



TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

January 15, 2024
Project No. T-5915-3

Mr. Stephen Nornes
Presbyterian Homes & Services and Senior Housing Partners
2823 Hamline Avenue North
Roseville, Minnesota 55113

Subject: Response to Comments
Wesley Homes Senior Living Expansion – Phase 2
Puyallup, Washington

Reference: Geotechnical Peer Review Letter, Wesley Homes Senior Living Expansion – Phase 2, Civil Construction Permit No. PRCCP20231028-CV1, Puyallup, Washington, Project No. 2124006.010, prepared by Landau Associates, dated December 5, 2023

Dear Mr. Nornes:

As requested we have reviewed additional comments from the City of Puyallup regarding slope stability at the location of the Care Center building for the subject project. The comments were provided in the referenced Peer Review letter by Landau Associates. The following summarizes our response and provides the additional information requested in the order of the bulleted comments listed on page 2 of the referenced letter.

First Comment - *Terra Associates' geotechnical engineering letter includes a seismic stability analysis cross section for the proposed building and the slope that supports it at the northwest area of the parcel. The seismic stability analysis result shows a factor of safety less than 1.2 for dynamic conditions. Additional dynamic analysis completed by Terra Associates resulted in lateral slope displacements of less than 2 inches along the edge of the proposed building and less than one-half-inch towards the mid-point of the structure. Per Section 21.06.1230 (2) (A) of the PMC, proposed development shall not decrease the factor of safety for landslide occurrence below the limits of 1.5 for static conditions and 1.2 for dynamic conditions. This is a basic development design standard that must be met per the PMC, unless it can be demonstrated that an alternative design that deviates from this design standard provides greater long-term slope stability while meeting all other provisions of Chapter 21.06.*

Response – Subsequent issuance of our May 22, 2023 comment response letter, we completed additional stability analysis to evaluate the effectiveness of supporting the western half of the Care Center building on pipe piles as recommended if the owner was not willing to accept risk of building displacements as a result of dynamic loading during a design level earthquake. The results of this analysis was summarized in a letter we issued on June 13, 2023. It appears that Landau did not have this information as the letter is not listed as a document they reviewed. The June 13 letter is attached for reference and provides the requested information that demonstrates the required minimum seismic safety factor of 1.2 is met with the western portion of the building supported on pipe piles.

Mr. Stephen Nornes
May 22, 2023

Second Comment - *Per Section 21.06.1230 (2) (B) of the PMC, the alteration shall not increase the threat of geological hazard to the project site or adjacent properties beyond predevelopment conditions, nor shall it result in a need for increased buffers on neighboring properties. In its geotechnical engineering letter, Terra Associates provides seismic stability analysis resulting in a factor of safety of 0.975, and states that the proposed development will actually decrease the potential for slope movements than what currently exists. To be in accordance with the PMC, Terra Associates should provide a pseudo-static slope stability analysis of the current existing slope for comparison.*

Response - This analysis had been completed, however, was not included with any of the previous submissions and responses. Results of the seismic stability analysis of the existing conditions from the SLIDE2 computer program published by RocScience is attached. The lowest indicated safety factor under seismic loading for the existing condition was .908.

Third Comment - *Per Section 21.06.1230 (11) of the PMC, a monitoring program shall be prepared and implemented for construction activities permitted in landslide and erosion hazard areas. In its geotechnical engineering letter, Terra Associates recommends adding a note to the project drawings specifying bi-weekly slope reconnaissance during construction and quarterly slope reconnaissance post building construction. To be in accordance with the PMC, a slope monitoring plan should be included in the project documents and approved by the owner.*

Response – We understand that our recommendations for slope monitoring as outlined in our May 22, 2023 response letter will be included with the civil drawings as approved by the owner.

Fourth Comment - *In its Geotechnical Report Addendum Response to Comments letter, Terra Associates recommends Rammed Aggregate Piers (RAPs) for mitigating unsuitable fill soils, however the extent of RAPs required is unclear. If RAPs are to be used, a recommended minimum replacement ratio to achieve suitable foundation support and/or site slope stability should be provided. Terra Associates should specify performance criteria for design of RAPs for slope stability improvement.*

Response – As noted earlier, the western half of the building will be supported by Pipe Piles as recommended in our attached June 13, 2023 letter. Ground improvement using Rammed Aggregate Piers (RAPs) will not be used.

We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Theodore J. Schepper

Theodore J. Schepper, P.E. 1-15-24
Senior Principal Engineer

Cc: Ms. Jill Krance, In Site Architects
Mr. Dan Balmelli, P.E., Barghausen Consulting Engineers

Attachments: Terra Associates, Inc. June 13, 2023 Letter
SLIDE2 Seismic Stability Analysis Results for Existing Conditions