

September 30, 2025

JN 24314

Rain Rock Properties LLC
5257 Forest Avenue Southeast
Mercer Island, Washington 98040

Attention: Kat Lin
via email: kathleenlinmd@gmail.com

Subject: **Foundation Change and Plan Review**
Proposed Accessory Dwelling Unit
5331 Forest Avenue Southeast
Mercer Island, Washington

Greetings:

We prepared a geotechnical engineering study for this project dated October 8, 2024 for the subject project at 5331 Forest Avenue Southeast. We subsequently have prepared two comment response/plan review letters for the project, with the most recent being August 18, 2025. Based on correspondence between the project team and Mercer Island's geotechnical reviewer, we understand that the reviewer disagrees with recommendations we presented in the study regarding the use of conventional footings being used as the foundation of the project. We still strongly believe that the use of conventional footings, which is what the existing residence is founded on, can be used for the project foundation. However, recent correspondence from the geotechnical reviewer indicated that the footing foundation design would need to be examined by a third-party reviewer to determine if it is acceptable. In the interest of time on this project, the project team has determined it more efficient to just change the project foundation to a pile-supported foundation so that a permit can be obtained. So while we still strongly believe that it is suitable to use a conventional foundation system for this project, we have recently provided recommendations for the use of a pipe pile foundation. Those recommendations are given below. In addition, this letter also provides our comments regarding the current project plans and an updated Statement of Risk.

PIPE PILES

Three- or 4-inch-diameter pipe piles driven with an 850- or 1,100- or 2,000-pound hydraulic jackhammer to the following final penetration rates may be assigned the following compressive capacities.

INSIDE PILE DIAMETER	FINAL DRIVING RATE (850-pound hammer)	FINAL DRIVING RATE (1,100-pound hammer)	FINAL DRIVING RATE (2,000-pound hammer)	ALLOWABLE COMPRESSIVE CAPACITY
3 inches	10 sec/inch	6 sec/inch	2 sec/inch	6 tons
4 inches	16 sec/inch	10 sec/inch	4 sec/inch	10 tons

Note: The refusal criteria indicated in the above table are valid only for pipe piles that are installed using a hydraulic impact hammer carried on leads that allow the hammer to sit on the top of the pile during driving. If the piles are installed by alternative methods, such as a vibratory hammer or a hammer that is hard-mounted to the installation machine, numerous load tests to 200 percent of the design capacity would be necessary to substantiate the

allowable pile load. The appropriate number of load tests would need to be determined at the time the contractor and installation method are chosen.

As a minimum, Schedule 40 pipe should be used. The site soils are not highly organic, and are not located near salt water. As a result, they do not have an elevated corrosion potential. Considering this, it is our opinion that standard "black" pipe can be used, and corrosion protection, such as galvanizing, is not necessary for the pipe piles.

Load tests are required on 3 percent of the installed piles up to a maximum of 5 piles, with a minimum of one pile load test on each project, per code. Additionally, full-time observation of the pile installation by the geotechnical engineer-of-record is required by code.

We recommend a minimum pile length of at least 10 feet below the existing ground surface. However, our experience with installation of small-diameter pipe piles indicates that it is likely that they will be longer than this minimum length to reach refusal.

Pile caps and grade beams should be used to transmit loads to the piles. Isolated pile caps should include a minimum of two piles to reduce the potential for eccentric loads being applied to the piles. Subsequent sections of pipe can be connected with slip or threaded couplers, or they can be welded together. If slip couplers are used, they should fit snugly into the pipe sections. This may require that shims be used or that beads of welding flux be applied to the outside of the coupler.

Lateral loads due to wind or seismic forces may be resisted by passive earth pressure acting on the vertical, embedded portions of the foundation. For this condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level compacted fill. We recommend using a passive earth pressure of 250 pounds per cubic foot (pcf) for this resistance. This is an ultimate value that does not include a safety factor. If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate.

If lateral resistance from fill placed against the foundations is required for this project, the structural engineer should indicate this requirement on the plans for the general and earthwork contractor's information. Compacted fill placed against the foundations can consist of soil that is tamped into place using the backhoe or is compacted using a jumping jack compactor. It is necessary for the fill to be compacted to a firm condition, but it does not need to reach even 90 percent relative compaction to develop the passive resistance recommended above. Due to their small diameter, the lateral capacity of vertical pipe piles is relatively small. However, if lateral resistance in addition to passive soil resistance is required, we recommend driving battered piles in the same direction as the applied lateral load. The lateral capacity of a battered pile is equal to one-half of the lateral component of the allowable compressive load. The allowable vertical capacity of battered piles does not need to be reduced if the piles are battered steeper than 1:5 (Horizontal:Vertical).

REVIEW OF PLANS AND STATEMENT OF RISK

We have completed a general review of the geotechnical aspects of the plans for the residence remodel and addition project to be constructed at 5331 Forest Avenue Southeast on Mercer Island. The plans we reviewed include: 1) Sheets A0.0 through A4.0, which were prepared by DiMarco Architecture and Design dated September 26, 2025, 2) Sheets S1.0 through S4.3, which were

prepared by Quantum Consulting Engineers LLC dated September 26, 2025, and 3) Sheets C01 through C04, prepared by Facet, dated March 28, 2025. In our judgment, the plans we reviewed conform to the recommendations in our geotechnical engineering study. It is our opinion that the completed development will not increase the potential for soil movement. As such, we provide the following Statement of Risk:

It is our professional opinion that the recommendations presented in the study and shown in the project plans are followed, the proposed project will render the development as safe as if it were not located in a geologically hazardous area and will not adversely impact critical areas on adjacent properties.

We trust that this letter is suitable for your needs at this time. If there are any questions, or if we can be of further service, please contact us.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.



9/30/2025



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