



**WINDSOR**  
ENGINEERS

## Civil & Geotechnical Engineering Review Memo

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**To:** Bill Kabeiseman  
**From:** Travis Tormanen, P.E.  
**Date:** July 3, 2023  
**Subject:** City of Cannon Beach  
Roberts Property & Nenana Right of Way  
Civil Engineering Review Memo



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### **Introduction**

Windsor Engineers (Windsor), a firm licensed to provide civil engineering in Oregon has at the request of the City of Cannon Beach (City), completed a review of the application materials associated with the project:

*2023 LUBA Remand of Development Permit DP#22-06 at Tax lot # 51031AA00600*

Included with this memo is an attachment that consists of a geotechnical review. The combined conclusions from Travis Tormanen, PE (civil review) and Tim Blackwood, PE (geotechnical review) constitute a summary of our professional opinions with regards to this application and its compliance with Cannon Beach Municipal Code Section 17.50.040.

The project record located on the City website at the following link includes an abundance of information. Windsor's observations and findings are described in this memo and attached. One of the common themes in our review is that the project's technical information was created by the applicant's team at different times and there is not a clear cohesive 'current set of design documents' that clearly describes the applicants current intent.

Link to project files:

<https://www.ci.cannon-beach.or.us/planning/page/2023-luba-remand-development-permit-dp22-06-taxlot-51031aa00600>

It is our understanding and assumption that the following are true:

- The proposed residence is a 1,233 square foot, two story home with access at the lower level.
- The elevated roadway within the public right of way may or may not be further considered by the applicant. This review assumes that the applicant is still considering both the elevated roadway alternative and the at-grade roadway alternative.
- The work within the Nenana Avenue right of way:
  - o will remain public property after the project has been constructed.
  - o will not attempt to meet public roadway requirements if it is constructed as an at-grade roadway to serve the house.

The intent of this review, as documented in this memo, is to comment on the applicant's compliance with City of Cannon Beach Municipal Code Section 17.50.040. Relevant code subsections are italicized in paragraphs on the following pages with Windsor comments following each code section in blue/bold text.

## **Applicant Scenarios**

There have been multiple scenarios presented for consideration. Windsor understands the following:

Scenario 1: Larger House with Elevated Roadway. Based on the results of the appeal process and the final Court of Appeals decision, this scenario is understood to be no longer in play. Windsor has not provided any commentary in this memo related to this scenario.

Scenario 2: 1,233 Square Foot (SF) Home with At-Grade Roadway. The most recent concept drawing provided by the applicant and in the project record shows an at grade driveway in conjunction with the 1,233 SF home. Most of the comments in this memo are based upon this scenario since it was the scenario presented most recently. The applicant, however, did not provide full engineering drawings for the at-grade roadway. As such, there are unanswered technical questions that lead to the conclusion that the applicant has not demonstrated compliance with Cannon Beach Municipal Code Section 17.50.040. Examples include sight distance, water and sewer utility connections, and pedestrian safety. There are also some safety factor concerns related to the residence that are identified by the geotechnical engineer in their attached findings.

Scenario 3: 1,233 Square Foot (SF) Home with Elevated Roadway. A coordinated submittal of the 1,233 SF home with the elevated roadway was not provided. This made the ability for the engineer to review this scenario impractical. If the applicant had provided full civil engineering drawings with the newer house plan, then the engineer could have assessed issues related to sight distance, steep slopes, pedestrian safety, access to the home, turning radiuses, etc. Given that the applicant did not provide a coordinated design submittal that shows engineering for the site with a 1,233 SF home and an elevated roadway, our review for this scenario draws the conclusion that the applicant has not demonstrated compliance with Cannon Beach Municipal Code Section 17.50.040. As is the case with Scenario 2, there are also some safety factor concerns related to the residence that are identified by the geotechnical engineer in their attached findings.

The Scenario 2 review of CBMC Section 17.50.040 is described in the following pages with the requirements being listed and the review commentary following each requirement.

### **17.50.040 Reports and plans required.**

#### ***A. Geologic Site Investigation Report.***

1. *A geologic site investigation report shall be prepared by a registered geologist or engineering geologist. The report is to be prepared in conformance with the city's site investigation report checklist.*

**Geologic site investigation reports have been completed for the project by Geotech Solutions, Inc. (GSI), Warren Krager, RG, CEG (Krager), and Earth Engineers, Inc (EEI).**

**The GSI report provides recommendations for the residence and the private property. The EEI report provides recommendations for the public right of way. A review of available geotechnical information has been performed with findings included in a separate memo attached to this memo.**

2. *Where recommended by the geologic site investigation report, or required by the building official, an engineering report prepared by a registered civil engineer shall be prepared. The report shall discuss the engineering feasibility of the proposed development and include findings and conclusions for: the design and location of structures; the design and location of roads; the design and location of utilities; land grading practices, including excavation and filling; stormwater management; and vegetation removal and replanting.*

**The geologic site investigation reports completed by GSI, EEI, and Krager discuss the engineering feasibility of the proposed development. The reports provide recommendations for the design and location of structures, roads, and utilities as well as recommendations for land grading, site excavation and filling, stormwater management, and vegetation removal and replanting.**

[a-34 2020-06-06 gsi report of geotechnical engineering services, house foundation support and stability analyses.pdf \(cannon-beach.or.us\)](#) **This geologic site investigation report completed by GSI discusses the findings during a geotechnical investigation of tax lot 600.**

[a-19 2020-06-30 earth engineers geotechnical report.pdf \(cannon-beach.or.us\)](#) **This geologic site investigation report completed by EEI discusses the findings during a geotechnical investigation of the Nenana ROW west of South Hemlock Street. This report was prepared by a registered professional engineer with an active license in the civil and geotechnical engineering branches.**

[a-18 2021-08-03 grading and erosion control permit application.pdf \(cannon-beach.or.us\)](#) **This engineering report and construction narrative was prepared by a registered civil engineer. The narrative was prepared by Jason Morgan, PE of Morgan Civil Engineering, Inc. and appears to meet the intent of the code section 17.50.040.A.2. Jason is a registered Oregon Professional Engineer with an active license.**

**Design and Layout of structures** – The Morgan report generally refers to the reports by other professionals for any discussion regarding structures. The EEI report refers to the elevated roadway but doesn't discuss access to the new 1,233 square foot residence.

**Design and Layout of roads** – The Morgan report briefly describes the existing access, traffic control, and construction access. The supplemental driveway plan A-2 dated 7/9/21 indicates an at-grade driveway rather than the elevated roadway mentioned in the report. An updated professional engineer stamped site plan was not observed in the project record. The report and supplemental driveway plan do not clearly state how the driveway, guardrail, and retaining walls are to be built. The EEI report refers to the elevated roadway. An "at-grade" roadway with lightweight foam block is discussed along with the pile supported option.

**Design and Layout of utilities** – The Morgan report describes the utilities meeting code.

**Land grading practices including excavation and filling** – The Morgan report generally refers to the reports by other professionals regarding excavation and filling. The EEI report discusses excavation, fill, and construction methods.

**Stormwater management** – The Morgan report describes a stormwater drainage and collection system. No water quality treatment is mentioned. The stormwater is described as being dispersed through diffusion. A drainage maintenance plan is briefly described. The EEI report strongly recommends that the stormwater be hard piped to the base of the slope, not disposed of on-site.

**Vegetation removal and replanting** – The Morgan report describes vegetation removal, restoration, and tree removal and protection.

3. *The burden of proof shall be upon the applicant to show construction feasibility. A proposed use will be permitted only where:*
  - a. *The geologic site investigation report indicates that there is not a hazard to the use proposed on the site or to properties in the vicinity; or*

**The geologic site investigation reports completed by GSI, EEI, and Krager all indicate that there are hazards with the use proposed on the site.**

- b. *The geologic site investigation report and engineering report specifies engineering and construction methods which will eliminate the hazard or will minimize the hazard to an acceptable level.*

**The geologic site investigation reports completed for the project by GSI, EEI, and Krager discuss recommended construction methods that may eliminate the hazard or minimize the hazard to an acceptable level.**

The engineering report completed by Morgan Civil Engineering, Inc. discusses the implementation of a majority of the construction methods recommended in the geologic site investigation reports. However, the engineering report fails to adequately discuss the construction feasibility of the proposed driveway/roadway design and location as well as proposed single-family dwelling design and location.

**EEl Report - Hazard 1**– Adding weight to the slope by placing fill should be avoided. The Morgan report discusses excavation and fill to be confirmed in the field by the geotechnical engineer. Eliminating or minimizing this hazard is not mentioned in the report.

**EEl Report - Hazard 2** – Disruption of existing horizontal drains. Eliminating or minimizing this hazard is not mentioned in the report. This hazard is shown on the Grading Utility Plans by Jason Morgan dated July 8, 2020. Three of the existing 2.5” steel drains are collected into one proposed 4” ABS pipe and routed to a mid-slope dispersion point. The elevated roadway drains to an 8” HDPE pipe routed to a mid-slope dispersion point. The EEl recommendation to hard pipe to the base of the slope appears to be only partially incorporated into the design (drawings show terminating the pipe mid slope).

**EEl Report - Hazard 3** – Work must occur in the dry season. This hazard is mentioned in the Drainage Maintenance portion of the report.

**EEl Report - Hazard 4** – Recommend the elevated road and private driveway be supported on drilled piers and tiebacks. This hazard is shown on the Grading Utility Plans by Jason Morgan dated July 8, 2020. At one point it was understood that the elevated roadway is no longer being considered. (It is not, however, clear to the reviewer if that elevated roadway is or is not being considered because the latest version of documents are not complete and coordinated.)

**EEl Report – Hazard 5** – Preserve the natural slope. This hazard is not mentioned in the report. This hazard is partially addressed by the supplemental driveway plan A-2 dated 7/9/21, which indicates an at-grade driveway rather than the elevated roadway mentioned in the report. An updated professional engineer stamped site plan was not observed in the project record.

## **PUBLIC RIGHT OF WAY AND DEVELOPMENT STANDARDS**

Typically, work within existing or dedicated public right of way must be constructed to City standards. This allows for consistent implementation of providing access to residents. A development is responsible for improving the portion of roadway within his/her frontage. This helps ensure that the cost of the improvement is fairly shared between developers. The discussion below does not address whether or not a driveway may be built rather than a public roadway. The purpose of this dialogue is to answer the question of the project documentation meeting “public road standards.”

In this case, the public right of way is unlikely to ever be improved to a public roadway standard. For example, it is not appropriate to require a two-lane roadway with bike lanes, curb and gutter, and sidewalks. While the City standards may not be clear regarding private improvements on public right of way, there is a “level of care” associated with vehicle and pedestrian access within public right of way.

While it is important to provide access to resident’s homes from public right-of-way where possible, this project generally is proposing work within unopened right-of-way, that is not part of the City’s inventory of maintained roads.

Below is an excerpt in *italic* from CBMC 12.36.030:

*12.36.030 Issuance of permits.*

*A. A permit shall be obtained from the public works department before planting, removing or otherwise significantly altering any tree or shrub in the street right-of-way or **placing or removing any improvement in the street right-of-way.***

*B. The following criteria shall be considered as part of the process of reviewing an application for a permit:*

- 1. Maintains public safety;*
- 2. Maintains adequate access for public use of the street right-of-way;*
- 3. Maintains or improves the general appearance of the area;*
- 4. Does not adversely affect the drainage or cause erosion of the adjacent property.*

*All of these criteria must be met in order for the public works department to issue a permit.*

The following comments are industry-recognized principles and general guidelines for consideration.

- Is the width, slope, turning radius of the access appropriate for this project?
- Will pedestrians be limited or restricted from the public right of way? How will public safety be maintained? A new vantage point on public property will likely draw interest from pedestrians and vehicles alike.
- Will the project accommodate future expansion to the extent feasible?

Comment #	Comment
1	A complete civil engineering submittal should have provided information for all vertical and horizontal radiuses for portions of the driveway that are within the public right of way.
2	A complete civil engineering submittal should have included a traffic control plan that includes verification that the traffic control plan includes appropriate signage and methods for safe ingress and egress to the right of way during construction.
3	Portions of the driveway within the right of way have a very steep slope. The applicant would be expected to demonstrate feasibility by referencing examples or standards that would show this is a reasonable slope for driver safety especially when the ground surface is wet. Parking lot drive aisles are typically limited to 10% longitudinal slope and 5% cross slope. Applicant did not provide justification or additional measures for the proposed 35% slope.
4	While applicant had provided a Utility Plan and Details for water, sewer, and other utilities for the elevated road/large house scenario, these were not provided for the second and third scenarios described in this memo. Complete engineering drawings should reference and include City details for trench backfill and restoration as well as sewer lateral and water service details.
5	Given that the private driveway will not provide access to emergency vehicles, it is assumed that a dry line will be installed for fighting fire. Drawings and details were provided with the initial elevated road scenarios to demonstrate fire safety features but were not included in the at-grade road scenario. A fire lane typically requires 20 feet wide clear zone. The driveway width indicated is 12 feet. To demonstrate necessary safety measures have been taken the applicant should have provided explanation / justification for horizontal clear width. It should be noted that the fire marshal may need to review the final design for adequacy.
6	A complete engineering submittal should have provided information on drawings to show where any storm drains are located. Also drawing information was not provided about stormwater measures to be taken related to new impervious areas including erosion protection and accessibility to any stormwater related infrastructure that could require repair or maintenance.
7	With the uncertainty about which road configuration the applicant intends to go forward with, it is not clear what access may be needed by city staff to maintain drains. It would be expected that the applicant verify and show easements, if any, required for City staff to access any existing or new stormwater/ drainage facilities and whether or not there will be any easements required for City staff to drive a vehicle into and out of the site including in the turn-around area.
8	Drawing A1.0 of the architectural permit set shows a wall on the sides of the driveway. The applicant did not provide a civil drawing nor structural drawings that showed materials of construction for the driveway and any walls that are to be constructed within the Public Right of

Comment #	Comment
	Way including calculations about potential impacts to slope stability. Grading adjacent to any walls also was not shown.
9	The applicant did not provide information about safety associated with steep drops along edge of driveway including parking area. Information to include potential fall height from the curb. The applicant also did not provide a drawing that shows guardrail locations, where appropriate, to protect against vehicles or pedestrians from falling within the public right of way. The purpose is to protect against rollover vehicle accidents or accidental falls by the public, guests, or city employees that may be in the right of way.
10	<p>Per NADA Guides, the average length of car is 14.7 feet. Obviously, there are shorter cars and longer cars and trucks, but the length of the turnaround area at 12 feet appears to be too short for ease and safety of turn around. Additionally, there is no radius on the north side of the 12 feet x 12 feet turn around area. The combination of being narrow (12 feet), short (12 feet) and tight (no radius) would make for difficult turning around of vehicles. This would especially be true if there were two vehicles on site at the same time. It also could be a problem if guests unfamiliar with the driveway are on site (delivery drivers, law enforcement personnel, etc.) Given that this could create safety issues and increases potential for accidents to occur, it would have been expected for the applicant to show more information and perhaps have submitted a revised configuration that improves safety while also fitting in with site constraints.</p> <p>Standard stalls are typically 9' x 18' per 17.78.030. A full engineering submittal should have provided dimensions of the off-street parking stalls. The minimum passenger car radius is typically 14.4 feet' inside, and 25.5' outside. Applicant should have demonstrated that the design vehicle can navigate the turn around.</p>
11	Applicant did not provide a gravity sewer design from the existing manhole near 2005 Hemlock Street to the check valve at Nenana Ave for the at grade roadway design. The expectation is that the gravity sewer main and lateral should be extended as far as possible in Hemlock.
12	<p>Applicant should have provided more current geotechnical information alongside a revised engineering submittal that reflects the most recent road/house configuration. The geotechnical information would have been expected to:</p> <ul style="list-style-type: none"> <li>- Demonstrate no decrease in factor of safety (FS) from this development.</li> </ul>

## GEOTECHNICAL REVIEW

In addition to the civil engineering development review described in this memo, a licensed geotechnical engineer has also been retained to review the applicant's development information for conformance with CBMC Section 17.50.040. The geotechnical review is described in an attached memo. The geotechnical review draws a conclusion that the applicant has not demonstrated compliance with this code section.

## OVERALL DEVELOPMENT REVIEW CONCLUSION

In reference to CBMC Section 17.50.040, the geological site investigation and geotechnical reports appear to address the appropriate considerations; however, the project documents do not fully implement and coordinate these aspects of the design.

In addition to the geotechnical considerations, the complexities of pedestrian and vehicle access on public right of way, the project civil engineering plans do not demonstrate adherence to public roadway standards or private development guidelines.

It is Windsor Engineers opinion that the applicant has not proven construction feasibility in accordance with CBMC Section 17.50.040.A.3. To properly achieve compliance, the applicant would have needed to address the issues raised in the attached geotechnical review memorandum, provided a full set of civil engineering plans that are consistent with the planned residence and that address the questions listed earlier in this memorandum.

CC: Tyler Stewart – Windsor Engineers, Robert St. Clair and Karen La Bonte – City of Cannon Beach





# Pali Consulting

## MEMORANDUM

June 29, 2023

Windsor Engineers  
27300 NE 10<sup>th</sup> Avenue  
Ridgefield, Washington

**Proposed Residence and Roadway**  
Compliance with Geologic Hazard Code  
Tax Lot 600, aka, Tolovana Park, Block 1, Lot 13  
Cannon Beach, Oregon  
Pali Project #: 074-20-002



## INTRODUCTION

This memorandum provides Pali Consulting Inc's (Pali's) review of proposed development at the above site in Cannon Beach, Oregon. The site is situated on a landslide commonly referred to as the "S-Curves Landslide". The City of Cannon Beach (City) requested our review for compliance of the proposed development with Cannon Beach Municipal Code (CBMC) Section 17.50.040, Development Requirements for Potential Geologic Hazard Areas, Reports and Plans Required.

The proposed development includes a residence to be constructed on the subject lot with a driveway to be constructed from Hemlock Street through the Nenana Avenue right of way (ROW) to the residence. Our review was primarily based on documents submitted to the City by the applicant and which the City provided to us, in particular, a July 16, 2020, submittal by Plan Development, LLC. The submittal included geotechnical reports by Warren Kreger, CEG, Geotech Solutions, Inc (GSI), and Earth Engineers, Inc. (EEI) for the applicant, as well as monitoring reports for the S-Curves Landslide completed by GSI for the City.

## BACKGROUND INFORMATION

As noted above, the site is located within the S-Curves Landslide. The S-Curves Landslide is an active portion of a larger mapped historic deep-seated landslide which extends several hundred feet north from the site. Most of the deep-seated landslide is not reported to be active, but the S-Curves Landslide is considered an active portion of it, due to recent and ongoing movement. A residence previously occupied the subject lot which was reportedly damaged by ground movement and eventually demolished. The S-Curves Landslide has also displaced Hemlock Street multiple times just upslope of the site. Horizontal



drains were installed to reduce the movement of the landslide in 2007/2008. GSI monitors landslide movement for the City and reports that movement of the landslide continues, although at a very slow rate: 0.2 inches in the last 3-year period read from 2015 to 2018.

CBMC Section 17.50.040 requires that development in geologic hazard areas be designed to eliminate the hazard or reduce it to an acceptable level. Since the S-Curves Landslide cannot be eliminated, hazard from the S-Curves Landslide would need to be reduced to an acceptable level to meet the requirement of the code. Acceptable levels for landslide hazards are typically evaluated based on factors of safety (FS). The FS against slope instability can be generalized as the ratio of forces resisting slope movement (soil strength, soil mass, etc.) to forces driving slope movement (gravity, earth pressure, etc.). A FS less than 1 indicates a condition when the available soil shear resistance decreases below the shear stresses required to maintain stability of the slope and the slope fails. FS above 1 are considered stable with increasing stability indicated by higher FS values. For new development, FS of 1.5 under static conditions and 1.1 under seismic conditions are usually recommended, although lower FS are sometimes allowed. For example, FS of 1.3 and 1.1 for static and seismic conditions, respectively, are sometimes allowed for existing development. Meeting the code will require that acceptable FS are met for these conditions.

## **EVALUATION AND CONCLUSIONS**

Based on our review of the submitted documents, our conclusions regarding compliance of the proposed road/driveway and residence are provided below.

### **Road/Driveway**

The applicant has proposed two different approaches to provide egress to the property from Hemlock Street. The approaches would both use the Nenana Street ROW and would include a pile supported viaduct from Hemlock to the property or an at-grade roadway with a retaining wall on the downhill side of the roadway.

Our review found that the pile-supported option has not adequately demonstrated compliance with 17.50.040. The applicant's analysis shows the roadway will decrease the FS of the slope approximately 1% (0.9%). The applicant concludes that this result indicates there is "no appreciable reduction" in the stability of the S-Curves Landslide (GSI, July 2020). Pali Consulting takes exception to this statement. In the case of an active landslide such as this (although movement has been slowed substantially by horizontal drains, it is still moving so active), the roadway should be constructed to result in no reduction in the FS of the landslide. Although the design as submitted does not comply with 17.50.040, it may be able to meet the above requirement with reasonable modifications. Since the applicant has not presented any modifications, however, it is our finding that compliance with 17.50.040 has not been demonstrated for the elevated road.

Similarly, our review of the at-grade option found that the applicant has not adequately demonstrated compliance with 17.50.040. Slope stability analyses demonstrating that there will not be an adverse effect from this option on the slope were not submitted. Compliance with 17.50.040 may be achieved if the applicant can demonstrate that the FS of the slope following road/driveway construction is not decreased from the current condition. Since the applicant has not presented such justification, however, it is our finding that compliance with 17.50.040 has not been demonstrated for the at-grade road.



## Residence

The applicant has proposed a modest dimensioned residence on the lot with a setback determined by a slope stability analysis completed by a professional licensed in the appropriate field for this work. Details of the analysis are not included in the submittal but appear reasonable and to generally conform with the standard of practice. The setback was determined based on a calculated FS against shallow sliding of 1.3. The development further includes an “A-frame” type pin-pile wall embedded into stable bedrock below the depth of sliding at the FS 1.3 setback. This is proposed to reduce the hazard of shallow landslides to extend east of the setback. Further the house is proposed to be supported on separate pin piles similarly embedded into bedrock.

Our review of this proposal found that the applicant has not adequately demonstrated compliance with 17.50.040 for constructing the residence on the subject lot. Although the hazard of shallow landsliding is addressed in the application, the deeper S-Curves Landslide on which the residence will be placed has not been addressed per 17.50.040. Our understanding of the extent of the S-Curves landslide from the project geotechnical report (GSI, 2020) is shown on the attached figure (brown block of ground in the attached section from the GSI June 6, 2020 memorandum). As demonstrated by continued movement, the FS of the S-Curves Landslide is  $\sim 1.0$  under high groundwater conditions. Such conditions probably occur each winter as groundwater increases from winter-time rainfall and during large storms. The residence will be placed on this active landslide. There is no discussion or analysis in the report about the FS of the S-Curves Landslide, only that the stability has been increased by horizontal drains. Although there needs to be further discussion of the appropriate FS for a new residence (1.3 may be acceptable for existing development, but 1.5 may be more appropriate for new development), if 1.3 is taken as acceptable, the S-Curves Landslide with a FS of  $\sim 1.0$  needs to be stabilized to a greater FS of at least 1.3. The analysis presented by the applicant shows the FS of smaller rotational slides within the toe of the feature are greater than 1.3 east of the proposed pile wall, so the lot achieves a FS of  $>1.3$  from such shallow slides at the toe. However, there is no demonstration that the proposed wall increases the S-Curves Landslide (again, the brown block in the SSA) to a FS greater than 1.3.

The design may meet the required stability if the improvements demonstrate that the S-Curves Landslide upon which the house will be constructed (as noted in the attached figure) which currently has a FS  $\sim 1$  can reach a FS  $>1.3$  (or possibly  $>1.5$ ). If this cannot be demonstrated, then the proposed development is not in compliance with 17.50.040.

Attachments: Figure from GSI June 6, 2020, with annotations

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