March 26, 2020 ESC19-G053

Disney & Associates, Inc.
Mr. Bob Disney
5706 Bethel Road SE Suite 100
Port Orchard, Washington 98367

THE RIDGE AT BUCK LAKE
LOT 19
38746 BENCHMARK AVENUE NE
HANSVILLE, WASHINGTON
TAX PARCEL 5536-000-019-0001

Dear Mr. Disney,

At your request, EnviroSound Consulting, Inc. (EnviroSound) is providing this letter in support of the development on lot 19. This letter supplements information provided in the ALKAI Consultants report dated March 2005. That report dealt principally with grading, and construction of the roads and utilities for the proposed development, specific recommendations for lot development were not addressed. As part of the current study, we have reviewed the design drawings provided by Dave's Septic Services, Inc. dated 1-17-2020 showing the proposed location of the residences and on-site waste water drain fields, and building plans provided by Bjorn & Poulson dated October 31, 2019. We have also reviewed a topographic survey titled "Homestead Composite Grading Plan" developed by Team 4, revised date July 24, 2006. In addition, a representative of EnviroSound Consulting (ESC) visited the site on March 6 and 25, 2020.

The subject parcel and adjacent properties are in an area mapped as a Moderate Erosion Hazard Area by Kitsap County.

Site Description

Lot 19 is a trapezoidal shaped property encompassing 0.76 acres, and is located in the northwestern portion of the Ridge on Buck Lake development. At the time of our visit, the subject property was an undeveloped parcel. Access to the site is along Benchmark Avenue NE. A small grass covered knoll was present adjacent to Newmark Avenue NE along the southern edge of the property. From there the property slopes down gently to the north-northwest and is predominately vegetated with brush and a few scattered trees. Based on our review of the topography provided on the Team 4 topographic map the slope in this area varies between approximately 15 and 20 percent. The areas north and east of the property are forested with trees.

The native slopes at the site appeared to be stable with no erosion or sloughing noted at the time of the site visits. In addition, there was no visible evidence of ground water, springs, seeps, or hydrophilic vegetation observed on the property at the time of our site visits.

Proposed Development

As noted previously, we were provided with copies of the proposed site development and building plans for the property. Based on our review of the drawings provided, we understand that the proposed development will consist of the construction of an approximately 1,600 square foot, one-story, single-family residence (SFR), with daylight basement and attached garage. The residence will be constructed in the southern portion of the site.

Based on a review of the provided septic design plan, a septic drainfield is proposed to be installed on the northern, gently sloping portion of the subject property.

Methodology

The geologic map for this area indicates that the site is underlain by Pleistocene continental sediments which consist of stratified clay, silt, sand, and gravel. Multiple test pits completed for the original report encountered gravelly outwash with interbedded layers of silt, underlain by dense cemented glacial till which is consistent with the information in the geologic map.

Prior to the time of our site visits, three shallow test pits had excavated on the site. One of the test pits was located in the footprint of the proposed building, and the other two were located within the area of the septic fields. In addition, a shallow hole was drilled using a hand auger on the grassy knoll along the property lines between lots 19 and 20. Each of the explorations encountered a surficial layer of grass or forest duff 2 to 3 inches in depth. This layer was underlain by loose, gravelly, silty sand. The sand layer was underlain by gravelly, silty fine sand at a depth of between 1.5 and 2.5 feet. Probing this underlying layer using a ½-inch diameter, steel T-bar indicated that the soils were glacially overridden and very dense. All of the soil was moist and no groundwater was observed. Locally there was iron oxide staining in some of the explorations, indicative of an intermittent groundwater/air contact.

Conclusions and Recommendations

Based on the findings of our field observations and our experience with projects of a similar nature it is our opinion that the proposed construction of the SFR is feasible provided that the following recommendations are followed. If the building plans are modified it is recommended that EnviroSound review the plans to ensure that the recommendations provided in this report are still applicable.

As noted previously, the subject property is located in an area mapped by Kitsap County critical areas as a moderate erosion hazard area. In our opinion, if the soils are disturbed in the sloping areas, there will be a serious erosion hazard and erosion control measures should be implemented immediately.

It has been our experience that soil erosion potential can be minimized through landscaping and surface water runoff control. Typically, erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales,

mulching, control ditches or diversion trenching, and contour furrowing. Erosion control measures should be in place before the onset of wet weather. Erosion hazard mitigation is presented in the Conclusions and Recommendation section of this report. The quantity of clearing area necessary for construction of this project will require a Stormwater Pollution Prevention Plan (SWPPP) to be prepared for construction.

Site Preparation

It is our understanding that a minimal amount of grading is planned for the proposed SFR. Clearing in the construction area should include removal of vegetation, trees and associated root systems. These materials will not be suitable for use as fill for roadway or building areas. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Excavation, depressions, or soft or pliant areas extending below planned finish subgrade level should be cleaned to firm, undisturbed soil and backfilled with structural fill to planned finish subgrade.

Foundation

We recommend that the proposed building be founded upon column or continuous wall footings bearing in the undisturbed, competent native soils or on compacted structural fill that has been placed over the undisturbed, competent native soils. Footings founded upon the medium dense or denser native soils could be designed for an allowable soil bearing pressure of 1,500 pounds per square foot (psf). This soil pressure may also be used for footings founded upon structural fill compacted as recommended in the fill placement and compaction section of this report. Minimum footing widths should be 24 inches for individual square footings and 12 inches for continuous footings. Footings should have adequate embedment for local frost penetration requirements. In the area of this project, the minimum depths are typically 18 inches for exterior footings and 12 inches for interior footings. If footings are supported by structural fill, the fill should extend beyond the outer edges of footings a minimum distance equal to the thickness of the fill beneath the footing. Based on the results of our explorations it is anticipated that the top of the bearing layer (medium dense or denser) will be encountered between roughly 1.5 to 2.5 feet below the existing ground surface within the proposed building footprint. The allowable bearing pressures given could be increased by one-third for wind or earthquake loads.

Footing excavations should be cleaned of all loose soil, leveled, and protected from water. The near surface site soils contain a sufficient quantity of fines to become soft and spongy when subjected to water and disturbance, however subsurface soils are primarily sands. All loose materials should be removed from the footing excavations. This should be accomplished prior to placement of concrete or the working surface. Assuming compliance with the above recommendations, we expect settlements to be less than ¾-inch, with differential settlements (between adjacent footings or over a 20-foot span of continuous footing) less than ½-inch. Lateral footing displacement can be resisted by friction along the base of the foundation and passive pressure acting against the appropriate footing faces. We recommend an allowable friction factor of 0.3 and an allowable equivalent fluid passive pressure of 200 psf/ft of depth. These values include a factor of safety of 1.5 for the allowable friction factor and 2.0 for the allowable equivalent fluid passive pressure.

Continuous drains with cleanouts should be installed at the base of the footings to prevent pooling of water underneath the single family residence. These drains should consist of a minimum 4-inch diameter perforated rigid pipe (with perforations placed down) with a minimum thickness of 6 inches of pea gravel around the pipe. The pipe and pea gravel can be wrapped in filter fabric, however drainage socks should not be used

around the pipe. The backfill soils within 1 foot of the walls should consist of free-draining sand and gravel material. This drainage system should be designed to transport water away from the structure and discharge into an appropriate area.

Site Drainage

The control of surface and near-surface water is very important for the long-term stability of the site and adjacent slopes. An effective drainage mitigation plan must address several aspects of the project. These include areas of slope protection, vegetation management, erosion control, and drainage control. Based on the information provided we understand that surface water runoff from roofs and other impervious surfaces, and groundwater from footing drains will be routed to an existing wetlands north of the property. Maintenance of the drainage system is very important for maintaining the stability of the slope, and thus it should be inspected on a regular basis and repaired as necessary.

Structural Fill

Soils with high fines content may be difficult to compact if the moisture content is not close to the optimum moisture content. Imported structural fill should consist of well-graded gravel and/or sand with a maximum grain size of 1½ inches and less than 5 percent fines.

Structural fill should be placed in loose lifts no more than 12 inches thick, moisture conditioned as necessary (moisture content of soil should be within 2 percent of optimum moisture) and compacted to 95 percent of the maximum dry density as determined by ASTM Test Method D-1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. Note that, although density testing of fill is frequently used as the primary criteria for acceptance of fill, it should not be the only criteria. If, in the judgment of the geotechnical engineer or his representative, placed fill is not suitable it should be rejected regardless of density test results. As an example, fill that is compacted wet of the optimum moisture content may exhibit "pumpy" behavior even if density test results indicate better than 95 percent compaction has been achieved. In such a situation, the fill should be removed and replaced with drier material.

Any fill placed on the existing slopes should be placed on undisturbed, dense, native soil, and keyed into the slope, and compacted as noted above.

Groundwater Considerations

At the time of our investigation, no springs or seeps were seen on the proposed building area. Groundwater seepage is not anticipated to be an issue on site development.

Earthwork Considerations

During wet weather conditions, which are typically present from October through April, subgrade stability problems and grading difficulties may develop due to high moisture content in the soil, disturbance of sensitive soils and/or the presence of perched groundwater. Therefore, we recommend that earthwork activity be performed during the dry season. If work must proceed in wet weather, we recommend following the guidelines presented in the wet weather section of this report.

Wet Weather Earthwork

The soils encountered during explorations that are likely to be encountered during grading activities are granular but contain sufficient amounts of silt and fine sand to make them moisture sensitive. The soils would likely provide a suitable working surface under dry conditions; however, after exposure to rain and continual vehicle traffic, the native soils will degrade rapidly and require overexcavation.

Wet weather generally begins about October and continues through about May, although rainy periods may occur at any time of the year. Therefore, we recommend scheduling earthwork during the normal dry weather months of June through September. In our opinion, earthwork performed during the dry weather months would be less costly than wet weather earthwork.

The following recommendations are applicable if earthwork is to be accomplished in wet weather or in wet conditions:

- Fill material should consist of clean, well-graded sand, or sand and gravel, with not more than 5 percent passing the No. 200 sieve, based on wet-sieving the minus-¾-inch fraction. Any fines should be nonplastic.
- A geotextile separator should be placed between native soils and structural fill.
- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Covering work areas or slopes with plastic, sloping, ditching, use of sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work. Bales of straw and/or geotextile silt fences should be used to control surface soil movement and erosion.
- Earthwork should be accomplished in small sections to reduce exposure to wet conditions. Excavation or the removal of unsuitable soil should be followed immediately by the placement of concrete or a layer of compacted, clean, structural fill or lean-mix concrete.
- No soil should be left uncompacted and exposed to moisture. A smooth drum vibratory roller, or equivalent, should be used to seal the surface if wet weather is anticipated. Wet surface soils should be removed prior to filling each day. Stockpiles of structural fill should be protected from wet weather with waterproof sheeting.
- In-place soils or fill soils that become wet and unstable, and/or too wet to suitably compact, should be removed and replaced with clean granular soil (see above).
- Excavation and fill placement activities should be observed on a full-time basis by an experienced geotechnical engineer if these activities are to be completed during wet weather or under wet conditions.

The above recommendations for wet weather earthwork should be incorporated into the contract specifications.

Erosion Control

In our opinion, erosion at the site during construction can be minimized by implementing standard degrees of care. The Contractor should employ proper erosion control measures during construction, especially if

construction takes place during wet weather. Covering work areas, soil stockpiles, or slopes with plastic, sandbags, sumps, and other measures should be employed as necessary to permit proper completion of the work. Bales of straw, geotextile silt fences, and drain inlet sediment screens/collection systems should be appropriately located to control soil movement and erosion.

We have prepared this letter based on standard practices, currently used in this area at the time of preparation. Although a previous geotechnical report was reviewed no specific subsurface investigation was performed by EnviroSound as part of this letter. The information presented in this letter was collected and interpreted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. Should you have any questions or concerns, which have not been addressed, or if we may be of additional assistance, please call our office at (360) 698-5950.

Sincerely,

Shawn E. Williams, L.E.G.
Senior Engineering Geologist

Engineering Geologist
2208

7-27-2020

Michael F. Wolczko, P.E.
Senior Geotechnical Engineer

MICHAEL JOHN WOLCZKO
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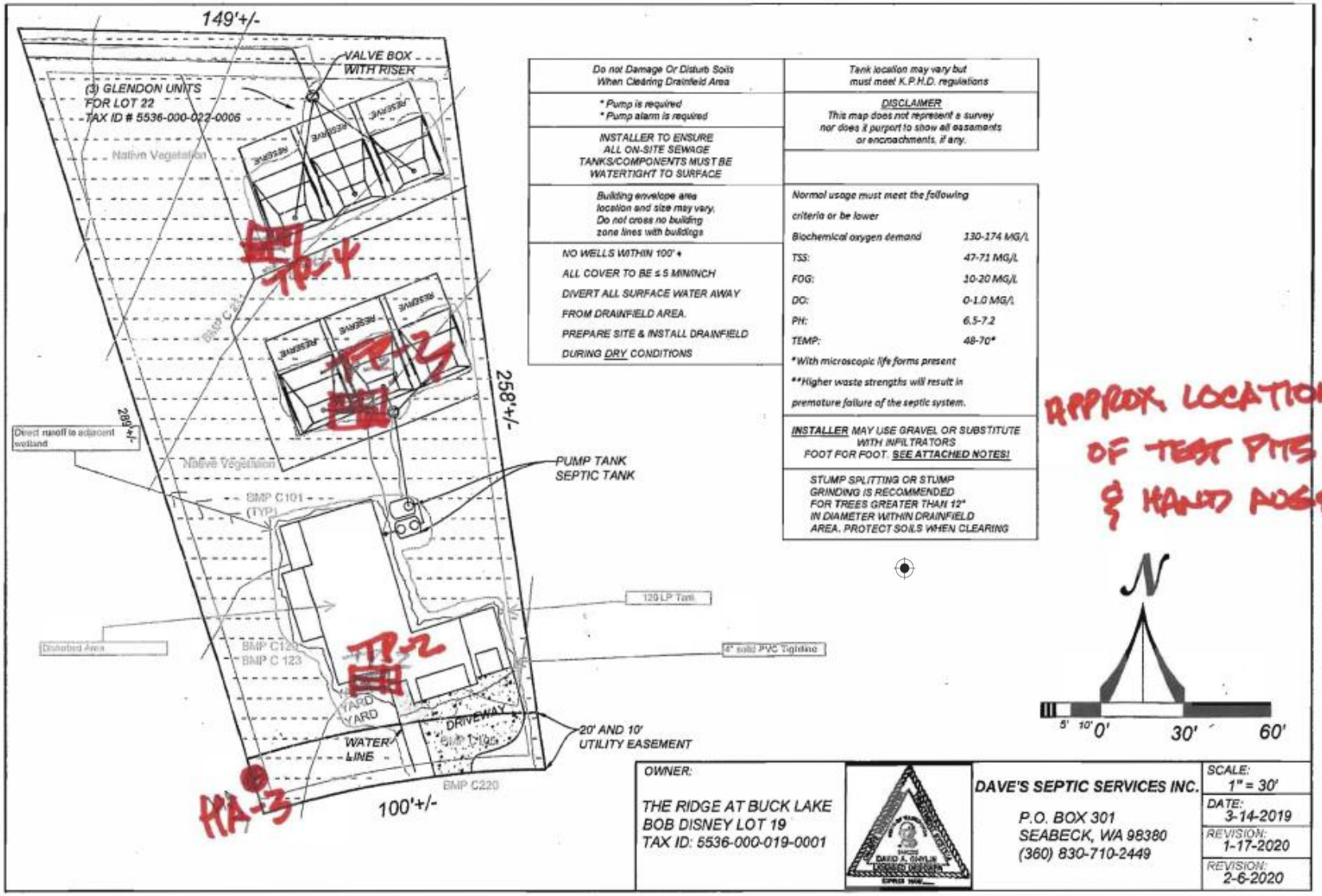
3/27/20



SITE PLAN	Scale: NTS	Date: 3/20	
Laughlin Plat – Lot 19 38746 Benchmark Avenue NE Hansville, Washington	Drawn by: CB	Approved by: SEW	EnviroSound Consulting
	Project No. ESC19-G053	Figure No. 1	

Permit Number: 20-00762