. Saint
Mr. L. Timson
Mr. A. G. Boucher
Mr. H. Aron
Mr. R. Forrest
Mr. C. S. Grebski

MEMORANDUM

TO: Mr. T. Kingsland,
Regional Structural Planning Engineer,
Kingston.

FROM: Functional Planning,
Kingston.

ATTENTION:

DATE: March 17th, 1972.

OUR FILE REF.

IN REPLY TO

SUBJECT:


W. P. 13-68, Highway 417,
District #9 - Ottawa.

This is to advise that a re-assessment of the connection of Highway 417 with the Ottawa Queensway is presently being carried out.

I would recommend, therefore, that all foundation investigation work cease for the section of the freeway between Innis Road and Ogilvie Road until further notification.

I have also requested DeLeuw Cather to cease the design work for this latter section, but have asked them to proceed with the design work between Innis Road and the southerly limit of the project.

Should you wish further clarification on the above, please do not hesitate to contact me.



A. J. Percy

Regional Functional Planning Engineer.

AJP/ss

c. c. to:

M. Devata ✓
P. D. Billings
J. E. Callaghan
H. Aron
M. R. Ernesaks
J. Wear
D. Farren
G. King

R. J. Forrest
E. Drimmel
D. Barr
S. Markiewicz
L. Timson
J. Trew
A. Boucher

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: July 5, 1972.

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 13-68-02, Site 3-304A, Hwy. 417 WBL over OQW EBL *Bridge #1*
W.P. 13-68-03, Site 3-304B, Eastern Parkway NBL over OQW WBL *Bridge #2*
W.P. 13-68-08, Site 3-303, Parkway SBL over OQW & 417 WBL *Bridge*
Highway 417, District 9 - Ottawa

We are sending you herewith two prints of both plan and profile of Highway 417, Scheme 1A, on which we have marked the proposed locations for the above-mentioned structures.

We would be pleased if you will make the necessary arrangements to initiate foundation investigations for the above sites.

At the present time Engineering Surveys are in the process of running the lines and may be contacted for a more detailed location of the proposed structures.



T. C. Kingsland
Regional Structural Planning Engineer

TCK/hl
encls.

c.c. C. S. Grebski
J. K. Anderson
R. Forrest

=====

Gordon R. Carton, O.C.

Design Services Branch,
Downsview 464, Ontario.
July 25, 1972.

Telephone: 248-3282.

F. E. Johnston Drilling Co. Ltd.,
P.O. Box 4134,
Postal Station 'E',
Ottawa 1, Ontario.

Dear Sirs:

This letter confirms our request of July 21, 1972,
for the supply of two diamond drills together with all
necessary equipment, as specified under the terms of our
Contract Agreement, at Ottawa on July 26, 1972.

Mobilization will be from Ottawa.

Our Project Number is W.O. 72-11083.

Yours truly,

M. Devata

M. Devata,
Supervising Foundations Eng.,
A. G. Stermac,
Principal Foundations Eng.

MD/ao

cc: W. W. Fry
(Attn: Mrs. M. Andrews)

Foundations Files ✓
Documents

MEMORANDUM

TO: Mr. A. E. Lodge,
Regional Services Manager,
Kingston, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION:

DATE: September 21, 1972.

OUR FILE REF.

IN REPLY TO

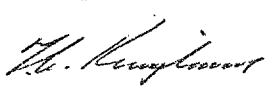
SUBJECT: W.P. 13-68 & W.P. 10-69 - Highway 417 - Ottawa Queensway to
Ramsayville
- Entry into Property for Foundation Investigations -

As agreed at our meeting in your office on Wednesday, September 20, I list below the structure sites where entry difficulties are being experienced by Foundations Section who wish to carry out foundation investigations:

| | |
|---------------|---|
| W.P. 13-68-08 | E. B. Overpass of O.Q.W. - Site 3-303 |
| W.P. 10-69-13 | Green Creek under Walkley Road immediately south of Highway 417 - Site 3-312 |
| W.P. 10-69-16 | Proposed crossing at McEwen Creek (Mather Drain Award) under Highway 417 ERL & WRI. |

Enclosed herewith are copies of 100' to 1" Plans of each of the structure locations showing in each case the area in which bore holes are required.

When property clearances at the above locations have been obtained for the purposes of foundation investigations, I shall be glad if you will notify the Principal Foundation Engineer, Mr. A. G. Stermac, Foundations Office, West Building, Downsview, with a copy to me. From the date of notifying Mr. Stermac and myself that entry may be made into a particular property, I shall be glad if any further change in status with regard to entry permission can also be notified to Mr. Stermac, with copies of correspondence to this office.


T. C. Kingsland
Regional Structural Planning Engineer

TCK/hl
encls.

c.c. P. D. Billings
✓ A. G. Stermac - Att. M. Devata
C. S. Grebski - Att. K. Bassi
E. R. Saint
R. Forrest
D. Barr



MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

MINISTER: HONOURABLE GORDON CARTON, O.C.

DEPUTY MINISTER: A. T. C. McNAB

PARLIAMENTARY ASSISTANT: WILLIAM NEWMAN, M.P.P.

Structural Planning Office, Postal Bag 4000, Kingston, Ontario
K7L 5A3

Your File: 01284

September 25, 1972

De Leuw, Cather & Company of Canada Ltd.,
Consulting Engineers,
Billings Bridge Plaza,
2315 Riverside Drive,
Ottawa, Ontario.
K1H 7X4

Attention: Mr. G. S. Saunders, P. Eng.

Dear Mr. Saunders:

SUBJECT: W.P. 13-68-02, Site 3-304A
 W.B. Overpass to E. Parkway & to O.Q.W. (W.B.)
 W.P. 13-68-03, Site 3-304B
 W.B. Overpass of O.Q.W. to E. Parkway
 W.P. 13-68-08, Site 3-303
 E.B. Overpass of O.Q.W.
 Highway 417, District 9 - Ottawa

Please find enclosed four copies of Site Plans for the above structures as follows:

- 1) Drawing E-5237-1 & E-5241-1 for W.P. 13-68-02, Site 3-304A
- 2) Drawing E-5240-1 for W.P. 13-68-03, Site 3-304B
- 3) Drawing E-5239-1 for W.P. 13-68-08, Site 3-303

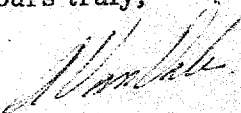
We will be glad if you will put a preliminary grade on the profile and preliminary structure outline on each of these drawings and forward two copies each to Mr. M. Devata, Foundations Office, Ministry of Transportation and Communications, West Building, Downsview 464, Ontario, to assist him in the preparation of the Foundation Reports for

De Leuw, Cather:

2.

these structures. It would be appreciated if you would send us one of the marked-up copies for our records.

Yours truly,



For: A. Van Dalen
T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl
encls.

c.c. Mr. G. King : De Leuw, Cather : Don Mills

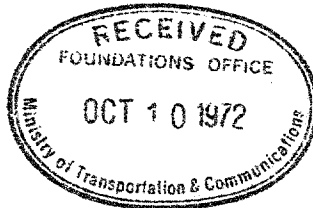
CONSULTING ENGINEERS

INGENIEURS CONSEILS

October 6, 1972

Our Ref: 01284

Mr. M. Devata
Foundations Office
Ministry of Transportation
and Communications
West Building
Downsview 464, Ontario



Dear Sir:

Re: W.P. 13-68-02, Site 3-304A
W.B. Overpass to E. Parkway & to O.Q.W. (W.B.)
W.P. 13-68-03, Site 3-304B
W.B. Overpass of O.Q.W. to E. Parkway
W.P. 13-68-08, Site 3-303
E.B. Overpass of O.Q.W.
Highway 417, District 9 - Ottawa

Enclosed are two (2) copies each of Site Plans for above structures with the preliminary grade and structure outlines indicated in red pencil as requested by Mr. Kingsland.

Yours very truly,

DE LEUW, CATHER & COMPANY OF CANADA LIMITED

A handwritten signature in cursive script, appearing to read "G.S. Saunders".

G.S. Saunders, P. Eng.

GSS:br
Encl.

c.c. T. Kingsland

Design Services Branch,
Downsview 464, Ontario.
October 20, 1972.

Telephone: 248-3282.

Master Soil Investigation,
104 Kenhar Drive,
Woodbridge, Ontario.

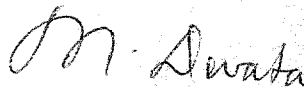
Dear Sirs:

This letter confirms our request of October 13, 1972, for the supply of a C.M.E. drill together with all necessary equipment, as specified under the terms of our Contract Agreement, at Ottawa, Ontario, on October 18, 1972.

Mobilization will be from Ottawa.

Our Project Numbers are W.O. 72-11083, 72-11088 and 72-11104.

Yours truly,



M. Devata,
Supervising Foundations Eng.,
For: A. G. Stermac,
Principal Foundations Eng.

MD/ao

cc: W. W. Fry
(Attn: Mrs. M. Andrews)

Foundations Files
Documents

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO: Mr. A.G. Stermac,
Principal Foundation Engr.,
West Bldg., Downsview, Ont.

FROM: Materials & Testing Office,
Kingston, Ontario.

ATTENTION: M. Devata

DATE: October 24th, 1972 .

OUR FILE REF.

IN REPLY TO

SUBJECT: RE: Hwy # 417, Innes Rd. to Ramsayville Structure Sites
W.P.'S 10-69-09, 10-69-04, 10-69-03, 10-69-08 ✓
10-69-07, 10-69-13, 10-69-16, 10-69-14, 10-69-15 ,
10-69-01, 13-68-08 .

In your Foundation Reports for these projects you have assumed a unit weight of 125 lb/cu ft., for compacted fill in structure approach fills. Shale rock and glacial till may be used for fill purposes on these projects. Investigation in this regard is currently underway. The unit weight of these materials is approximately 150 lb/cu ft.

The Design Consultant should be advised of the additional berm requirements at these structure approach fills for the higher unit weight (150 lb/cu ft.

AMB/pab

A.M. Batten
A.M. Batten ,
Senior Soils Supervisor .

c.c. P.D. Billings
A.J. Percy
J.E. Callaghan
T. Kingsland
A. Rutka
G. Wrong

*Considered in report.
CSP
Dec 4/72*

MEMORANDUM

TO: Mr. A. G. Sternac,
Principal Foundation Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. B. Darch

DATE: November 10, 1972.

OUR FILE REF.

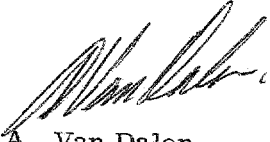
IN REPLY TO

SUBJECT: W.P. 13-68-02, Site 3-304A, Hwy. 417 WBL over OQW EBL
W.P. 13-68-03, Site 3-304B, E. Pkwy NBL over OQW WBL
W.P. 13-68-08, Site 3-303, Pkwy SBL over OQW & Hwy. 417 WBL
Highway 417, District 9 - Ottawa

Further to our telephone conversation of this afternoon, enclosed please find two copies each of the following site plans for the above structures:

| | |
|---------------------|-------------|
| E-5237-1 & E-5241-1 | Site 3-304A |
| E-5240-1 | Site 3-304B |
| E-5239-1 | Site 3-303 |

We understand that these plans show the latest profile grades.


A. Van Dalen
For: T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl
encls.

c.c. Mr. G. W. King: De Leuw, Cather (Toronto)
Mr. G. S. Saunders: De Leuw, Cather (Ottawa)
Mr. C. S. Grebski - Att. Mr. K. Bassi



DOCUMENT MICROFILMING IDENTIFICATION

GEOCREs No. 3165-86

DIST. 9 REGION EASTERN

W.P. No. 13-68-02/03/08

CONT. No. 73-192

W. O. No. 72-11083

STR. SITE No. 3-304A, 3304B, 3-303

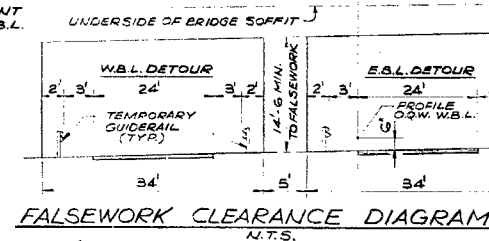
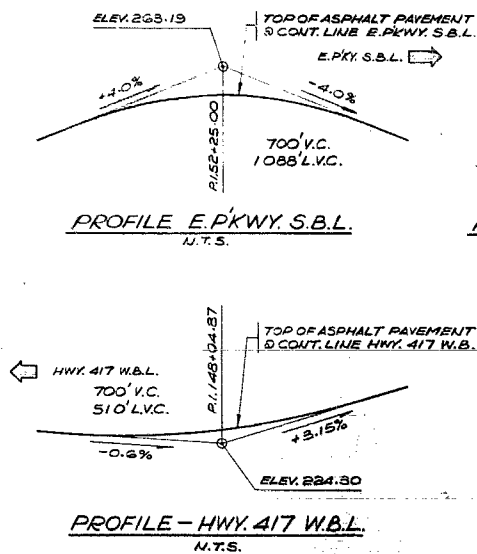
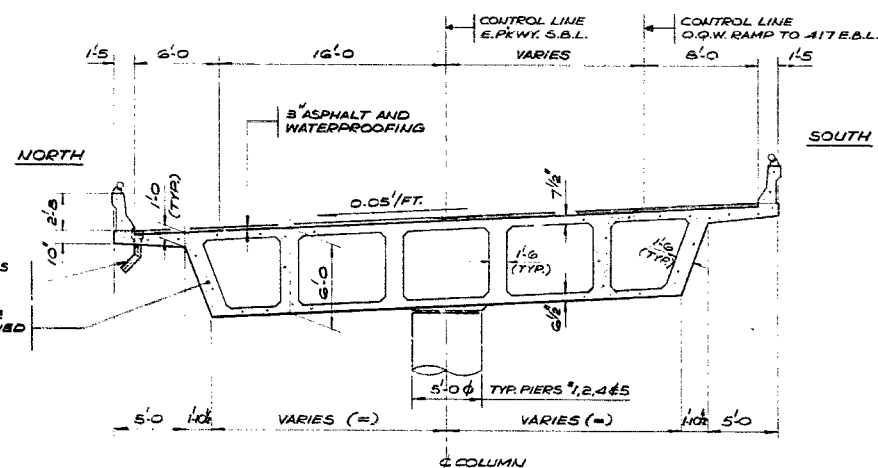
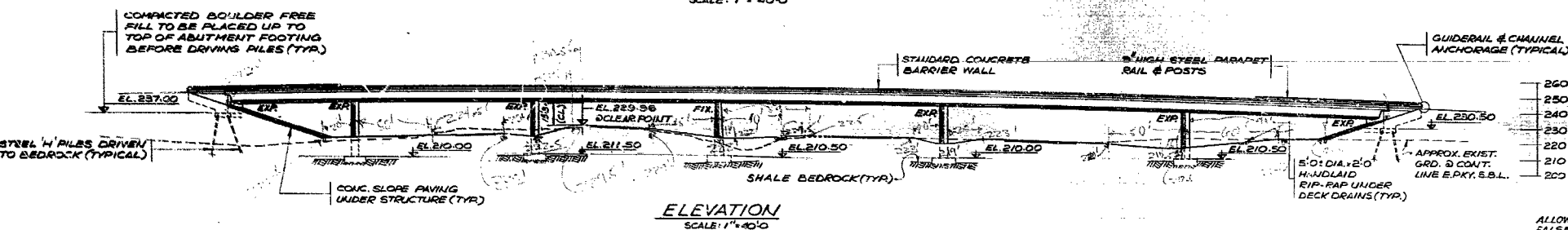
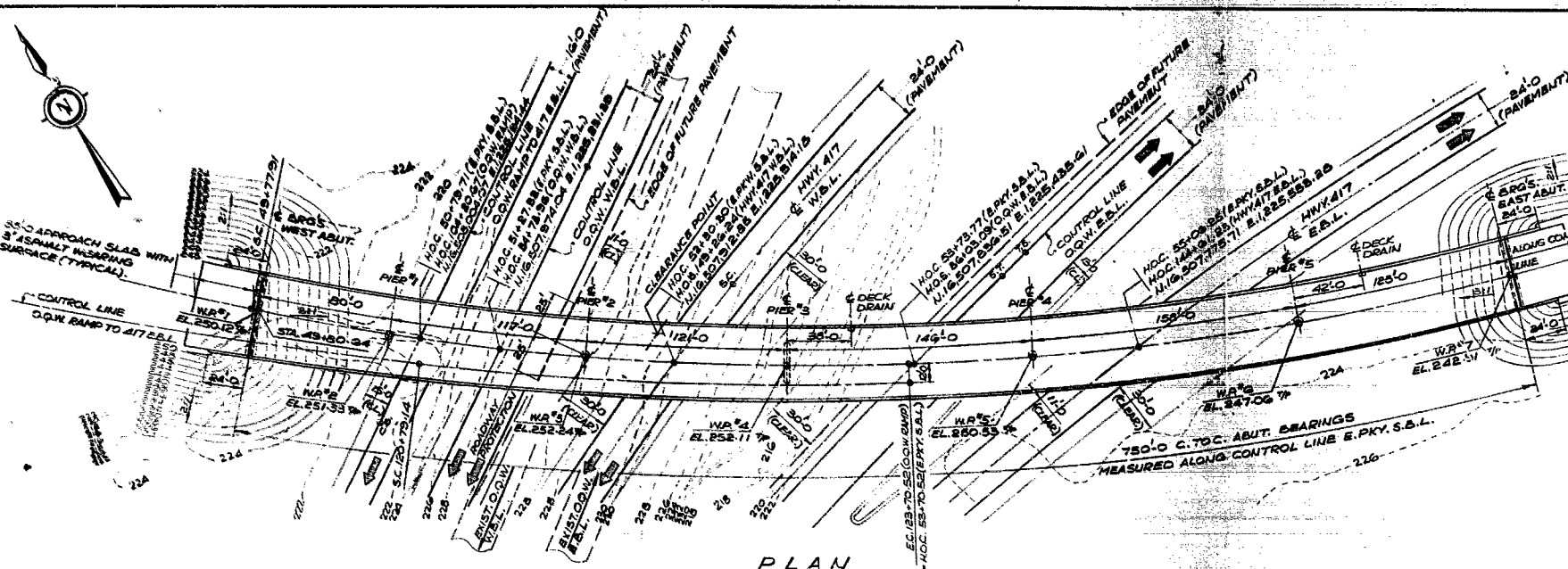
HWY. No. 417

LOCATION BRIDGE SITES 1, 2, 3

EASTERN PARKWAY, HWY 417, 3 QEW

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 415

REMARKS: Documents to be unfolded
before microfilmed



REFERENCE BENCH MARK
S.M. EL. 224.05 GEODETIC DATUM
N.E.W. IN U.S. ROOT OF 2.0' E.L.M. 85.0'
RT. 45+04 (E.P.K.W.Y. S.B.L.)

CURVE DATA:

E.P.K.W.Y. S.B.L.

CURVE DATA:
Δ = 57°00'00" CS = 4°30'00"
Δc = 58°37'30" Ls = 200.00'
D = 5°30'00" LT = 118.57'
E = 1637.02' ST = 81.53'
Lc = 932.14' P = 0.73'
E = 68.66' D(FLAT) = 1°00'00"
D(SHARP) = 3°30'00"

O.Q.W. RAMP TO 417 E.B.L.

CURVE DATA:

Δ = 11°44'29.35"
Δc = 6°44'29.35"
D = 5°00'00"
R = 1509.86'
Lc = 231.35'
S = 5.57'

SPIRAL
Gs = 3°00'00"
Ls = 200.00'
Ts = 292.17'

NOTES:

- W.P. DENOTES WORKING POINT
- T/P DENOTES TOP OF ASPHALT PAVEMENT

LIST OF DRAWINGS

- GENERAL PLAN
- BOREHOLE LOCATIONS & SOIL STRATA
- FOUNDATION LAYOUT
- FOOTING REINFORCEMENT
- PIERS
- WEST ABUTMENT
- EAST ABUTMENT
- DECK LAYOUT
- DECK REINFORCEMENT I
- DECK REINFORCEMENT II
- DECK REINFORCEMENT III
- DECK REINFORCEMENT IV
- CABLE DETAILS I
- CABLE DETAILS II
- CABLE DETAILS III
- BEARINGS & EXPANSION JOINT DETAILS
- CONCRETE BARRIER WALL (2'8" HIGH)
- DETAILS OF 8" HIGH STEEL PARAPET RAILING
- APPROACH SLABS
- DETAILS OF CONC. SLOPE PAVING
- STANDARD DETAILS
- PLAN-EMBEDDED DETAILS
- TYPICAL EMBEDDED DETAILS
- ELECTRICAL STANDARD DETAILS

GENERAL NOTES

CLASS OF CONCRETE:

DECK, BARRIER WALLS, PIER COLUMNS & SHAFT, APPROACH SLABS
REMAINDER

CLEAR COVER ON REINFORCING STEEL:

FOOTINGS, ABUTMENTS & PIERS - 3"
DECK: TOP SLAB - TOP 1 1/2", BOT. 1"
BOT. SLAB - TOP & BOT. 1"
WEBS - 1 1/2"
APPROACH SLABS - 2", BARRIER WALLS - 1 1/2"

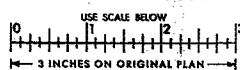
CONSTRUCTION NOTES:

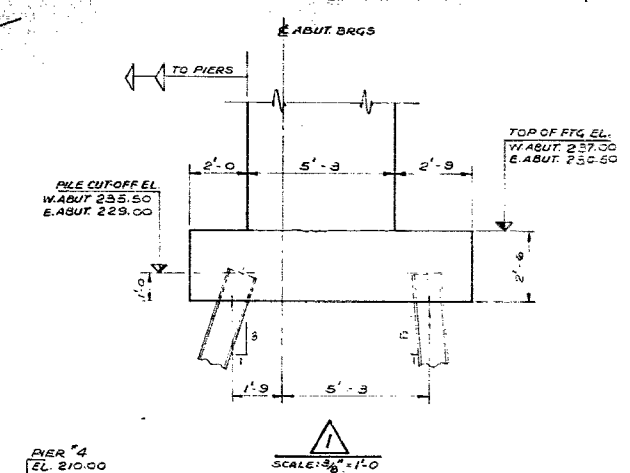
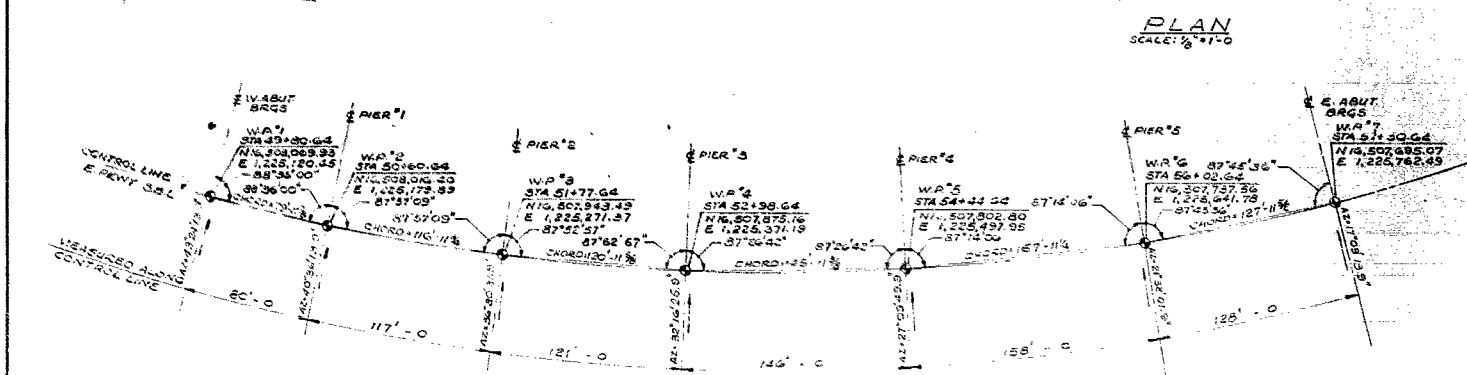
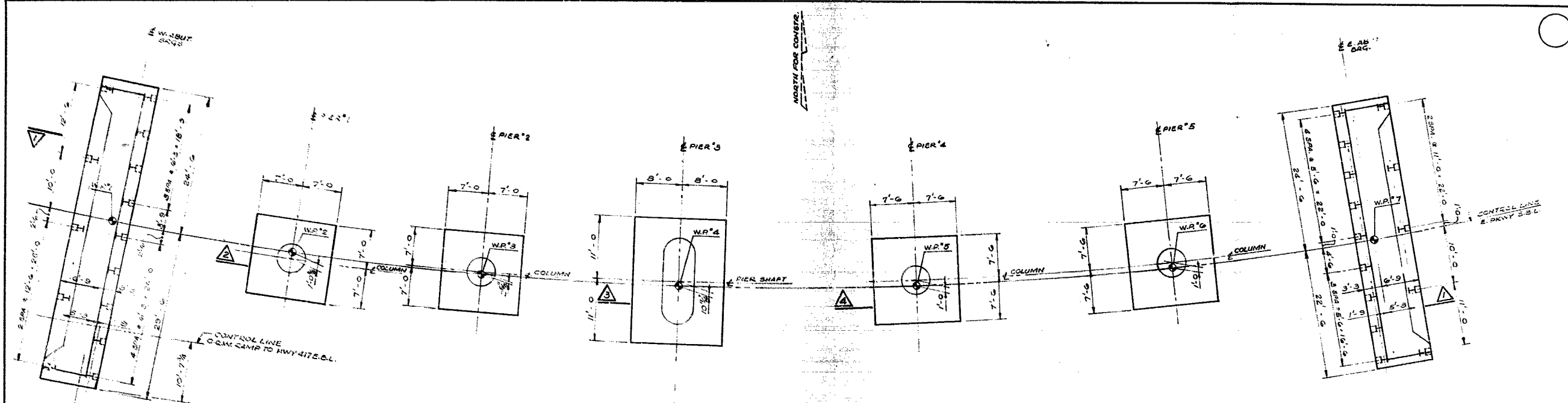
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF 3/16".
NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED, STRESSED AND GROUTED.

| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
| | | | |
| | | | |

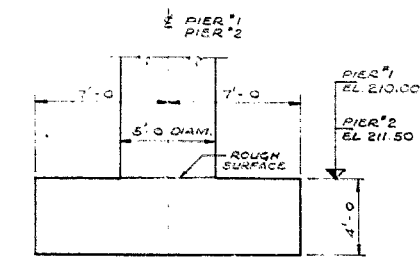
| | | | |
|--|---------------------|----------------|---------------------|
| DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS ONTARIO | | | |
| DeLew, Cather ENGINEERS & PLANNERS - OTTAWA | | | |
| EASTBOUND OVERPASS OF O.Q.W. BRIDGE No. 3 | | | |
| KING'S HIGHWAY No. 417 | DIST. No. 9 | | |
| CO. REG. MUNICIPALITY OF OTTAWA - CARLETON | | | |
| TWP. GLOUCESTER LOT 25 CON. II | | | |
| GENERAL PLAN | | | |
| APPROVED | STRUCTURAL ENGINEER | SITE No. 3-303 | W.P. No. 73-68-08 |
| DESIGN | C.E.S. CHECK | L.D.H. | CONTRACT No. |
| DRAWING | R.A.P. CHECK | C.S.S. | DRAWING No. 3-303-1 |
| DATE | APR/73 | LOADING | H530-24 |

FOR REDUCED PLAN



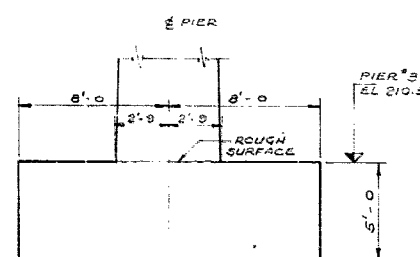


| STEEL H' PILE DATA | | | |
|--------------------|----|--------|-----------|
| LOCATION | Nº | LENGTH | TYPE |
| W. ABUT. | 14 | 34'-0" | HPI2 x 74 |
| E. ABUT. | 14 | 28'-0" | (TYP) |



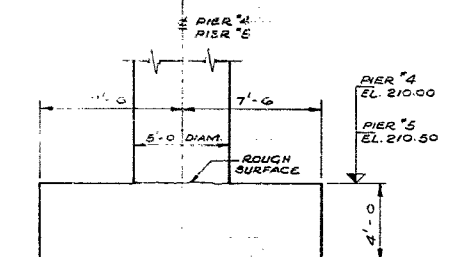
TYPICAL - PIERS 1 & 2

SCALE: 1/8" = 1'-0"



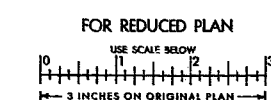
TYPICAL - PIER 3

SCALE: 1/8" = 1'-0"



TYPICAL - PIERS 4 & 5

SCALE: 1/8" = 1'-0"



- NOTES:
- PILES TO BE DRIVEN TO BEDROCK.
 - SPACING OF PILES TO BE MEASURED AT UNDERSIDE OF FOOTINGS.
 - PIER FOOTINGS TO BE FOUND ON SOUND BEDROCK.

3195-86
GEOCRE No.



| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
| | | | |

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

DeLeuw, Cather
ENGINEERS & PLANNERS - OTTAWA

**EASTBOUND OVERPASS OF O.Q.W.
BRIDGE Nº 3**

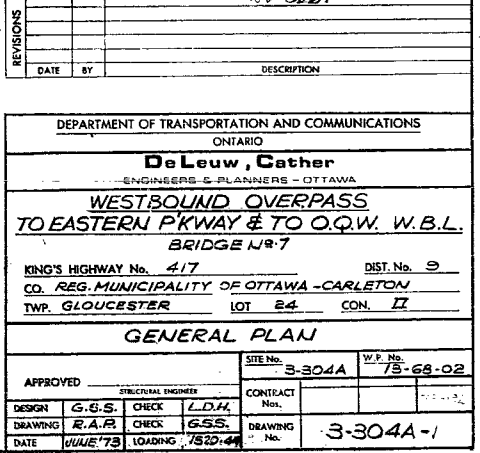
KING'S HIGHWAY No. 417 DIST. No. 9
CO. REG. MUNICIPALITY OF OTTAWA - CARLETON
TWP. GLOUCESTER LOT 25 CON. II

FOUNDATION LAYOUT

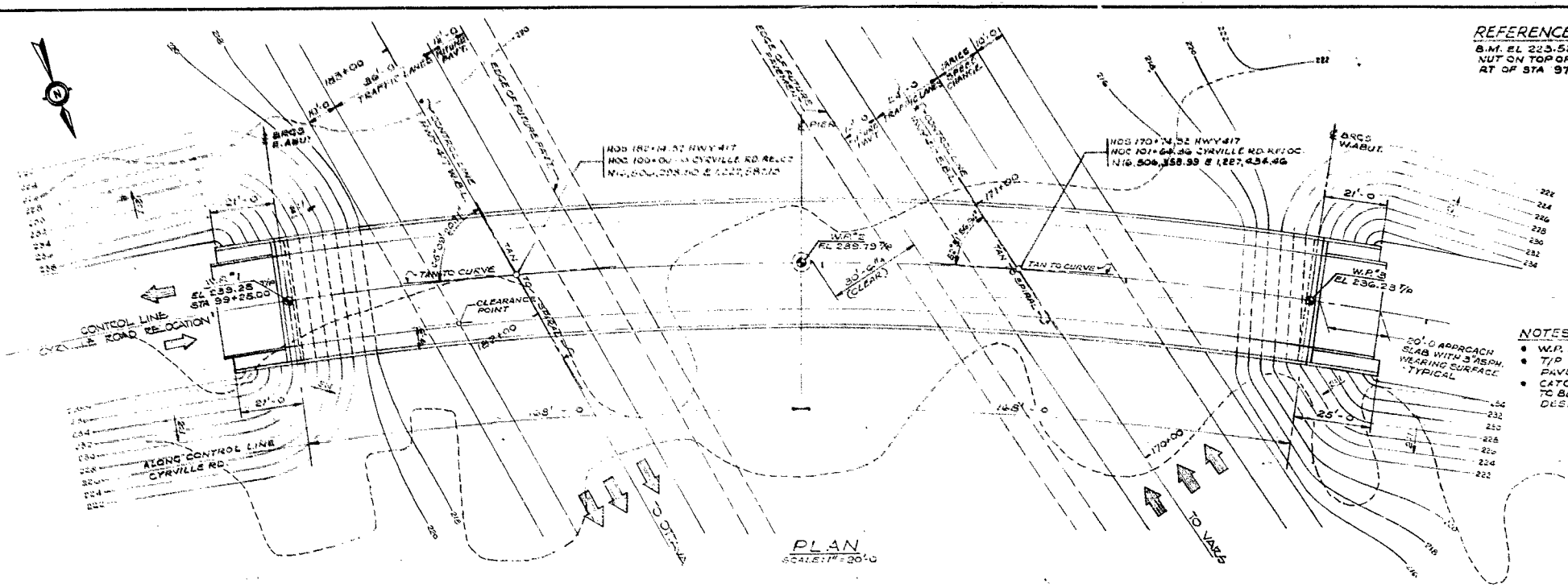
APPROVED: [Signature] SITE No. 3-303 W.F. No. 73-68-08

| | | | |
|---------|----------|---------|---------|
| DESIGN | L.D.H. | CHECK | G.S.S. |
| DRAWING | K.A.B. | CHECK | R.A.P. |
| DATE | 4 APR 73 | LOADING | 4520-44 |

CONTRACT No. 3-303-3



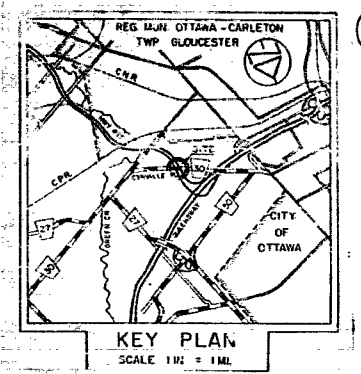
D-56-304A-3



REFERENCE BENCH MARK
B.M. EL 223.52 GEODETIC DATUM
NUT ON TOP OF FIRE HYDRANT 157.0'
AT OF STA 97+30 (CYRVILLE RD)

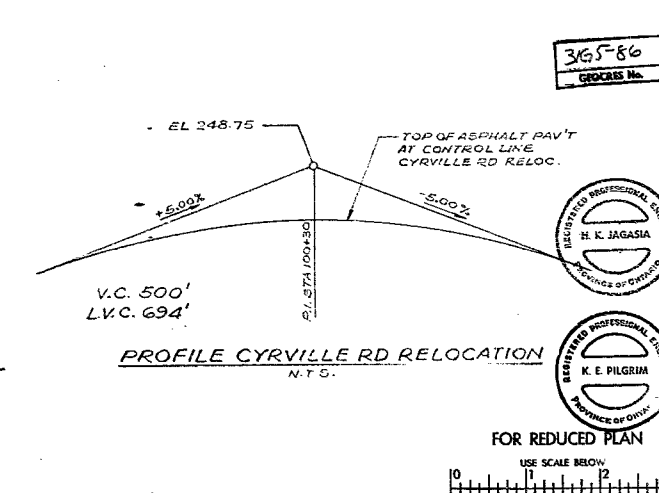
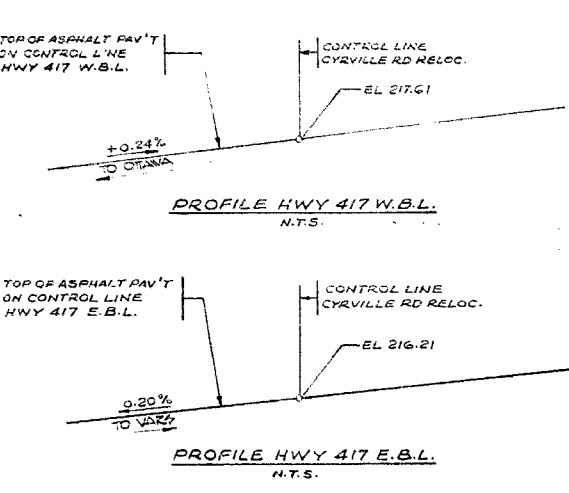
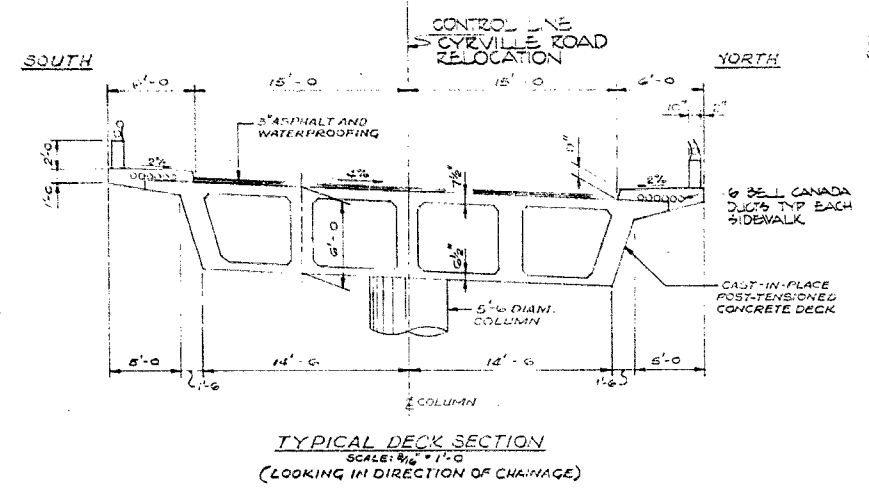
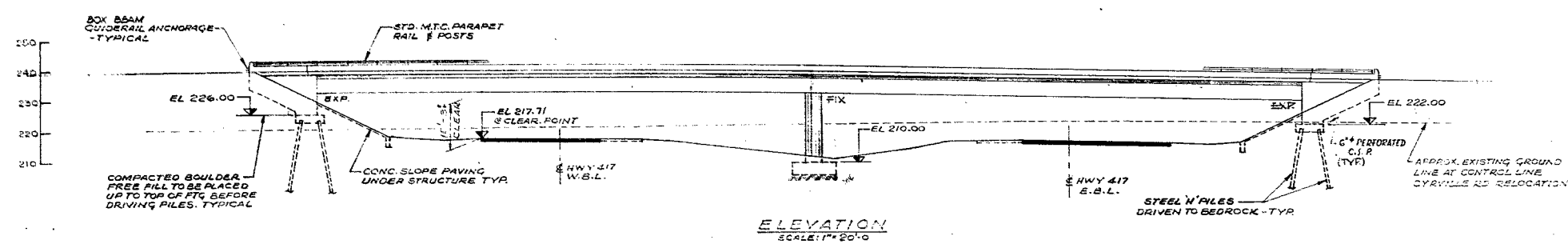
CURVE DATA:
CYRVILLE ROAD
Δ = 35° 56' 28.15"
Δc = 102° 35' 28.15"
D = 1' 32.50"
R = 1145.32'
Lc = 521.81'
Es = 51.91'
SPIRAL
Δs = 5° 45' 00"
Ls = 150.00'
Ts = 421.10'
HIGHWAY 417 W.B.L.
D = 2° 45' 00"
Ls = 450.00'
HIGHWAY 417 E.B.L.
D = 3° 30' 00"
Ls = 450.00'

- NOTES:
- W.P. DENOTES WORKING POINT
 - T/P DENOTES TOP OF ASPHALT PAVEMENT
 - CATCH BASINS OFF STRUCTURE TO BE PROVIDED BY SYSTEMS DESIGN.

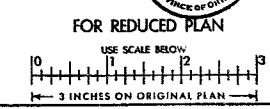


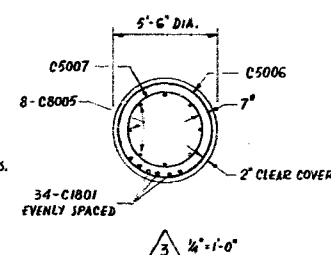
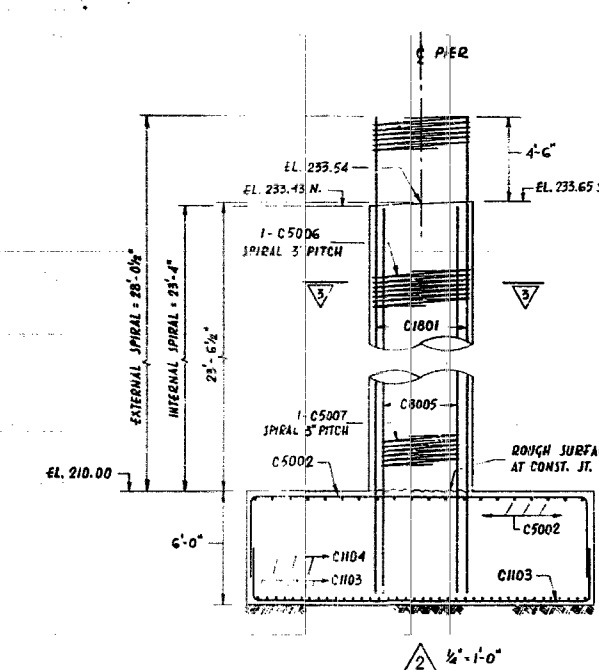
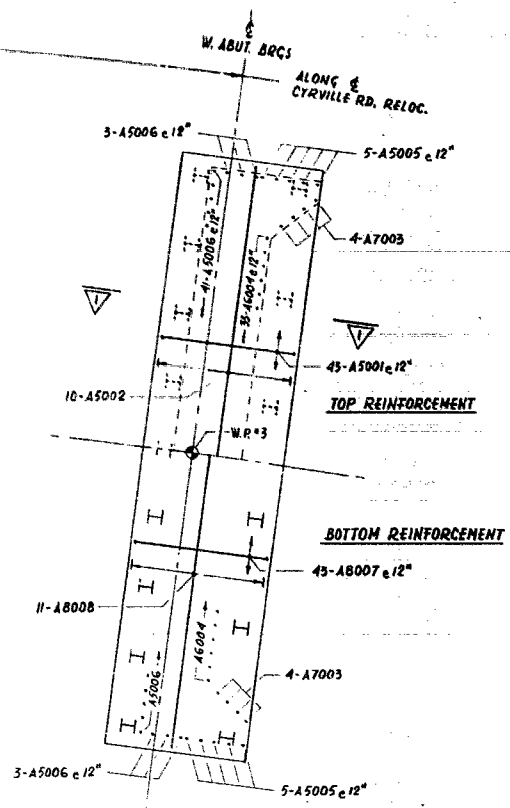
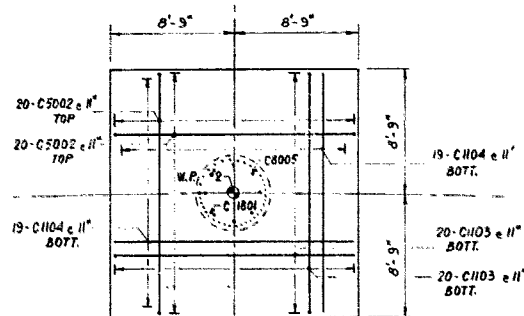
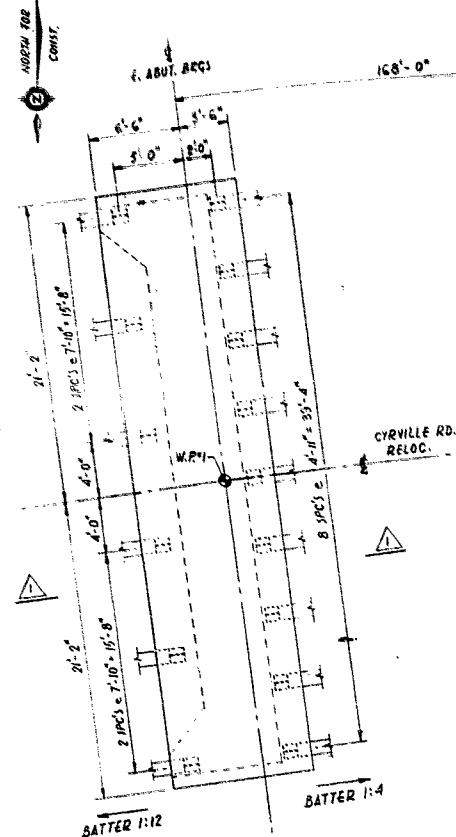
- LIST OF DRAWINGS
- | | |
|----------|-----------------------------------|
| 3-314-1 | GENERAL LAYOUT |
| 2 | BORE HOLE LOCATIONS & SOIL STRATA |
| 3 | FOOTINGS & PIER COLUMN |
| 4 | EAST ABUTMENT |
| 5 | WEST ABUTMENT |
| 6 | DECK DETAILS & BEARINGS |
| 7 | DECK REINFORCEMENT I |
| 8 | DECK REINFORCEMENT II |
| 9 | LONGITUDINAL CABLES |
| 10 | TRANSVERSE CABLES |
| 11 | PARAPET WALL DETAILS |
| 12 | STANDARD STEEL PARAPET RAIL |
| 13 | 20 FT. APPROACH SLABS |
| 14 | DETAILS OF CONC. SLOPE PAVING |
| 15 | STANDARD DETAILS I |
| 16 | STANDARD DETAILS II |
| 3-314-17 | PLAN - EMBEDDED DETAILS |

- NOTES:
- CLASS OF CONCRETE
- | | |
|---|-------------|
| DECK, SIDEWALKS, PARAPET WALLS, PIER COLUMN | 5000 P.S.I. |
| REMAINDER | 3000 P.S.I. |
- CLEAR COVER ON REINF. STEEL
- | | |
|--|------|
| FOOTINGS & ABUTMENTS | - 5" |
| SIDEWALKS, APPROACH SLABS & PIER COLUMN | - 2" |
| DECK: TOP SLAB - TOP 1 1/2", BOTTOM - 1" | |
| 20 FT. - TOP & BOT - 1" | |
| WEBS - 1 1/2", PARAPET WALLS - 1 1/2" | |
- CONSTRUCTION NOTES
- THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF ± 1/8".
- NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED, STRESSED AND GROUTED.



| | |
|--|-----------------------|
| 365-86 DESIGN No. | |
| MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO | |
| 72-11-109 | |
| CYRVILLE ROAD UNDERPASS | |
| KING'S HIGHWAY No. 417 DIST. No. 9 | |
| REG. MUNICIPALITY OF OTTAWA - CARLETON | |
| TWP. GLOUCESTER LOT 24 CON. II | |
| GENERAL LAYOUT | |
| APPROVED | CONTRACT No. |
| DESIGN K.P. CHECK H.J. | W.P. No. 13-68-04 |
| DRAWING K.A.B. CHECK K.R. | SITE No 3-314 SHEET 1 |
| DATE SEPT. 1973 | LOADING HS20-44 |

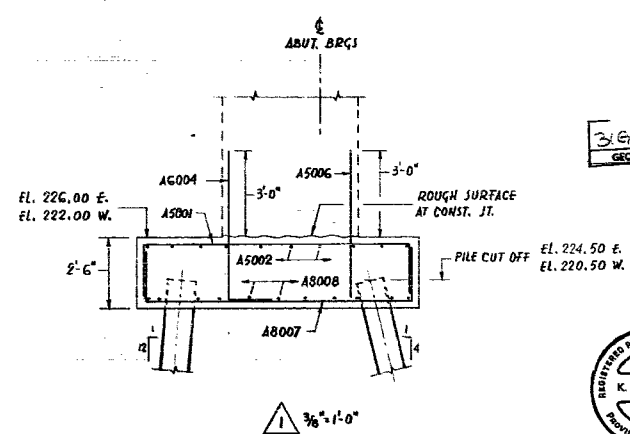
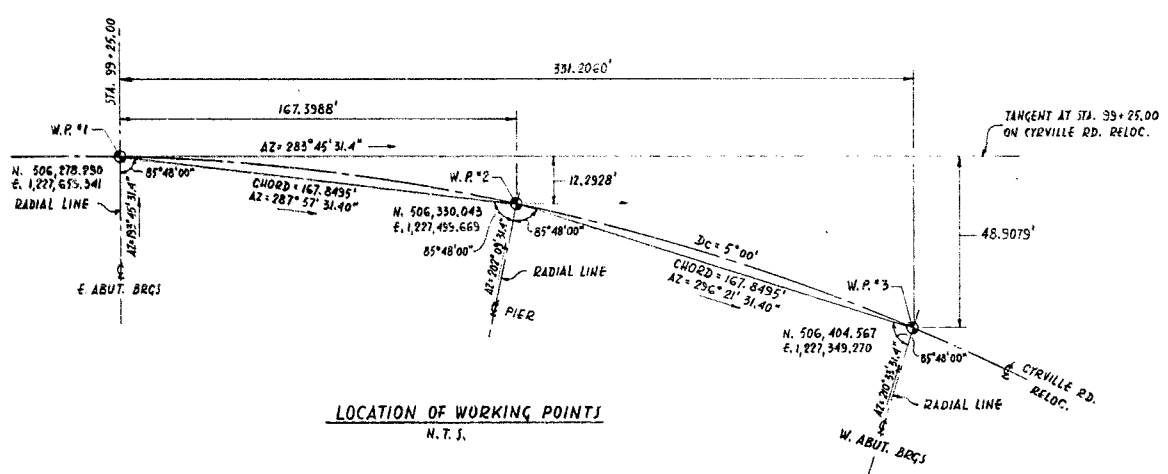




FOUNDATION LAYOUT
SCALE: 3/8" = 1'-0"

| LOCATION | BATTER | Nº REQ'D | TYPE | LENGTH |
|------------|--------|----------|---------|--------|
| EAST ABUT. | 1:12 | 6 | HP12x74 | 17'-0" |
| | 1:4 | 9 | | 12'-0" |
| WEST ABUT. | 1:12 | 6 | HP12x74 | 17'-0" |
| | 1:4 | 9 | | 12'-0" |

- NOTES:
- DIMENSIONS, REINF. & PILE LAYOUT SIMILAR FOR BOTH ABUTMENTS, EXCEPT AS SHOWN.
 - SPACING OF PILES TO BE MEASURED AT UNDERSIDE OF FOOTING.
 - BOTTOM REINF. TO BE SPACED TO AVOID PILES.
 - PILES TO BE DRIVEN TO BEDROCK.
 - PIER FOOTING TO BE FOUNDED ON SOUND BEDROCK.



3165-86
GEODESIC No.

| | | | |
|--|---------------------|--------------------------------|----------|
| MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO | | | |
| 72-11-109 | | | |
| CYRVILLE ROAD UNDERPASS | | | |
| KING'S HIGHWAY No. 417 | | DIST. No. 9 | |
| REG. MUN. OF OTTAWA-CARLETON | | TWP. GLOUCESTER LOT 24 CON. II | |
| FOOTINGS AND PIER COLUMN | | | |
| APPROVED | STRUCTURAL ENGINEER | CONTRACT No. | |
| DESIGN | K.P. CHECK | W.P. No. | 13-68-04 |
| DRAWING | P.K. CHECK | DATE | JER 1973 |
| LOADING | 13-20-44 | SITE No. | 3-314 |
| | | SHEET 3 | |

