

November 23, 2017

Proposal No. P1791724

Mr. Gary Moore
Director of Engineering Services
City of Hamilton
77 James Street North, Suite 320
Hamilton, Ontario
L8R 2K3

EVALUATION OF PAVEMENT SURFACE SKID RESISTANCE RED HILL VALLEY PARKWAY, CITY OF HAMILTON

Dear Sir,

Golder Associates Ltd. (Golder) is pleased to present this proposal to the City of Hamilton (City) to investigate the skid resistance of the existing pavement surface on the Red Hill Valley Parkway (RHVP), located in the City of Hamilton. As part of this assignment, Golder will also provide recommendations for methods to improve the skid resistance, if such improvement is required. This proposal details are scope of work for this assignment, and the associated cost estimate.

Scope of Work

Golder's scope of work for this assignment will include first carrying out a field investigation program which will include the following testing:

- Surface frictional properties using the British Pendulum Tester in accordance with ASTM E303; and
- Pavement texture measurements using a volumetric technique in accordance with ASTM E965; and
- Coring of the surface course asphalt layers.

Both the friction testing and the texture measurements will be carried out during one night. Golder will retain the services of a qualified traffic control subcontractor to provide the required traffic control for the testing. In each direction of the RHVP the friction and texture measurements will be made at 15 locations, with both tests being carried out at each location.

At each location that is tested for friction and texture, Golder will obtain a core of the surface course asphalt layer. A 150 mm diameter core barrel will be used to obtain the asphalt core, and the coring machine will be operated by a Golder representative. After the core at each location is extracted, the core hole will be filled with cold-patch asphalt.

The asphalt cores will be brought to Golder laboratory to Whitby, Ontario. The cores will be broken down and the aggregates from the surface course asphalt layers will be extracted from each core. The extracted aggregates will then be sent to a laboratory in Ireland for testing of Polished Stone Value in accordance with British Standard 812. The laboratory to be used to carry out the testing will be Testconsult Ireland Limited, located in Ireland.

Golder Associates Ltd.

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The results of the field investigations and laboratory testing will be used to determine whether the pavement surface on the RHVP has sufficient frictional resistance, and if not then the cause for the low frictional number will be ascertained. Additionally, based on the causes for the potentially low skid resistance, Golder will provide recommendations for methods that may be implemented to improve the pavement frictional numbers. Golder will also evaluate the potential of using hot-in-place recycling to restore the pavement friction.

The findings of our investigations and analysis will be presented to the City in the form of a draft report. Upon receipt of comments on the draft report, Golder will make necessary updates and the report will be finalized.

Cost Estimate

The total cost to complete the scope of work detailed above will be \$18,100 (excluding HST). An approximate cost breakdown for this assignment is provided in the table below.

Task	Total Labour	Total Disbursement	Total Cost
Field Investigation	\$5,100	\$900	\$6,000
Laboratory Testing	\$500	\$3,700	\$4,200
Analysis and Reporting	\$6,900	\$100	\$7,000
Project Management	\$800	\$100	\$900
Project Total	\$13,300	\$4,800	\$18,100

Closure

We thank you for the opportunity to submit this proposal and look forward to working with you on this interesting assignment. Our work for this assignment will be carried out in accordance with mutually agreed upon terms and conditions. If you are agreeable to the scope of work and cost estimate detailed in this proposal, please provide us with written authorization to proceed. If you have any questions about this proposal or require further clarification, please do not hesitate to contact the undersigned.

Yours truly,

GOLDER ASSOCIATES LTD.



Vimy Henderson, Ph.D., P.Eng.
Pavement and Materials Engineer



Ludomir Uzarowski, Ph.D., P.Eng.
Principal, Senior Pavement and Materials Engineer

RR/LU/r