
Response to comments (see red):

1. The geotechnical report still makes no reference to the project drawings. In addition, the drawings make no reference to the July 13, 2019 report. For clarity, if the drawings are based on the geotechnical report, it should be so stated on the drawings. In addition, the geotechnical report should state that the drawings have been reviewed and are in compliance with the geotechnical recommendations. We would expect that the geotechnical report would have a date more recent than the date of the drawings as it would not be possible to review the drawings before the drawings are created. **Included drawings to the geotechnical report for the stormwater report and geotechnical report for the critical area report. It appears that the critical area report for the project addressing CMC 16.59 was not sent to you for review.**
2. In our first review, we had suggested that 1 test pit did not meet the geotechnical engineering standard of care for a property of this size—especially a property with slopes and a designated geotechnical hazard area (see Sheet C000). Based on reviewing their revised report (see Section 4.0), it appears that Engineering NW has chosen to not perform any additional subsurface explorations, or to provide recommendations on how they are going to confirm the subsurface conditions within the bearing stratum of structures further along in the project. It is still our professional opinion that 1 exploration location is not sufficient for a property of this size. **The critical area report has identified the potential geologically hazardous area and the project is recommending “Management Zone” see chapter 16.59.090. Due to the size of the project, it is cost-prohibitive to perform slope stability analysis along with additional soil testing on the adjacent parcel, thus a Management Zone is recommended which is allowed by code. Also, the adjacent parcel owner may not allow us access.**
3. Throughout the report, it refers to the site soils sometimes as silt and sometimes as clay. This is probably a minor issue, but since the report is to be revised again, this discrepancy should be corrected just so there isn’t confusion later by the contractor. **Revised for the geotechnical report for the project TIR.**
4. Section 4.1 of the report still 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. The missing test results should be included in an updated report. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
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. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**

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6. Section 4.2.1 of the report states that the soil is classified as a clay. Clay soils in the Camas area are known to be potentially expansive. The report does not state whether the clay soils encountered in the test pit were tested so that they could be evaluated for expansion potential (i.e. Expansion Index lab test). **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**

 7. Section 5.1 states that the 6-foot deep test pit was loosely backfilled and recommends that the top 3 feet of loose backfill be recompact. This recommendation would leave 3 feet of poorly compacted test pit backfill in place, which could lead to settlement. If a structure is to be constructed where the test pit is located, it should be fully backfilled with properly compacted structural fill (i.e. all 6 feet). **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**

 8. In Section 5.2 there are still conflicting recommendations for the required minimum compaction of structural fill (90 versus 92 percent). Please clarify in the revised report. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**

 9. Section 5.2.1 still incorrectly notes that undocumented fill (sand and gravel) was encountered at the site. In reviewing the exploration log (TP-1) and Section 5.1, we did not see a note about existing sand and gravel fill being present. Please clarify in the revised report. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**

 10. Section 5.4 of the revised report now only states that the house foundations are “to follow current IBC.” All of the detailed geotechnical foundation recommendations that were included in the original report were removed for some reason. At a minimum, Engineering NW should state what the appropriate foundation bearing soils are based on their subsurface investigation, and what allowable foundation soil bearing pressure should be used.
This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4

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11. In Section 5.5, there is still a reference to a company called “CNE.” It is not clear what CNE’s relationship is to Engineering NW. This needs to be clarified or corrected. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
 12. Section 5.5 still states that stiff silt and silty sand soils were encountered in the subsurface exploration. This is not correct, based on the test pit log. Please clarify in the revised report. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
 13. Section 5.7 still 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. The report recommends site Class C, but that is not supported by the subsurface information presented in the report. Engineering NW should provide justification (i.e. the calculation) for how they determined Site Class C from their subsurface investigation. It appears that Site Class D is likely to be more appropriate. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
 14. Section 5.13 still 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. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
 15. The utility trench backfill compaction requirements in Sections 5.2 and 5.14 are still not consistent with each other. Please correct in the revised report. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
 16. Section 5.17 still 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. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**
 17. 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 Engineering NW clarify in their report how they determined the soil strengths. **This section has been removed from the geotechnical report for the project TIR. Geotechnical report for the project TIR meets all requirements outlined in Chapter 5 V-5.4**

18. The test pit log is 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. **Revised geotechnical report for the project TIR.**
19. 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 geologically hazardous areas in the report, 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). **Please refer to the project critical area report**
 - b. Description of proposed grading, areas proposed for storage of materials, proposed storm drainage areas (reference Section C.1.b). These items are shown on the Civil drawings, but there is no discussion or recommendations in the geotechnical report as required. **Please refer to the project critical area report**
 - c. A recommendation for whether any areas of the project require a minimum setback from geologically hazard areas, or not (reference Section C.5). There is a geologic hazard area shown on Sheet C000 of the Civil drawings but no discussion or justification provided in the geotechnical report as required. **Please refer to the project critical area report.**

Most of the items included in our first 2 peer review reports are not addressed in the revised report by Engineering NW. Based on their lack of response, it's not clear that they were provided our first 2 peer review reports. Moving forward, it would be beneficial if Engineering NW was to acknowledge our comments, even if they don't agree with some of them.

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.

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