

DYREGROV CONSULTANTS

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File #252788

Earth Tech Canada Ltd.
850 Pembina Highway
Winnipeg, Manitoba
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Attention: Mr. Eric Hutchison, P.Eng.

Dear Sir:

Re: NEWPCC
Centrate Treatment Project
Nitrogen Removal Facilities

Further to the geotechnical report for the above-noted project submitted in February 2006 and as a result of recent discussions regarding the approximated 9 to 10 metre excavation required, I would offer the following comments.

For bidding purposes, I would recommend that the open cut excavation slopes be considered as 4 horizontal to 1 vertical and where these slopes cannot be accommodated, shoring must be considered. The design of the shoring shall be based on the parameters which are provided in the geotechnical report for the project.

It is my understanding that an excavation plan, which will be required for the project, must be designed and endorsed by a geotechnical engineer. The geotechnical engineer must confirm that the aforementioned slope of 4 horizontal to 1 vertical is adequate from a slope stability aspect. Otherwise, the geotechnical engineer may endorse flatter or steeper slopes by quantitative analyses in the development of the excavation plan.

Recent experience on similar projects has demonstrated that the floor of excavations have rebounded as much as 660 mm. A major component of the heave has been attributed to vertical soil displacement resulting from the driven precast pile installation. Part of the heave can also be related to elastic rebound due to unloading of the underlying soil. This does not include any heave or shrinkage which could occur due to environmental factors such as drying or wetting during construction. To minimize the heave due to the pile installation, preboring to within 1.5 metres of the glacial till surface (Test Hole 1 till elevation is 213.97 metres) would be beneficial.

-2-

The piezometric elevation in the underlying bedrock which was considered for the NEWPCC U/V structure was 224.01 metres which is above the base of the anticipated depth of the excavation. As such, there is a risk that the preboring could make a connection between the bedrock water conditions and the excavation. The risk is considered to be low if the preboring is limited to within 1.5 metres of the glacial till surface.

If this preboring is considered, the heave would be expected to be less than the 660 mm which has been reported. It is suggested that if this preboring is done, that an allowance of 330 mm be considered. If full 330 mm rebound does not occur, it can be taken up with additional thickness of sand bedding. If the rebound is greater than 330 mm, then additional removal of soil to the required elevation would be necessary.

All recommendations are to be confirmed by the geotechnical engineer retained by the contractor.

Yours truly,

DYREGROV CONSULTANTS



Per:

A handwritten signature in black ink, appearing to read "A.O. Dyregrov".

A.O. Dyregrov, P.Eng.