



**THURBER** ENGINEERING LTD.

February 2, 2022

File: 33256

Clean Harbors Canada Inc.  
4090 Tefler Road, R.R. #1  
Corunna, Ontario N0N 1G0

Attention: Mr. Michael Parker  
Vice President, Canadian Environmental Compliance

**GEOTECHNICAL PEER REVIEW  
GHD RESPONSE LETTER OF JANUARY 28, 2022  
CELL 20-1 SLOPE STABILITY ISSUES  
CLEAN HARBORS LAMBTON LANDFILL FACILITY  
CORUNNA, ONTARIO**

Dear Mr. Parker:

Thurber Engineering Ltd. (Thurber) has prepared the following comments to GHD's letter of January 28, 2022, "Responses to Geotechnical Peer Review and Updated Assessment – Cell 20-1 Slope Issues, Clean Harbors Lambton Landfill Site" (i.e. Thurber Peer Review letter of December 23, 2021).

In general, GHD in its response letter, has filled in most of the missing information noted in the Thurber Peer Review Letter. For expediency, the following presents only outstanding issues that in our opinion require additional consideration when interpreting the geotechnical models for implementation during landfilling.

This letter references the following GHD reports:

- Geotechnical Evaluation and Remedial Plan (GHD Report)  
Cell 20-1, Slope Issues – Clean Harbors  
Lambton Facility Landfill Corunna, Ontario, dated November 12, 2021
- Addendum to the Geotechnical Evaluation and Remedial Plan (GHD Addendum)  
Cell 20-1, Slope Issues – Clean Harbors  
Lambton Facility Landfill Corunna, Ontario, dated December 17, 2021
- Geotechnical Investigation (GHD Geotechnical Design Report)  
Cell 20, Subcell 1  
Clean Harbors Lambton Facility Landfill  
Corunna, Ontario, dated January 19, 2021



## 1. SLOPE STABILITY MODELLING

GHD utilized Geo-Studio 2021, SLOPE/W module, to complete the slope stability modelling, both for the design of the slope and subsequent post slope movement analyses. In its response letter, GHD has updated its modelling to include site conditions encountered during recent investigations, including deep hydrostatic impacts.

In reviewing the most recent modelling results, the following questions arise:

- Instead of modelling the hydrostatic pressure through the permeable zone in the bedrock, GHD has applied it by subdividing the Black Shale Till layer and applying it to the lower subdivision. It is unclear why this was done or how it affects the modelling results, particularly since the Black Shale Till is not a water bearing soil. GHD should provide further description of this aspect of the model.
- GHD should provide figures showing the hydrostatic pressures and pore pressures assumed throughout each modelled area.
- Please provide a figure showing the full array of nodes used for modelling each section and the minimum FS calculated for each.
- In Figure 7, GHD indicates that CKD has a unit weight of 21 kN/m<sup>3</sup>. Based on our past experience with CKD, this is a very high unit weight. We recommend that this value be confirmed through testing.

## 2. MINIMUM FACTOR OF SAFETY

In its initial Geotechnical Design Report, GHD identified a minimum Factor of Safety (FS) for slope design should be 1.3. This minimum FS was continued to be utilized by GHD in its two post slope movement reports, GHD Report and GHD Addendum.

In its recent response letter, GHD identifies slope FS that are below 1.3 and as low as 1.16. Given the Site history of slope movements, these low FS represent a significant risk that should be mitigated through design and/or monitoring.

We recommend that Clean Harbors develop remedial plans to improve the FS during filling the open landfill cell as soon as possible, given site conditions and weather. The proposed slope monitoring program should also be sufficiently robust to detect slope instability for safety and allow for remedial responses, as possible. Particular attention should be given to the potential impacts of the spring thaw, and the implementation of additional monitoring at that time.



We would be happy to discuss these comments further.

Please feel free to contact us with any questions or comments.

Yours truly,  
Thurber Engineering Ltd.

Renato Pasqualoni, P.Eng.  
Principal





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Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

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