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Reference: 022043

November 29, 2022

Don Daniels
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Santa Margarita, CA 93453

Subject: Addendum to Soils Engineering Report for Proposed Single Family Residence at 495 Sea Court, Shelter Cove, Humboldt County, California

Don Daniels:

SHN previously provided a Soils Engineering Report for your proposed single-family residence at 495 Sea Court (Assessor's parcel number [APN] 111-121-036) in Shelter Cove, California, dated June 15, 2022. In that report, we provided soils engineering data, conclusions, and recommendations for a wood-framed structure that we understood would include an elevated living area supported, or partially supported, by concrete drilled piers. The site is an oceanfront lot characterized by a limited buildable area. The northeastern part of the lot, adjacent to Sea Court, occupies the western edge of a flat marine terrace surface that forms the plateau beneath the Shelter Cove airfield. This flat portion of the lot represents the buildable area of the lot; a 160-foot-wide bedrock platform occurs seaward of the western edge of the terrace but is considered unbuildable.

In the previous soils report, we recommended the structure be located a minimum of 5 feet back (landward) from the edge of the marine terrace. Based on preliminary design, however, we understand that the spatial constraints of the lot require consideration of encroaching within 5 feet of the edge of the marine terrace, and you have requested we evaluate the impacts of this consideration and provide recommendations as appropriate.

Discussion

The marine terrace surface is underlain by about 8 feet of marine terrace sediments, typically layered granular (sand, silt) shallow marine deposits. These terrace sediments are underlain by the eastward continuation of the bedrock platform, a hard (mostly basalt) rock surface. The seaward edge of the terrace sediments is a steep 6- to 8-foot-high face, blanketed with ground cover vegetation (pickle weed) but considered susceptible to erosion and retreat.

In our analysis and reporting, we interpret that the modern terrace edge is subject to a low potential for coastal erosion under current conditions. The broad bedrock platform seaward of the terrace edge and the elevation of the terrace platform (about 35 feet) suggest it is likely subject to coastal erosion under only the most extreme conditions, if at all. Very high tectonic uplift rates have been documented in the

region, so the terrace may represent a raised platform elevated beyond most coastal exposure. The potential of erosion at the seaward edge of the terrace sediments cannot be precluded, however. The site is subject to both tsunami inundation and rising sea levels, both of which would increase exposure levels (a large tsunami would be a catastrophic event).

The 5-foot setback recommended in our earlier soils report was intended to provide a buffer from rare coastal erosion events to protect buried foundation elements, and to provide passive lateral soil resistance. The passive lateral soil pressure is intended to supplement the support (end-bearing and lateral) generated by socketing the concrete piers in the underlying bedrock, as previously recommended.

We interpret that moving the structure closer to the terrace edge will increase the susceptibility to erosion and exposure of foundation elements. Subject to a rare coastal erosion event with such a small buffer, concrete piers that were once buried along the seaward edge of the home may become exposed, such that they become free-standing piers that have lost the protection and lateral resistance provided by the soil column.

Recommendations

To mitigate the increased potential for impacts related to retreat of the terrace edge, it should be assumed that coastal retreat occurs within the lifetime of the structure such that the seaward row of support columns become exposed. At a minimum, the seaward row of piers should be designed as though they are free-standing without any passive soil resistance. This may require additional pier reinforcement, decreased pier spacing, or additional pier embedment to compensate for the loss of passive soil resistance and the exposure to the coastal elements (including potential future inundation). We assume this additional design work is the responsibility of the project structural engineer.

We previously recommended that piers extend 8 feet below grade or 2 feet into bedrock, whichever is greater. However, the hardness of the bedrock beneath the site is not known, and the possibility exists that it may not be feasible to develop 18-inch pier holes into the rock. If drilling refusal is met, and in the opinion of the Geotechnical Engineer or qualified representative that the piers cannot be founded the recommended embedment into bedrock, then the piers and other foundation elements can be supported in the deepest feasible pier hole (or in the worst case, directly on the top of the bedrock surface) provided that the necessary lateral resistance is accommodated through doweling a sufficient number and size rebar into the bedrock.

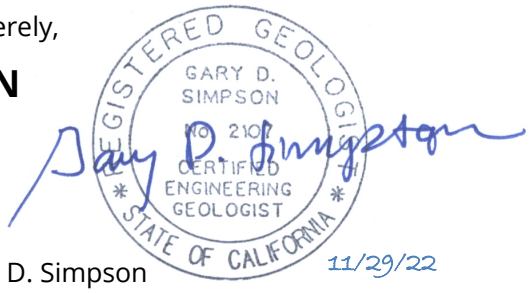
The piers should be interconnected with grade beams and tie beams to support proposed residential structure loads. All grade beams should be designed to span unsupported between piers. The drilled piers on the west (ocean) side should be tied back to the adjacent eastern (land) side piers using reinforced concrete tie beams. Tie beams should be at least 12 inches square and reinforced with at least two No. 5 reinforcing bars top and bottom. The piers should be reinforced to their full depth and the reinforcing steel should be tied into the grade beam and tie beam steel. Western-eastern grade beams and tie beams should be spaced no more than 20 feet apart. A well-tied foundation designed this

way will utilize the passive resistance below the eastern (land) side piers and grade beams to increase the overall stability of the structure.

We previously recommended maintaining vegetation along the terrace edge to reduce the exposure to future erosion. By encroaching toward the bluff, with deck support piers likely penetrating the terrace edge slope, the importance of maintaining existing vegetation is even more critical. To the extent feasible, it is essential not to disturb the soils or vegetation along the seaward-facing slope at the edge of the terrace.

Sincerely,

SHN



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GDS:ame