



MEMORANDUM

Date: April 15, 2016

To: Matthew Leavitt, P.Eng.
Project Soils Engineer
Northwestern Region

Cc: A. DeSira, M.Eng., P.Eng.
Foundation Engineer
and
Ken Ahmed, P.Eng.
Senior Foundation Engineer
MERO-Pavement and Foundations Section

From: Stan E. Gonsalves, P.Eng.
Principal Engineer
Designated MTO Foundation Contact
exp Services Inc.

Re: Addresses on Comments on the Draft Foundation Investigation and Design Report
Whitewood Creek Culvert Replacement, Highway 590, Site No. 48W-168/C,
Township of Marks, District of Thunder Bay

Agreement No. 6014-E-0017, Assignment # 2
GWP 6349-14-00
MTO Geocres No. 52A-213

We are pleased to submit the Final Foundation Investigation and Design Report of the above noted project. The final report addresses all comments on the Draft Foundation Investigation and Design Report noted in the MTO letter of March 21, 2016. In particular, **exp's** responses to these comments are:

1. Exp's response to MTO Comment No. 1: *MTO GEOCRES No. 52A-213 is assigned to the Final Report and Foundation Drawings.*

FOUNDATION INVESTIGATION REPORT

2. Exp's response to MTO Comment No. 2: *A sentence is added in Section 1.4.5, pg. 7 of the final report addressing this.*



3. FOUNDATION DESIGN REPORT

4. Exp's response to MTO Comment No. 3: *The embedment length of pile, referring below the culvert invert level, has been updated in Section 2.3.3.1, p.g. 14 of the final report.*
5. Exp's response to MTO Comment No. 4: *A paragraph is added in Section 2.3.3.1, pg. 15 of the final report providing reference to the potential for encountering cobbles or boulders within the Till material and challenges associated with driving sheet piles.*
6. Exp's response to MTO Comment No. 5: *Since the embedment length of pile has been updated in the final report, the calculated sheet pile capacity has also been updated. The sheet pile capacities are calculated based on a static analysis, considering skin friction and end bearing resistance, using the effective stress β method. Since the sheet piles will also be retaining the approach fills, only the embedded, outside portion of the sheet piles below the creek bed is considered to calculate axial resistance.*
7. Exp's response to MTO Comment No. 6: *A paragraph is added in Section 2.3.3.1, pg. 15 of the final report to clarify the inspection and testing requirements for installation of the sheet piles for the sheet pile culvert option.*
8. Exp's response to MTO Comment No. 7: *Agreed, the cofferdams, is to envelop temporarily a construction site. Therefore, the height requirement of the cofferdam has been updated in the final report to extend 1 m above the water level in creek at the time of construction (see Section 2.7, p.g. 28).*
9. Exp's response to MTO Comment No. 8: *The effective stress analysis for a long term stability assessment was performed using an effective cohesion value of 'zero'. The reference to 100 kPa was typographical error. The Table 2.6 has been updated in the final report (see Section 2.8.2, p.g. 29).*
10. Exp's response to MTO Comment No. 9: *Two Professional Engineers, Silvana Micic and Stan Gonsalves, who is exp's Designated Principal Contact identified for MTO Foundation Engineering Projects, signed and stamped the Final Foundation Investigation Report and the Final Foundation Investigation and Design Report.*

RECORD OF BOREHOLE LOGS

11. Exp's response to MTO Comment No. 10: *The note 2 has been removed from the borehole logs.*



We trust these responses satisfactory address the items raised after the MTO review. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

A handwritten signature in black ink, appearing to read 'Silvana Micic', written over a horizontal line.

Silvana Micic, Ph.D., P.Eng.
Senior Geotechnical Engineer
Project Manager

A handwritten signature in blue ink, appearing to read 'Stan Gonsalves', written over a horizontal line.

Stan Gonsalves, M.Eng., P.Eng.
Principal Engineer
MTO Designated Contact