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November 15th, 2022

Brad Sturman
Sturman Architects
9 – 103rd Ave NE, Ste 203
Bellevue, WA 98004

RE: Simpson Residence
6454 E. Mercer Way, Mercer Is., WA 98040
Structural Review Letter

Dear Brad,

This letter is intended to respond to comments by the City of Mercer Island regarding the structural design as it relates to the potential of liquefaction and lateral spreading. We have reviewed the AESI geotechnical report dated 11-12-19 as well as the Geotech Consultants memo dated 9-1-22 for the subject property. Based on these documents, we understand that the building site is susceptible to liquefaction during the event of an earthquake. An analysis of the site has further calculated that up to 6" of ground settlement may occur during the Maximum Considered Earthquake (MCE) with a 1-in-2,475-year probability. As a result, the geotechnical reports have recommended that all building structures to be pile supported to mitigate against excessive settlements during an MCE.

We also understood that the potential for lateral spreading is a concern on this site during an MCE. Lateral spreading is an event that occurs with the flow of a liquefied layer of soil toward a free space. As stated in the Geotech Consultant memo, the free space in question is Lake Washington. Based on the geography of the site, it is reasonable to assume that this layer will flow relatively uniformly in the same direction. The pipe piles as currently designed are flexible and will be able to remain stable during large lateral movements.

For the design of this project, we have tied new concrete slabs to foundations and new foundations to existing foundations with reinforcing steel. The existing foundations consist of continuous concrete stem walls and footings which are tied together with a consistent level diaphragm. We believe this continuity will perform adequately during a seismic event.

Based on the review of the geotechnical documents, it is our professional opinion that the deep driven pipe pile system as presented in our structural drawings can sustain large displacements and provide adequate support of the residence to prevent building collapse.

Please let us know if we can be of further assistance.

Sincerely,

SWENSON SAY FAGÉT, INC.
A Structural Engineering Corporation

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