

036

Hernández, Nelson

From: Kleinberg, Sam
Sent: Tuesday, December 2, 2025 5:09 PM
To: Mark Seel; pandersonpe@gmail.com
Cc: MacNeill, Ryan; Rizzo, Jordan; Hernández, Nelson; Mazier, Alejandra
Subject: FW: WEHI

Thank you Mark for your quick reply,; Please see our comments below in red:

From: Mark Seel <mseel@Langan.com>
Sent: Tuesday, December 2, 2025 1:24 PM
To: Kleinberg, Sam <SKleinberg@cmeusa1.com>; pandersonpe@gmail.com
Cc: Hernández, Nelson <NHernandez@cmeusa1.com>; MacNeill, Ryan <rmacneill@cmeusa1.com>; Rizzo, Jordan <jrizzo@cmeusa1.com>; Mazier, Alejandra <AMazier@cmeusa1.com>
Subject: RE: WEHI

This Message is from an external sender.

Sam,

A couple observations and thoughts:

1. The infinite slope case assumes water and failure surface parallel to the ground surface and assumes uniform surface and subsurface conditions. The infinite slope case is therefore an approximation because the ideal case doesn't exist (i.e., slopes are not exceptionally long or uniform). The infinite slope case is also a very shallow condition to validate the proportion of depth to length, as opposed to deeper seated potential failures. **CME Response: We understand the limitations but maintain our recommendation that the stability evaluation consider the potential impact of heavy rain events on slope stability. The last Langan submittal included infinite slope evaluations, but those were above the assumed phreatic surface used in the calculation. In our opinion assuming the seepage parallel to the slope and at the ground surface emphasizes the need for the recommended Planning Board development requirements outlined in our report at the last meeting.**
2. Our cases accounted for a water level shape that is based on the geometrical shape of slope and considering the only source of water is from direct precipitation between the ridge line and the eastern slope, which is limited. **CME Response: We have recommended that the BMP-10 and BMP-11 infiltration basin mounding discharge be controlled to limit the groundwater flow over the slope for that reason. Due to the difficulty in determining natural and forced infiltration on the slope, we have recommended the conservative assumption outlined in our response to Langan Comment No. 1.**
3. The strength values used in both CME and Langan's analysis ignore forms of cohesion as conservative cases. However, if you back calculate the minimum friction values required to achieve FS=1.0, the soil's friction would have to be at least 45 degrees, which is not realistic in the upper few feet. Therefore, cohesion is present, likely in the form of roots. If you check the minimum root cohesion required to achieve FS=1.0 (assuming friction of 30 degrees for the upper 2 feet), cohesion would have to be at least 35 psf or slope failures would be visible after intense rainfalls, and there is no evidence of

this anywhere on the site. Therefore, the root cohesion must be considerably higher. Various researchers have evaluated root cohesion and determined values typically range from 200 psf for clear cuts and natural wooded/forested land to 500 psf. The site is predominantly wooded; however, if C= 100 psf root cohesion is used, FS values would be well over 1.5 (i.e., 1.7 to 7) for the slopes in question. **CME Response: We recommend that Langan provide a formal response to the Planning Board on the basis described herein, to address this issue.**

4. The existing slopes are not going to be disturbed and the developer must maintain the vegetation, therefore the analyses demonstrate shallow failures are unlikely. **CME Response: We agree that the existing slopes must be protected from disturbance and that the vegetation must be maintained both by the developer and his successors. That is why we have recommended that enforceable requirements based on our review recommendations to the Board be established.**

I trust this addresses your concerns. Please call with any questions.

Mark

Mark Seel
Associate Principal / Vice President

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ATHENS CALGARY DUBAI LONDON PANAMA

From: Kleinberg, Sam <SKleinberg@cmeusa1.com>

Sent: Monday, December 1, 2025 5:55 PM

To: Mark Seel <mseel@Langan.com>; pandersonpe@gmail.com

Cc: Hernández, Nelson <NHernandez@cmeusa1.com>; MacNeill, Ryan <rmacneill@cmeusa1.com>; Rizzo, Jordan <jrizzo@cmeusa1.com>; Mazier, Alejandra <AMazier@cmeusa1.com>

Subject: RE: WEHI

Importance: High

Greetings,

We have attached a partial markup of the output for the cases of elevated GW_Critical and Infinite surfaces as submitted to us. We have completed the infinite slope checks using the basic hand calculation equation for Factor of Safety with phreatic surface at the ground surface and seepage flowing parallel to the slope for sections A&B. Our computations indicate factors of safety ranging from 1.178 and 0.88 at sections A & B respectively. The basis for our recommendation to address this case is included the attachment from Lambe and Whitman which is a valid reference. While the groundwater level has not been established, severe rainfall could develop a perched water condition over the bedrock with seepage parallel to the slope. The output indicates that the infinite slope cases for sections A&B are above the assumed seepage level and do not address our recommendations.