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**Property Owner:**

Derek & Eileen Cheshire  
7615 E Mercer Way  
Mercer Island, WA 98040

August 8<sup>th</sup>, 2025  
City of Mercer Island

Permit# CAO25-005 (Cheshire Residence SFR)  
7615 East Mercer Way, Mercer Island, WA 98040

**CORRECTION RESPONSE MEMO #2 - *Corrections not already addressed in Geotechnical Memo are highlighted.***

**Please Note:** Foundation design revised within plan set structural drawings, as clouded, including new catchment wall. New catchment wall also shown on civil, landscape, and architecture plans. This letter addresses MI SUB 2 Corrections under CAO25-005, that are not already addressed in the submitted Geotechnical Response memo dated August 8, 2025. Associated Building Permit Geotechnical Peer Review corrections are addressed in separate Geotechnical Response Memo and within the 2503-130-SUB-1-PLANS-review plan set correction response document. Both are uploaded with Building Permit 2503-130 Sub 2. We have included the latest Drainage Report with this resubmittal, as a reference.

**GEOTECHNICAL PEER REVIEW – REVIEWER MICHELE LORILLA**

**MI SUB 2 REVIEW COMMENT 1:** This comment is provided as a placeholder to review the statement of risk following completion of all comments being addressed. An updated statement of risk will be required upon final approval of the building permit plan set.

**Project Team Response:** Acknowledged. A statement of risk reflecting review of the final approved building permit plan set by Geotechnical Engineer of Record will be provided at that time.

**MI SUB 2 REVIEW COMMENT 6:** In the response above, the “...isolated areas of instability, such as within the slope to the west...” will require mitigation recommendations to meet the requirements of the statement of risk provided by the geotechnical engineer. The proposed development should not focus solely on the proposed building, but the entire property, i.e. not only the potential impact of the development on the slope, but the impact of the slope on the development.

The Nisqually earthquake produced lower ground motions than those anticipated with the current IBC earthquake loading used for the design of this project. So although the site response after the Nisqually earthquake “shows little to no signs of obvious foundation settlement or displacement”, that response is not indicative of how the site will respond under current IBC earthquake design loading.

**Project Team Response:** For this correction response, please review Geotechnical Engineer of Record Memo “RESPONSE TO LAND USE REVIEW COMMENTS” dated August 8, 2025 from Earth Solutions NW uploaded with this submittal.

**MI SUB 2 REVIEW COMMENT 7:** From FHWA-NHI-11-032 (see Reference citation at the end of this letter):

“While there is some limited information to indicate that the shear strength of soil increases with increasing strain rate, the peak shear strength of soil subjected to cyclic loading is generally assumed to be equal to or less than the peak static strength. If the soil is dry, the static drained shear strength may be used. If the soil is saturated, even if the soil is relatively free draining, the undrained shear strength should be used for seismic analyses because of the rapid nature of earthquake loading. For cohesive soils of low to

intermediate sensitivity, the static shear strength of the soil may be reduced by 10-15% when subjected to large magnitude earthquakes ( $M > 7$ ) to account for a potential reduction in shear strength due to cyclic loading.”

This FHWA reference does not support the geotechnical engineer of record’s response that use of a higher strength under seismic loading is “consistent with local standards and based on published recommendations for values...”. In reviewing slope stability analyses submitted by local geotechnical engineers for projects on Mercer Island, the use of higher soil strengths under seismic loading is not the standard of practice.

Please revise slope stability analyses to conform to local standard of practice and to the FHWA reference that indicates that “the peak shear strength is generally assumed to be equal or less than the peak static strength”.

**Project Team Response:** For this correction response, please review Geotechnical Engineer of Record Memo “RESPONSE TO LAND USE REVIEW COMMENTS” dated August 8, 2025 from Earth Solutions NW uploaded with this submittal.

MI SUB 2 REVIEW COMMENT 8: Please provide the calculation for the slope height reduction factor and the average peak acceleration that takes into account spatial incoherence. Please provide revised slope stability analyses using this average peak acceleration to verify that the FOS is a minimum of 1.1 for the western slope as indicated in ESNW response above.

From the debris flow discussion above:

“This condition suggests the slope is stable in the current condition and configuration. No modification is proposed for this slope; therefore, the stability will not be adversely impacted by the project.”

Although no direct impact of the proposed development on the stability of the existing slope to the west is anticipated, the impact of the slope on the proposed development must be assessed. Therefore, not only the current condition, but future stability of the slope must be considered. If slope stability analyses indicate unstable conditions (e.g. under seismic loading conditions), please provide mitigation recommendations.

**Project Team Response:** For this correction response, please review Geotechnical Engineer of Record Memo “RESPONSE TO LAND USE REVIEW COMMENTS” dated August 8, 2025 from Earth Solutions NW uploaded with this submittal.

MI SUB 2 REVIEW COMMENT 9: Based on the variability of the soil conditions encountered at the site, worse or better conditions could be expected. This is the unknown associated with the site given the range of conditions encountered in the subsurface explorations. As such, a different conclusion that considers the range of conditions could be made. For example, post-liquefaction differential settlement could approach the maximum estimated post-liquefaction settlement value and that value may be greater if the subsurface explorations have not encountered the worst condition at the site.

Please provide maximum total and differential post-liquefaction settlement estimates so that the structural engineer can assess the potential associated damage and/or life safety issues. Please provide calculations for review to support the post-liquefaction settlement estimates given.

The groundwater conditions in borings B-6 and B-7, located to the west and north of the proposed structure seem to be very similar. The effects of liquefaction indicated for the B-7 conditions should be considered in the stability analyses. Please provide residual strength estimates for the liquefiable layers for review and include those strengths in revised stability analyses. Please provide an assessment for lateral spreading and/or debris flow failures using these residual strengths. Please provide associated calculations of lateral spreading and/or debris flow deformations. Please include mitigation recommendations for potential post-liquefaction effects. For example, if debris flow failures are anticipated, please determine debris flow volumes and runout and determine whether the proposed structure could be physically impacted by the debris flow. If so, please provide mitigation measures or provide impact loading values for the structural engineer to consider in the structural design. On the downslope side of the residence, please indicate whether lateral spreading or debris flow would undermine the structure and provide mitigation recommendations.

Please provide these results to other project members (e.g. the structural engineer and architect) so that the project team can provide a coordinated design that addresses these deformations without the potential for building collapse.

Please have the structural engineer state potential post-liquefaction settlement and lateral deformations in the design criteria section of the General Notes- Structural Design plan sheet.

Please have the structural engineer provide a statement on the General Notes- Structural Design plan sheet indicating the design approach used to accommodate the estimated post-liquefaction deformations and whether the proposed structural design can withstand these deformations without building collapse.

**Project Team Response:** Structural plans now state potential liquefaction settlement and lateral deformations in the design criteria of the general notes of the structural plan set Sheet 1.0 (clouded). The structural engineer has also provided a statement in the general notes on the structural plan set Sheet 1.0 (clouded) that “The building design is capable of tolerating the above estimated deformation without collapse”.

For the remainder of this correction response, please review Geotechnical Engineer of Record Memo “RESPONSE TO LAND USE REVIEW COMMENTS” dated August 8, 2025 from Earth Solutions NW uploaded with this submittal.

MI SUB 2 REVIEW COMMENT 11: The foundation mitigation proposed must meet the requirements of MICC 19.07.160.B.3. Otherwise, the statement of risk required from the geotechnical engineer of record for building and critical area permit approval cannot be made.

Since the reviewer’s opinion on the appropriate foundation design for the structure continues to differ significantly from the geotechnical engineer of record, an independent third-party review can be requested by the applicant. Please contact the Mercer Island Building Official (gareth.reece@mercergov.org).

**Project Team Response:** For this correction response, please review Geotechnical Engineer of Record Memo “RESPONSE TO LAND USE REVIEW COMMENTS” dated August 8, 2025 from Earth Solutions NW uploaded with this submittal.

MI SUB 2 REVIEW COMMENT: Reviewing the structural calculations provided, the active lateral earth pressure used in the wall design appears to be 29.6 pcf rather than the 49 pcf indicated on the structural drawing, Sheet S1.0. The 49 pcf appears to be included incorrectly as a 49 psf uniform surcharge load. The 49 pcf loading should replace the 29.6 pcf loading used in the calculations. Please revise structural calculations and resubmit for review. Please modify structural wall design as needed.

**Project Team Response:** Structural calculations were revised as requested and uploaded with resubmittal.

MI SUB 2 REVIEW COMMENT: Please note that there are additional review comments included in the building permit (2503-130) review that have not been addressed in the June 17, 2025 response letter from ESNW. Those additional comments should be addressed in responding to the building permit review comments.

**Project Team Response:** Associated Building Permit Geotechnical Peer Review corrections are addressed in separate Geotechnical Response Memo uploaded with Building Permit 2503-130, as well as within the 2503-130-SUB-1-PLANS-review plan set correction response document.