

Technical Memorandum

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Re: **Location 2** - Mississauga Road (RR 1) from 300 m north of Queen Street West (RR 6) to 100 m South of Bovaird Drive (RR 107) - Region of Peel.

This technical memorandum has been prepared to provide the required updates to the Technical Studies for Amendment to Previously Approved Schedule 'C' Municipal Class EA for Mississauga Road for Location 2. For the purposes of this technical memorandum, the limits of Location 2 are shown in Table 1.

Table 1 – Summarized Details of Road under the EA Study for Location 2

Plan Work	From	To	Current Lanes	Planned Lanes	Appx. Length (km)
None	300 m north of Queen St. West	200 m north of Adamsville Rd.	6	6	0.5
Widening	200 m north of Adamsville Rd.	450 m north of Williams Pkwy.	4	6	1.5
Widening	450 m north of Williams Pkwy.	100 m south of Bovaird Dr.	2	6	0.8
Total for Location 2					2.8

Amec Foster Wheeler reviewed the existing Trow Associates Inc. Report ("Preliminary Geotechnical Investigation Mississauga Road from Queen St. to Bovaird Dr. (Hwy 7) approx. 3 km – Brampton, Ontario dated June, 2005). As stated in the Trow Report, the purpose of the geotechnical investigation was to determine the pavement configuration and subsurface condition along the road and provide recommendations for the preliminary design of the road improvement/widening works.

DESKTOP INFORMATION FROM THE REPORT

A summary of Amec Foster Wheeler's review of the Trow Report is provided in following paragraphs.

Geotechnical Investigation and Traffic Data

- Traffic data including AADT, growth rate and percent of commercial vehicles.
- A total of 13 boreholes advanced at the edge of pavement at an interval of 250 m to a depth ranged from 1.8 to 2.3 m.
- A total of 13 shallow test pits to assess the thickness of topsoil.

- Three (3) granular samples for granular gradation.
- Five (5) tests on soil samples for inorganic parameters listed in table 3 of the MOE Document “Soil Ground Water and Sediments Standards for Use under Part XV.1 of the Environmental Protection Act”.

Pavement Composition

The asphalt thickness at edge of pavement ranged from 150 mm to 210 mm with an average of 190 mm. A second layer of old asphalt was found in some of the boreholes but was ignored in the assessment of the pavement structure adequacy.

A granular fill was encountered at edge of pavement underlying the asphalt ranging in thickness from 280 mm to 550 mm, with an average of 400 mm. Underlying the granular fill, the predominant soil profile consists of fill overlying clayey silt till.

The granular base equivalency (GBE) ranged from 415 to 641 mm with an average of 500 mm. The AASHTO structure number (SN) ranged from 43.2 to 68.2 mm with an average of 54.8 mm. The thickness of the topsoil on the ground surface at the test pit locations ranged from 50 to 155 mm with an average of 90 mm.

The existing pavement conditions was rated as “Poor Condition”.

DISCUSSION AND RECOMMENDATIONS FOR DETAILED DESIGN

Based on review of available information and requirement to obtain sufficient information for detail design, Amec Foster Wheeler’s recommends the following:

- **Available information:** Based on borehole location plan, the boreholes were situated in a staggered manner, at the edge of pavement of the road lanes every 250 m. i.e. the spacing between each borehole per lane is 500m.

Amec Foster Wheeler Recommendation for update: For detailed design, it is recommended that 12 additional boreholes be drilled, each advanced to a depth of about 1.5 m and situated in between the 2005 boreholes to maintain a spacing per lane of 250 m. Additionally, hand auger to a depth of 1.0 m adjacent to the boreholes in the widening areas to determine the topsoil thickness.

- **Available information:** Three (3) sieve analysis were performed that showed 21 to 40% gravel, 51 to 67% sand and 9 to 14% silt and clay. The samples did not meet OPSS requirements except one sample met the gradation of Granular B.

Amec Foster Wheeler Recommendation for update: It is recommended more laboratory soil testing from the boreholes be conducted to confirm the 2005 gradation tests, as presented in Table 2.

- **Available information:** The environmental test results met the specified requirements in Table 3 of the MOE except for electric conductivity (EC) and Sodium Absorption Ratio (SAR). It was concluded that the exceedance of EC and SAR do not require a cleanup, and was not considered a cause of concern but could affect the growth of certain species of plant. Tests were not conducted for TCLP, and metal and inorganic tests.

Amec Foster Wheeler Recommendation for update: It is recommended that two (2) composite soil samples from the project area be tested for the analysis of Ontario Regulation 558 Toxicity Characteristic Leaching Procedure (TCLP), six (6) soil samples be tested for metals and inorganics as presented in the Table 2. The primary focus of the environmental sampling would be to assist in providing recommendations for soil handling and/or off-site soil disposal options should there be excess soil from construction and/or contaminated soil that require removal prior to construction.

- **Available information:** Pavement design was recommended in the report.
Amec Foster Wheeler Recommendation for update: It is recommended that the pavement design be updated based on the projected construction year.
- **Available information:** Pavement rehabilitation was recommended in the report.
Amec Foster Wheeler Recommendation for update: It is recommended that an update pavement visual condition survey be carried out and the rehabilitation strategy be revisited based on latest survey results and the latest existing SN to improve the pavement structure adequacy.

Slope stability analysis of the embankments less than 3.0 m in height is not necessary, provided a slope of 2Horizontal:1Vertical (or flatter) is maintained.

Table 2: Summary of Recommendations for Update the Geotechnical Investigation and Reporting

<i>Field Work</i>	
Pavement Condition Survey 12 BHs to a depth of 1.5 m 12 Hand Auger to a depth of 1.0 m	
<i>Laboratory Testing - Soil Testing</i>	<i>Environmental and Chemical Analysis</i>
Moisture Content (10) samples Sieve analysis (6) tests Hydrometer (2) tests Atterberg Limits (2) tests	Metals & inorganics (6 samples) TCLP (2 samples)

The recommended additional investigations can be completed at detailed design.