



Earth  
Engineers,  
Inc.

2411 Southeast 8<sup>th</sup> Avenue • Camas • WA 98607

Phone: 360-567-1806 • Fax: 360-253-8624

[www.earth-engineers.com](http://www.earth-engineers.com)

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February 3, 2020

City of Camas  
Community Development Department  
616 Northeast 4<sup>th</sup> Avenue  
Camas, Washington 98607  
Attention: Madeline Sutherland

Phone: 360-817-7255  
E-mail: [rmaul@cityofcamas.us](mailto:rmaul@cityofcamas.us)

**Subject:       Geotechnical Peer Review  
Proposed Hidden Ridge Estates Residential Subdivision  
Northeast Ingle Road  
Camas, Clark County, Washington  
EEI Report No. 20-013-1**

Dear Ms. Sutherland:

Per your request, **Earth Engineers, Inc. (EEI)** has completed a geotechnical review for the project referenced above. Our services for this project are being conducted in accordance with EEI Proposal No. 19-P054 dated February 17, 2019, which was authorized by Robert Maul on February 19, 2019.

## **PROJECT BACKGROUND INFORMATION**

Our understanding of the project is based on the following information that you provided to us.

- **July 13, 2019 report by Engineering Northwest PLLC titled “Geotechnical Engineering Study for Hidden Ridge Estates, City of Camas, Washington.”** The report was performed for CAMVEST GM LLC of Vancouver.

We have not been provided any design drawings for the proposed subdivision.

Briefly, we understand that the project consists of constructing a residential subdivision consisting of 14 lots on the 7.61 acre property. Engineering Northwest has been retained by CAMVEST GM to act as the Geotechnical Engineer of Record for the project and has completed the geotechnical investigation report, which has been submitted to the City of Camas and forwarded to us for review.

## **PURPOSE AND SCOPE OF SERVICES**

The purpose of our geotechnical review was to assess the geotechnical report provided to us and provide our professional opinion on whether the report (1) meets the geotechnical engineering standard of care, and (2) meets Camas Municipal Code (CMC) Chapter 16.59.060—Critical Area Report Requirements for Geologically Hazardous Areas.

## **REVIEW COMMENTS**

After reviewing the Engineering Northwest report, we offer the following comments:

1. On page 1 of the report, it indicates the report is dated both July 13, 2019 and March 12, 2017. While it doesn't affect the engineering recommendations, we recommend the correct report date be shown for clarity in an updated report.
2. Page 4 of the report states that the project will consist of 14 lots served by a private road, utilities, a public road, a stormwater facility, and other related infrastructure improvements. But the report does not state if drawings were provided to the Geotechnical Engineer. The Geotechnical Engineer should consider the locations of the structures when they complete their geotechnical evaluation. It is especially important to evaluate the stormwater facility location—if stormwater will be disposed of on site. We recommend the project drawings be forwarded to the Geotechnical Engineer so that they can include them in an updated report.
3. Section 4.0 of the report states that only 1 subsurface exploration was performed for the approximate 7.61 acre development. It is our professional opinion that 1 exploration for a 7+ acre project is not sufficient to fully evaluate the subsurface conditions and the associated geologic hazards. While there is no code requirement for how many explorations should be performed, we would expect that they would perform at least 1 exploration per acre, or at least 8 explorations. And then if the Geotechnical Engineer identifies areas of concern during their site reconnaissance that warrants a subsurface investigation of that area, the number of explorations would go up from 8.

As an added comment about the subsurface explorations, it is a little confusing as to whether the one exploration was a test pit or a hand auger boring. We recommend the terminology be updated to consistently indicate which one it is. We suggest that the geotechnical engineer consider performing test pits and not hand auger borings, wherever practical for their supplemental subsurface investigation. The reasoning is that the subsurface exploration log included at the end of the report indicates there are "large rocks" within the clay soils. Test pits are better for evaluating soil with floating rocks, because they won't hit premature refusal like hand auger borings can. We do understand that site access can limit the type of exploration equipment, however it looks like from the aerial photo in Figure 2 of the report, that some areas of the property would be accessible to a backhoe or excavator.

4. Section 4.1 of the report indicates lab testing consisted of moisture content, dry density, and organic content. We did not see the dry density and organic content test results included in the report. In the updated report, include the missing test results.
5. Section 4.2 of the report states that there are slopes on the project site. There is not enough information provided in the report to understand whether slope stability issues have been fully evaluated and addressed. There may not be any slope issues, but the report just doesn't go far enough to describe slopes (i.e. angles and heights) or say how they were evaluated to be stable.
6. Section 4.2.1 summarizes the soils encountered in the one subsurface exploration as clay loam (ML). ML is a silt, not a clay. Also, the soils described in Figure 1 of the report are not all consistent with ML. To avoid confusion, we recommend the report be corrected for consistency. The reason this is important is that the clay soils in Camas are known to be potentially expansive. However, ML soils are typically not expansive. So it's important to know whether the site soils are clay or silt.
7. Section 5.1 recommends scarifying the existing till soil zone. This recommendation is a little confusing. First of all, we would expect that the till zone, which is reportedly organic, should be fully removed from beneath structures. Secondly, for areas to be scarified, there doesn't appear to be a recommendation to recompact the scarified zone. The revised report should provide more clear direction related to the existing tilled soil zone as well as recompacting any scarified soils during construction.
8. Section 5.1 states that "the test pit excavations were backfilled using the...hoe bucket." This is confusing because elsewhere in the report it implies there was only 1 subsurface exploration and it was with a hand auger, not a backhoe. Please clarify in the revised report.
9. In Section 5.2 there are conflicting recommendations for the required minimum compaction of structural fill (90 versus 92 percent). Please clarify in the revised report.
10. Section 5.2.1 notes that undocumented fill (sand and gravel) was encountered at the site. In reviewing the exploration log (TP-1), we did not see a note about existing sand and gravel fill being present. Please clarify in the revised report.
11. Section 5.4 states that the project will consist of apartments. Is this correct?
12. Section 5.4 also implies that the footings must be supported on compacted structural fill, and cannot be supported on the native soils. Is this correct?
13. Section 5.5 states that stiff silt and silty sand soils were encountered in the subsurface exploration. This is not correct. Please clarify in the revised report.
14. Section 5.7 provides a *preliminary* Site Class recommendation. We recommend that Engineering Northwest provide a *final* Site Class recommendation--in accordance with

the currently adopted version of the IBC, not the outdated 2009 version. We also recommend they take another look at the Site Class recommendation. It may be that Site Class D is more appropriate for the soil conditions encountered. Site Class C is suppose to be very dense soil or soft rock with an average N-value greater than 50. Site Class D is suppose to be stiff soil with an average N-value between 15 and 50.

15. Section 5.13 implies there is moderate potential for shrink-swell soils, but then does not indicate whether the potentially expansive soils need to be mitigated or not. Please clarify in the revised report.
16. The utility trench backfill compaction requirements in Sections 5.2 and 5.14 are not consistent with each other. Please correct in the revised report.
17. Section 5.17 talks about gravel-sand soil encountered at the site. But the exploration log (TP-1) does not indicate gravel-sand soils were encountered. Please correct.
18. The test pit log (TP-1) describes soil strength but it's unclear how they determined that. They didn't report any pocket penetrometer readings, shear vane readings, drive probe, or dynamic cone penetrometer test readings, which would indicate how weak or strong the soil is. Standard of care would be to collect some kind of soil strength data. We recommend that when they conduct the additional subsurface explorations discussed in #1 above, they plan to collect quantitative soil information.
19. The test pit log is very confusing. It uses the term "test pit" and "boring" throughout, yet they are different exploration methods. The dept of the bottom of the exploration is confusing because the log says it terminated at 6 feet, yet there is a line at 15 feet and we are not sure what that is for.
20. The report does not appear to address the following requirements of Camas Municipal Code (CMC) Chapter 16.59.060—Critical Area Report Requirements for Geologically Hazardous Areas:
  - a. Identification of the geologically hazardous area including the type and extent of the geological hazard, and the reason the area is or is not likely to be impacted by the proposed development plan (reference Section C.1.a).
  - b. Description of proposed grading, areas proposed for storage of materials, proposed storm drainage areas (reference Section C.1.b).
  - c. Topographical site plan showing locations of geologic hazard areas, proposed development, and 2-foot topographic contours (reference Section 2.a).
  - d. A recommendation for whether any areas of the project require a minimum setback from geologically hazard areas, or not (reference Section C.5)

As a general comment, there are a lot of inconsistencies in the Engineering Northwest report. All the inconsistencies make the reader wonder how much of the report has carry-over errors from a previous project that was not meant to be included for this report. At that point, it becomes unclear what to believe in the report and not what to believe.

With regard to general compliance with Camas Municipal Code (CMC) 16.59.060 and general geotechnical engineering standard of care, it is our professional opinion that the geotechnical report provided to us does not satisfy the intent of the code section or standard of care. We recommend that Engineering Northwest be requested to respond to the items above in a revised or supplemental report.

## **LIMITATIONS**

This report has been prepared for the exclusive use of the City of Camas for the specific application to the proposed Hidden Ridge Estates residential subdivision on Northeast Ingle Road in Camas, Washington. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

We appreciate the opportunity to perform this geotechnical engineering evaluation. If you have any questions pertaining to this report, or if we may be of further service, please contact Troy Hull at 360-567-1806 (office) or 360-903-2784 (cell).

Sincerely,  
**Earth Engineers, Inc.**



Troy Hull, P.E  
Principal Geotechnical Engineer