

G.I.-30 SEPT. 1976

GEOCRES No. 4037-18

DIST. _____ REGION _____

W.P. No. 259-66-02CONT. No. 79-120

W. O. No. _____

STR. SITE No. _____

HWY. No. E.C. ROW EXPIRYLOCATION Can. Pac. Rwy Overhead
1.9 mi E of Walter Rd.

No of PAGES - _____

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____REMARKS: _____

Mr. A.P. Watt
Head, Structural Section
Southwestern Region, London

Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building
Downsview

79 01 29

Re: Foundation Recommendations for
The E.C. Row Expressway
W.P.s 259-66-02/04/05/06/08 and
257-66-08, District 1, Chatham

Foundation investigation reports were requested for the above structure sites on the E.C. Row Expressway in Windsor. Due to the urgency of the design schedule, it was also requested that preliminary recommendations should be made in an interim report. Recommendations will be made at this time for all 6 sites although further fieldwork will be required to confirm these recommendations for Central Avenue and Jefferson Blvd. because the line has been shifted since fieldwork was done for these structures.

Subsurface Conditions

Subsoil consists of from 120 to 150 feet of clayey silt overlying relatively flat limestone bedrock. The upper 10 to 20 feet of the clayey silt forms a desiccated crust which is brown in colour and has a moisture content of approximately 15 percent. The remaining 100+ feet of clayey silt is grey in colour with moisture contents ranging from 15 to 20 percent. The undrained shear strength ranges from 2000 to 5000 psf in the crust but decreases to as low as 1000 psf in the underlying soil.

Summary

1. Piers may be supported on spread footings in the crust with design loads of from 2 to 3 tons per square foot. Settlements of from 1 to 3 inches are predicted depending on the location.
2. Perched abutments may be supported by short tube piles driven into the crust with design loads of 25 tons per pile. Alternatively, spread footings on compacted granular cores with design loads of 3 tons per square foot may be considered. In both of these cases large settlements will result from the loads imposed by the embankments. Depending

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on the height and width of the embankment, these settlements will range from 4 inches to 8 inches. These values could be reduced by the use of stage construction.

3. Any or all of the structure footings may be supported on piles to bedrock. In this case settlements will not exceed 1 inch. Either 12 3/4 x 1/4" tube piles or H piles with a 74 pound section will carry a design load of 120 tons per pile. The H piles should be fitted with standard flange plates to prevent damage on boulders and to increase the contact area bearing on the rock. The driving energy for tube piles would have to be reduced to less than 30,000 ft-lb per blow when the pile is within 7 feet of bedrock.
4. Reinforced earth structures should be considered for the 2 railway crossings. These structures would consist of reinforced earth walls with a deck supported on spread footings placed in the granular material back of the wall facing and would be loaded to 2 tons per square foot. The ability of reinforced earth to withstand settlement; its speed of construction; and the cost of a deep piling alternative, suggests reinforced earth will compare favourably both in cost and time of construction with more conventional alternatives.

Recommendations

E.C. Row and CPR, W.P. 259-66-02

A single span structure is proposed.

1. Spread footings
 - 3 tons/sq. ft. at 598
 - adhesion of 2000 lb/sq. ft.
 - maximum settlement = 10 in.
 - differential settlement 3" in 50 ft.
2. Piles to bedrock at elevation 476.
3. Reinforced earth walls with a deck supported on spread footings loaded at 2 tons per square foot.

E.C. Row and Little River, W.P. 259-66-04

1. Spread footings
 - 2 tons per square foot at 583
 - adhesion of 2000 lb/sq. ft.
 - settlement - 2 in.
2. Piles to bedrock at elevation 470.

*572 agreed for this
KG E + 1 Keen*

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E.C. Row and Jefferson Blvd., W.P. 259-66-05

1. Piers

- spread footings at 3 tons/sq. ft. at elev. 598
- adhesion of 2000 psf
- settlement - 2 in.

2. Abutments

- compacted granular at 3 tons/sq. ft.
- settlement - 6 in.
- tube piles to elevation 590 with loads of 25 tons per pile
- settlement 6 in.

3. Piles to bedrock at elevation 460+ 10

E.C. Row and Lauzon, W.P. 259-66-06

1. Center Pier

- spread footing at 487 at 2 tons/sq. ft.
- adhesion of 2000 lb/sq. ft.
- settlement of 2 in.

2. Abutment

- compacted granular at 3 tons/sq. ft.
- settlement of 6 in.
- tube piles to elevation 584 with a design load of 25 tons per pile
- settlement of 6 in.

3. Piles to bedrock at elev. 475

Lauzon Parkway and CPR, W.P. 259-66-08

A 3 span structure is proposed.

1. Piers

- spread footings at 2 tons per sq. ft. at 587
- adhesion of 2000 lb/sq. ft.
- settlement - 3 in.

2. Abutments

- tube piles to 585 with a design load of 25 tons per pile
- settlement - 8 in.

3. Piles to bedrock at elevation 478

4. A single span reinforced earth structure as outlined in the summary.

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E.C. Row and Central Ave., W.P. 257-66-08

1. Piers

- spread footings at 3 tons per sq. ft. at elev. 610
- adhesion of 2000 lb/sq. ft.
- settlement of 2 in.

2. Abutments

- compacted granular at 3 tons/sq. ft.
- settlement - 4 in.
- tube piles to elev. 605 with a design load of 25 tons per pile
- settlement - 4 in.

3. Piles to bedrock at elev. 495+ 10



P.J. Stuart
Project Engineer

PJS/gs

cc: J. Keen
A. Crowley
J. Anderson
Files /

Mr. J. Forester
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Geotechnical Section
Southwestern Region, London

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Room 315, Central Building

79 04 23

Re: Settlement of E.C. Row Expressway Embankment
at C.P.R. Overhead
W.P. 259-66-02, Site 6-289
E.C. Row Expressway, District 1, Chatham

This memorandum confirms our prediction of a 10 inch settlement of the subsoil under the proposed 28 foot high E.C. Row Expressway embankment at Sta. 470+80. Any utilities in this area should be designed to tolerate this differential settlement between the toe and top of the slope.


P.J. Stuart
Project Engineer

PJS/gs

cc: Files ✓

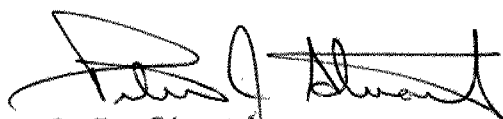
Mr. A.P. Watt
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Re: CPR Overhead, 1.9 Miles East of Walker Road
W.P. 259-66-02, Site 6-289
E.C. Row Expressway, District 1, Chatham

A review of the Preliminary General Arrangement Drawing for the above structure shows the design is adequate from a soil mechanics viewpoint.



P.J. Stuart
Project Engineer

PJS/gs

cc: Files ✓

35MM

DRAWING

