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November 22, 2024

Client: Ann C. Jones Family LP
807 Chuckanut Shore Road
Bellingham, WA 98229

Cc: City of Bellingham Planning & Community Development
Ali Taysi ; AVT Consulting, LLC

Project: **Proposed 38-Lot Woods at Viewcrest Plat**
352 Viewcrest Road, Bellingham, WA

Subject: **Memorandum #2 – Response to Public Comment & COB RFI (Issued 8/14/2024)**

Dear Ms. Jones and City of Bellingham,

At the request of the Jones family, Element Solutions has reviewed select public comments submitted regarding the preliminary plat application for the Woods at Viewcrest Plat, and reviewed the project RFI issued by the City of Bellingham (COB) Planning & Community Development Department on August 14, 2024. The purpose of this Memorandum is to offer our response to those public comments and RFI items pertaining specifically to geotechnical and geologic hazard aspects of the project and site.

Responses are organized by comment source as follows:

- Response to Engineering Geology comments by Stratum Group (March 19, 2024)
- Response to City of Bellingham (COB) RFI comments (Issued 8/14/2024)

This Memorandum relies on data collected previously and presented in the *Geotechnical Investigation & Geohazard Report - Proposed 38-Lot Plat Development, Jones Edgemoor Estate* (October 6, 2022). Additional geologic hazard review work has been completed in 2024, as presented in the *Geohazard Review Addendum – Stormwater Outfall Plan* (November 22, 2024), which is submitted concurrently with this comment response. The Addendum letter supplements the original report as an additional technical document, and is referenced in this Memorandum where applicable.

RESPONSE TO ENGINEERING GEOLOGY COMMENTS

Stratum Group (Stratum) submitted a public comment letter which was provided for our review by COB, dated March 19, 2024. The letter briefly overviews some components of our *Geotechnical Investigation & Geohazard Report - Proposed 38-Lot Plat Development, Jones Edgemoor Estate* (October 6, 2022), and provides seven comments relating to the proposed plat and associated studies. Below we offer our direct responses to the Stratum comments, as considered relevant to Geotechnical and Geohazard considerations.

1) Assessment of Geohazards for Stormwater Outfall

Plans for stormwater management for the proposed plat, including in particular the downslope outfall routing and dispersal location referenced by Stratum, were developed after the Geotechnical Report preparation. The statement of exclusion from geohazard review for the southern shoreline slope quoted by Stratum pertains to lot development and other upland plat infrastructure considered at the time of the study. It is common practice in our region for stormwater tightlines to traverse areas of steep slopes below development areas as a means to direct stormwater to a suitable release location at the base of a slope, where such approaches are deemed necessary by prevailing site conditions. It is also recognized that the current stormwater management plan is conceptual for the purpose of plat review; changes may be made to the outfall plan during full design.

We concur that stormwater outfall plans (routing, anchoring, release point, etc.) should be designed to best fit site conditions, and should be reviewed prior to permitting. In the interest of addressing public comments at this time for preliminary plat approval, we have undertaken further focused site assessment. The additional work was specifically for reviewing upland, slope, and shoreline conditions associated with the proposed outfall system as depicted on the preliminary plat drawings. The results of additional review are presented in the *Geohazard Review Addendum – Stormwater Outfall Plan* (November 22, 2024).

Based on the additional work, it is our opinion that the preliminary outfall plan is feasible pending full civil design, and that risks of stormwater outfall tightline use at this site can be appropriately mitigated. This is provided that suitable materials and installation standards are utilized and the outfall system is constructed in accordance with our recommendations. In the addendum letter, we have provided supplemental guidance and recommendations for consideration in final design to optimize protection of the outfall and steep slope environment which it will traverse. We have also issued a standing recommendation that final stormwater outfall design plans be reviewed by Element.

2) Incorporation of Lot Drainage into Stormwater Plan

Full stormwater design has not been completed at this stage for the preliminary plat approval process. We expect that detailed plans for handling of individual lot stormwater will be incorporated in full civil design of the plat and/or later lot-specific design.

The preliminary plat primary drainage infrastructure includes storm drain (SD) utilities along the interior roads. It is reasonable at this stage of design to assume that individual lot contributions to runoff, as necessary, can typically be directed into the SD utility along frontages. Alternatively, additional downhill connections into the downslope stormwater outfall system could be incorporated, where preferable to frontage connections or due to topographic constraints (such as for Lots 23 to 33). In our opinion, and based on these likely options, proper stormwater runoff management is feasible to be implemented in final design which adheres to our recommendations for controls and provides adequate protection to the sloping environment of the project site.

3) Assessment of SE Bluff & Drainage of Lots 23 to 33

We have concluded that the lot development areas are sufficiently far away from the southeast shoreline bluff slope to not warrant further geohazard assessment of the association between upland lots and the southeast bluff. The anticipated building areas are on the order of 200 to 250 feet from the top of the bluff slope. For clarity of the location of the referenced SE Bluff, see Geotechnical Report Figure 4 for the labeled area with crest demarcated by an orange boundary.

Furthermore, it is anticipated that stormwater runoff from the lots uphill of the SE bluff area will be sufficiently managed so that there is no increased risk of impacts to the areas downhill of the lots, including the upland slope and SE bluff. As necessary, final design can incorporate lot drainage connections to the primary stormwater drain utility or outfall (see #2 response above), or to alternative approved release locations servicing individual lots or groups of lots which can be reviewed during final design to verify there is no risk for adverse impacts to the SE bluff area from upland development. Additional assessment of the areas downhill of Lots 23 to 33 is not necessary for preliminary plat approval.

4) Impacts of Stormwater Release on Tidelands

We understand the tideland in the vicinity of the project site shoreline has been assessed by Northwest Ecological Services (NWES, Memorandum dated November 22, 2024). The tidal area was determined to meet the definition of a mud flat, not a Category 1 Wetland. The nearest mapped marine wetland is reportedly 870 feet away, located along the shoreline to the northeast of the proposed outfall dispersion location. Thus, the proposed dispersion point is well outside of the maximum buffer of 200 feet (per communication with NWES).

As part of the additional geohazard review completed in 2024 related to the current stormwater outfall concept, we have assessed conditions of the subject shoreline in the area of the proposed dispersion location. Findings are reported in the *Geohazard Review Addendum – Stormwater Outfall Plan* (November 22, 2024). The upper tidal area directly below/around the outfall dispersion point is favorably composed of gravel and sand soils, interspersed with both translated large sandstone remnants and local exposures of underlying/buried bedrock (either float or intact). These conditions are interpreted to have a relatively low susceptibility to erosion associated with dispersed stormwater release and resulting overland water flow within the upper tidal area. This area is also subjected to the effects of tidal fluctuations and wave action daily, and is commonly submerged.

We anticipate some cumulative effect will result from project stormwater outfall dispersion over a long-term timeframe. The most likely effect is localized flow channeling from the release location leading outward towards the main flow zone of the larger bay area. This phenomenon is demonstrated by the existing neighborhood stormwater outfall near the railroad trestle to the west of the project area (below Arbutus Place). At that location, a narrow and shallow flow path extends from the beachfront for around 100 feet through the upper tidal zone, then dissipates as flows are absorbed into the greater lower tidal area away from the shoreline.

Based on review of public GIS mapping of existing stormwater utilities (COB CityIQ), the Arbutus Place outfall appears to serve a cumulative area larger than that of the project site; as such, it may accommodate larger flow volumes than anticipated for the project site outfall. The Arbutus Place outfall also appears to be released next to the shoreline via a direct culvert pipe discharge (per mapping, not observed directly). Associated effects to the tideland as a result of the existing outfall are localized, and no discernable impacts are seen to the greater tidal area past the local flow channel near the shoreline. We have concluded that the Arbutus Place comparison location does not appear to have experienced physical impacts that could result in a loss of shoreline and tidal area function.

We interpret, from a geotechnical perspective, that the proposed outfall and dispersion release plan for the project site will not result in significant impacts to the shoreline and tidal area. Nor do we anticipate a loss of function to the shoreline environment adjacent to the site as a result of the localized changes that are likely to occur from establishment of a new outfall.

5) Impacts to Wetland B and Relict Landslide Feature

We understand that Wetland B has been assessed by Northwest Ecological Services, and determined to be a Category IV Wetland with a habitat score of 5 (lowest rating). While the final civil design will need to incorporate general protections and protection from pollutants as required by code, hydroperiod analysis is not required (Department of Ecology *Stormwater Management Manual for Western Washington*, 2019, Volume 1 Section 3.4.8 MR8: Wetlands Protection). Pollution protection is addressed by incorporation of a modular wetland unit specifically servicing split flows to the proposed dispersion trench.

Per communication with Pacific Surveying & Engineering (PSE), the dispersion trench is included in the preliminary plat design with intent to maintain wetland hydrology while avoiding direct impacts to the wetland area or its buffer. Full design has not been completed. Flows are expected to be relatively low, controlled, and may be adequately addressed with a rock pad release point if suitably low. The intent is for release to occur outside of the wetland buffer along the low-gradient topographic bench on its uphill side. If the intended split flow system proves to be problematic in full design for reasons unforeseen at this time, it can be eliminated as it is not required either for greater plat stormwater management or by DOE design standards.

The relict landslide feature (suspected by geomorphology in imagery) is located over 200 feet from the proposed dispersion trench and Lots 34 to 36 development areas. Based on surface topography, it is likely that most of the Lot 34 to 36 area drains down-gradient southeastward, along the upland area to the southwest of the suspected relict landslide area. The closest up-gradient building site, on Lot 38, is over 100 feet away from the top of the steep northeast slope. These locations are far outside of the standard 50-foot LHA buffer per code. Impacts to the northeast slope area from development are expected to be negligible, assuming standard practices are followed in design and construction. The project exceeds critical area geohazard avoidance standards, and further assessment is not necessary for plat approval.

Surface topography from the dispersion location uphill of Wetland B (and nearby lots) grades down at an average bearing of approximately 110 to 120 (360 azimuth). Based on site geology and the prevalence of underlying shallow restrictive conditions (encountered in explorations), we expect natural surface runoff and shallow soil interflow to roughly follow topographic gradients. As such, the outflow from a controlled stormwater release above Wetland B would not flow directly toward the suspected LHA feature. Transient flow would continue to the southeast through a zone of gentle topography over a forested flow path of at least 300 feet before reaching areas of steeper topography which are south of the suspected LHA map extent. It is our opinion that no further assessment is necessary for preliminary plat approval.

Comments 6 and 7:

These relate to construction noise considerations and shorelines administrative permitting / allowable uses. Comments are not considered applicable to geotechnical or geohazards review, and as such no response is warranted here. These issues have been addressed separately with other reports or submittals. Refer to the *Wildlife Habitat Assessment* (Raedeke Associates, Inc., November 22, 2024) report for commentary addressing noise impacts. Refer to the *Preliminary Stormwater Management Report* (PSE, November 22, 2024) for discussion of stormwater management alternatives. The project has applied for a shoreline SDP and SCUP, and a critical areas report has been filed with the City.

In closing, we appreciate the thoughtful comments offered by Stratum Group as a local consultant with similar expertise in the field of Engineering Geology, although we note that the author has not performed investigation or assessment of the site conditions. We have provided response to the Stratum comments which demonstrate the project complies, or is reasonably anticipated to comply (pending final design), with applicable standards and is feasible as proposed in the preliminary plat application.

RESPONSE TO COB RFI

We offer the below in response to RFI items pertaining to Geologically Hazardous Areas.

Address of 2009 Preliminary Report:

Reference and Scope of Prior Work

The RFI cites prior work completed at the property, and requests discussion of its findings with respect to the current proposal. Per BMC 16.55.430(D), prior reports “may be incorporated into the required critical area report, if deemed still valid and appropriate by a professional engineer or geologist” (emphasis added). We interpret this code to allow, but not require, incorporation of prior findings into a later study at the option and discretion of those performing the new work. Based on common industry practices, this typically relates to re-publication and/or reliance on prior exploration data and possibly calculations or analysis completed by others, but not typically to interpretation or re-application of the data to a later proposed action which is the responsibility of the current authors.

A “*Geologic Preliminary Feasibility Report*” was completed by Pacific Surveying & Engineering in December, 2009 and provided to the Jones Family (property owners). The report’s executive summary declares work included a brief field inspection along with collection and limited evaluation of existing information (namely public map resources). It is our understanding that this preliminary review was done ahead of a development concept for the purpose of informing the owners of potential challenges for future design and development, and to preliminarily discuss areas to preferentially avoid which could pose acute difficulties or infeasibility for lot or road developments due to prevailing geological features.

Given the preliminary nature of the earlier review and the timeframe since it was completed (over 10 years), we elected to undertake a full geotechnical and geohazard study for the project without relying on the past work. In the interest of responding to the RFI request, the below discussion is provided.

Commentary on General Findings and Interpretations

We interpret that the preliminary work findings, as observed in 2009, are predominantly in agreement with those of our recent full-scope geotechnical investigation and geohazard assessment work from a technical perspective. We concur on the cited general character of the property, common presence of slopes over 40% (as mapped), absence of features indicating large instability on the steep slopes (outside of northeast corner area), lack of evidence of surface erosion / runoff issues and general low susceptibility thereof, lack of soil creep evidence on steep grades, and presence and general orientation of underlying bedrock which is favorable for large-scale stability. We also concur on conservatively interpreting the roughly arcuate northeast slope feature as a potential former landslide area based on its geomorphology, and have utilized more modern GIS tools to accurately delineate its limits for avoidance. The areas identified as ground wetness or water seeps/flows in the 2009 letter correspond to current mapped wetland areas and are thus considered well known conditions.

While we do not claim to speak for prior authors, we have been asked by the RFI to interpret the relevance of prior work to the development plan. It is our impression that interpretive language in the preliminary report is provided from a cautionary perspective to ensure that, in 2009, the clients were made aware of site conditions and potential hazards which future development planning should seek to address or avoid as part of planning and design. In our experience in conducting numerous preliminary geohazard reviews of this nature, an emphasis is placed on communicating the need for careful planning and design in such cases. The letter concludes with statements indicating support for proper development planning and design to avoid the potential impacts cited therein, and encourages full site investigation along the lines of what has now been completed for the proposed development.

Commentary on Hydrology

In the course of our geotechnical investigation activities and many site visits for reconnaissance spanning from 2019 to 2024, we have gained a substantial understanding of site-specific conditions. The site surface is broadly underlain by restrictive conditions, either shallow bedrock or glacial drift (mantling bedrock), which contributes to shallow down-gradient subsurface transmission of meteoric water. Where underlying conditions are excessively shallow and/or confining topography creates preferential pathways for downhill water flow, surface wetness and localized seepage can occur. This phenomenon is apparent in the northeast part of the site. In our opinion, the most likely water transmission pathway is broadly in a downhill direction. While we do not rule out the potential for some local variability in flow path as a function of localized conditions, it is very unlikely that substantial transient water flow occurs in an up-gradient or cross-gradient manner through the interior of the site.

Our *Geohazard Review Addendum (2024)* provides further detailed assessment of conditions in the northeast part of the site. We have interpreted that hydrological flow into the northeast upland area (Lot 38 vicinity) broadly occurs as transient water migration from uphill off-site areas to the north and northwest, as well as from the northmost part of the central area of the site (see Figure 2 of Addendum). Additionally, the northeast corner area wet conditions appear to be related to a municipal outfall directed onto the site and subsequently recollected near Sea Pines Road at the east site border.

The 2009 Preliminary Report hypothesizes that water is migrating across the slope instead of downslope, following geologic contacts. While we do not rule out that this is plausible on a small scale, we believe it is very unlikely that significant groundwater migration is occurring in this manner to travel many hundreds of feet laterally across or in opposition to the prevailing sloping grades. Rather, it is likely that transient water seeks an overall downhill trend of transmission as a function of gravity while its migration path is locally influenced by underlying restrictive conditions and variations in topography (*Geohazard Review Addendum, 2024*).

Based on the afore-mentioned topographic patterns, it is unlikely that the remaining majority of the site is contributing transient water to the northeast area. Thus, we expect the site development will have negligible effect to hydrology of the northeast area, assuming suitable stormwater management practices are followed for the plat and lot developments. It is our understanding, from consulting on the preliminary plat stormwater management plan, that the current concept and final design are intending to avoid such impacts by instituting adequate controls and systems which mitigate stormwater runoff risks and seek to maintain site hydrology.

In conclusion, we have reviewed the “*Geologic Preliminary Feasibility Report*” (PSE, 2009) as requested. It is our opinion that no modifications to our work are needed. We have conducted a full-scope geotechnical and geohazard investigation that addresses the current proposed plat and meets code requirements.

Confirm Building Envelopes Versus Geohazard Buffers:

We recognize that difficulties on confirming building envelopes or questions on buffer verifications result from the combination of the project extent, scale of maps, and iterative design process concurrent with and influenced by our work. Please refer to Figure 1 of the *Geohazard Review Addendum* (2024), attached for reference, as well as the most recent plat plans for current depiction of the proposed layout with respect to site conditions. We have also produced a series of exhibits to provide a detailed view of specific lots and areas where the buffer compliance is not obvious from review of the full site maps. The assumed building envelopes are 60’ x 60’ square (blue outline) pursuant to BMC 23.08.060.D.1 for new lot creation. Orange outlines are 54’ x 54’, representing a 10% reduction (permitted as a departure pursuant to BMC 23.48.030.C.2.b).

Refer to attached Sheets 1 to 9 and the comments below for clarification:

- Lot 6 building envelope is shown to be outside of the minimum 10-foot CAO buffer (Sheet 1). The remaining northwest lots (1 to 5) are >10 feet from the delineated geohazard slope area (green).
- Lot 7 is shown to be outside of minimum buffers to the northwest and southeast (Sheet 2). In addition, we re-verified the building envelope is over 20 feet from the nearest steep rock exposure to the east (per 2022 Geotech report recommended setback).
- In the west-central area, Lots 14 (Sheet 3) and 20 (Sheet 4) are shown outside of the 10-foot minimum buffers.
- Lots 24 through 33 are shown on Sheets 5 to 7 to be outside of the 10-foot buffers from the downhill slope and side-slopes delineated as geohazard areas.
- Lot 38 is shown to be substantially outside of the code standard 50-foot buffer assumed for the northeast slope area. Actual distance is over 100 feet.
- Sheet 9 illustrates the coastal bluff slope buffer (150 feet assumed per 2022 Geotech report). All lots are well outside of this recommended extent from the top of the southeast bluff.

In conclusion, we have verified the required minimum buffers and project-specific setbacks recommended in the 2022 Geotech report can be met by the proposed plat assumed building envelopes under BMC 23.08.060.D.1 for new lot creation with limited 10% departures. This review has demonstrated that the proposed lots have sufficient building envelope area that is not encumbered by delineated critical area slopes or their recommended minimum buffers.

Confirm Current Stormwater Design:

The 2022 Geotech report and Memorandum #1 by Element were issued during the design process and prior to the current stormwater design concept submitted for plat approval. We have been aware of the evolution of the stormwater management concept for the plat, in particular the outfall plan, and have had the opportunity to contribute our expertise to the conceptual design process.

The proposed stormwater management and outfall plan is as depicted on the Preliminary Plat drawings, dated 12-1-2023. All commentary in this RFI response pertains to this most current version of the plat plans, and specifically Sheet 7 (Road and Stormdrain Plan) and Sheet 8 (Stormwater Outfall).

The *Preliminary Stormwater Management Report*, prepared by Pacific Surveying & Engineering (PSE), was previously submitted accompanying the plat drawings. The report has been updated. The current version is dated November 22, 2024.

Our *Geohazard Review Addendum – Stormwater Outfall Plan (2024)* was completed prior to and concurrent with response to this RFI, and is based on the most current project information referenced above. We have performed this additional work to assess specific aspects of the stormwater system as currently conceived with respect to geohazard conditions. The Addendum includes additional guidance and recommendations for final design.

REFERENCES

Engineering Geology Comments – Proposed Woods at Viewcrest 38-Lot Plat. *Stratum Group*, March 19, 2024.

Geologic Preliminary Feasibility Investigation Report for the Ann Jones Family Representatives – Chuckanut Bay Property. *Pacific Surveying & Engineering*, December 31, 2009.

Geohazard Review Addendum – Stormwater Outfall Plan, Proposed 38-Lot Woods at Viewcrest Plat. *Element Solutions*, November 22, 2024.

Geotechnical Investigation & Geohazard Report – Jones Edgemoor Estate – Proposed 38-Lot Plat Development. *Element Solutions*, October 6, 2022.

Preliminary Stormwater Management Report – The Woods at Viewcrest. Pacific Surveying & Engineering, Inc., November 22, 2024.

Wetlands and HCA Report Addendum – The Woods at Viewcrest. *Northwest Ecological Services*, November 22, 2024.

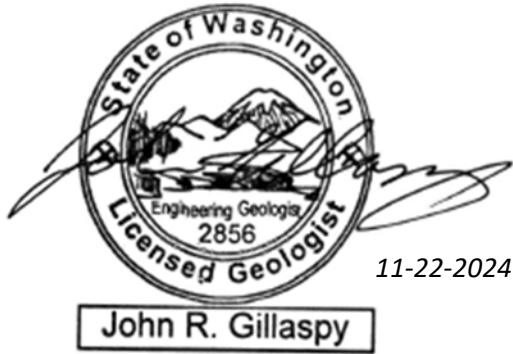
Wildlife Habitat Assessment – Woods at Viewcrest. *Raedeke Associates, Inc.*, November 22, 2024.

CLOSING

Thank you for the opportunity to contribute our expertise to your project. Please feel free to contact us at (360) 671-9172 if you have any questions or comments regarding this correspondence.

Sincerely,

ELEMENT SOLUTIONS



John Gillaspie, LEG

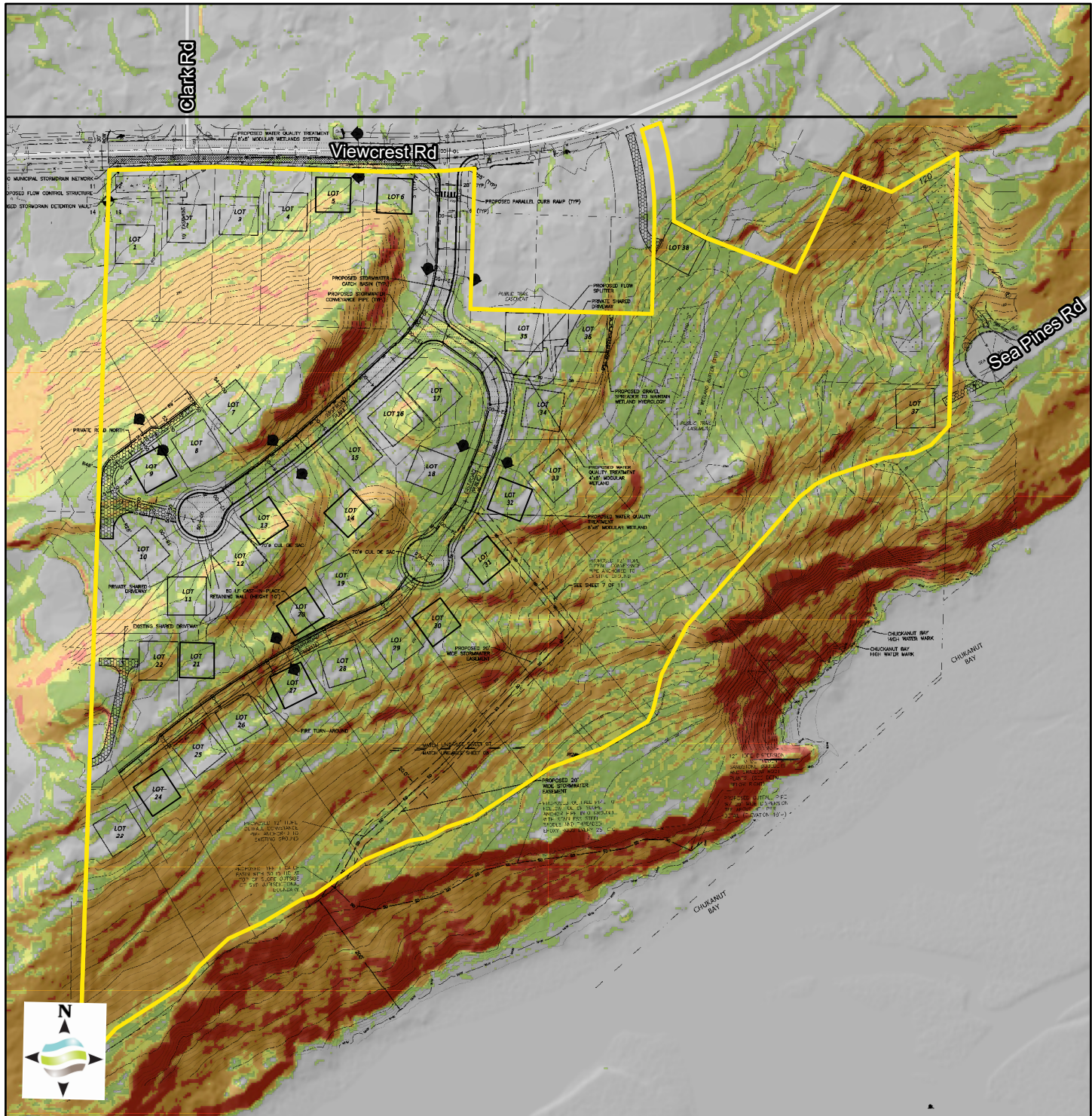
Environmental Services Manager

Attached: Figure 1 – GIS Map of Project Area with Proposed Stormwater System Plan Overlay
(published in *Geohazard Review Addendum (2024)*)
Geological Critical Areas Exhibits - Sheets 1 to 9

Incorporated by Reference: *The Woods at Viewcrest Preliminary Plat*
(Pacific Surveying & Engineering, 12-1-2023):

Statement of Limitations

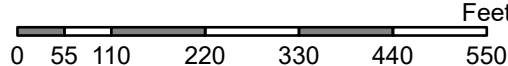
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Data Credits:
 [Parcels] Whatcom County 2018
 [Roads] COB 2018
 [Lidar] COB 2013

- Development Area
 - Roads
- percent_slope
- 0 - 15
 - 15 - 30
 - 30 - 40
 - 40 - 80
 - 80 +

*Contours Shown are From Survey by PSE



1:2,700

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Figure 1
 Viewcrest Plat
 Jones Edgemoor GHA Review
 Percent Slope Map - Entire Study Area

Date: 10/18/2024

LOT 6 - GEOLOGICAL CRITICAL AREAS EXHIBIT

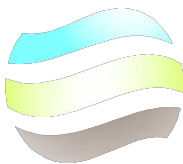
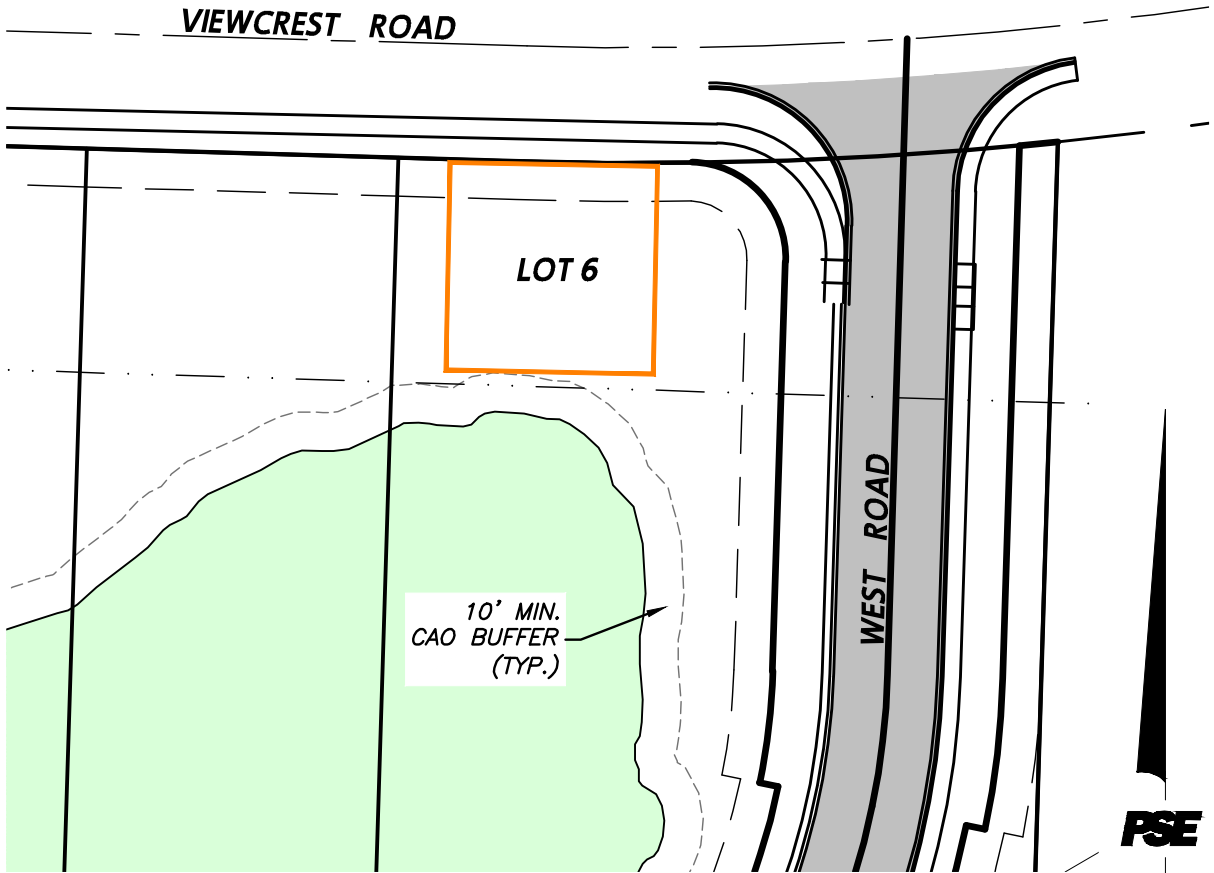
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RANGE 2 EAST, W.M., CITY OF BELLINGHAM, WHATCOM COUNTY, WASHINGTON



A BLUE BOX REPRESENTS A 60'X60' BUILDING ENVELOPE
PURSUANT TO BMC 23.08.060.D.1. AN ORANGE BOX
REPRESENTS A 10% DEPARTURE (54'X54') FROM BMC
23.08.060.D.1.



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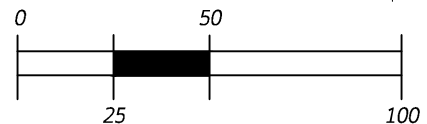
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GRAPHIC SCALE
(US SURVEY FEET)



LOT 7 - GEOLOGICAL CRITICAL AREAS EXHIBIT

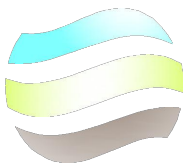
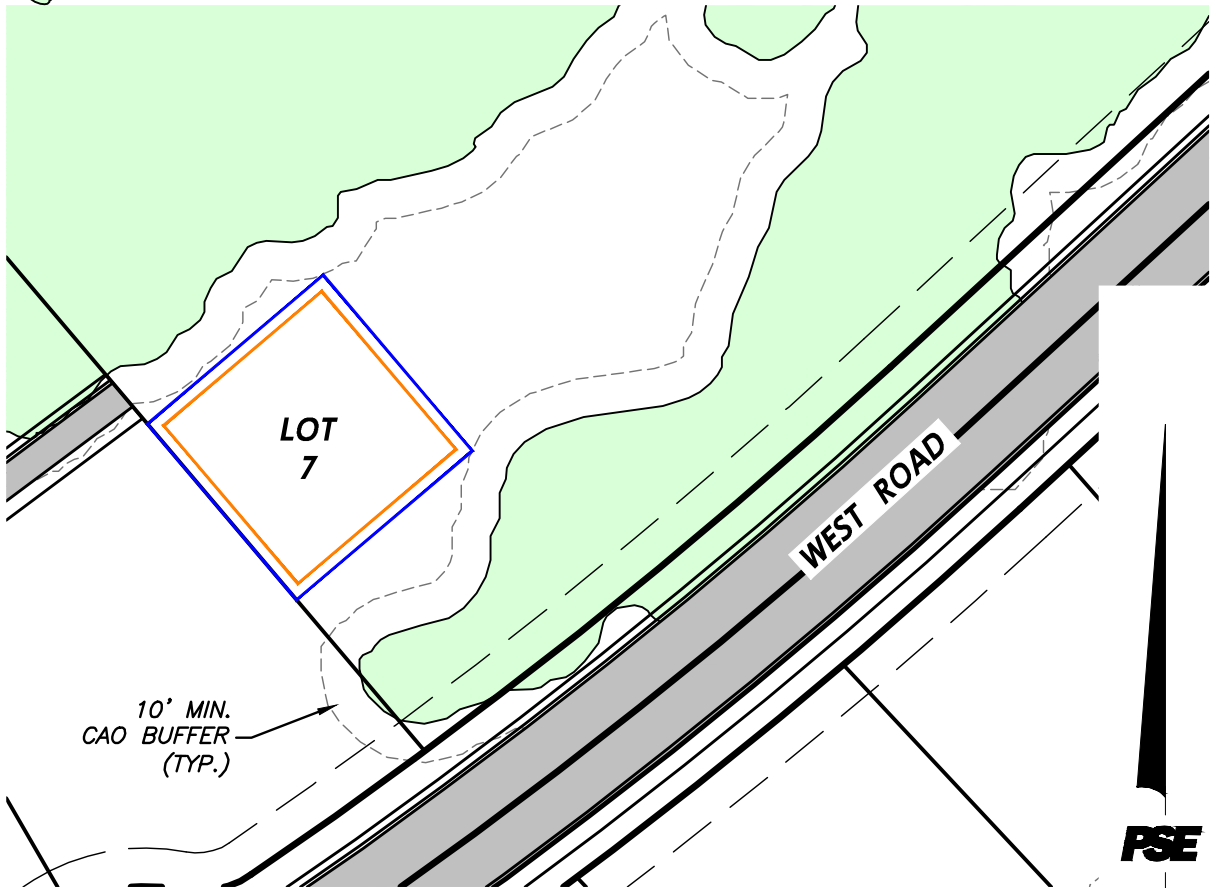
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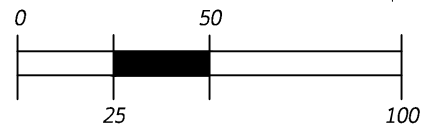
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LOT 14 - GEOLOGICAL CRITICAL AREAS EXHIBIT

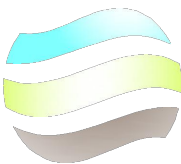
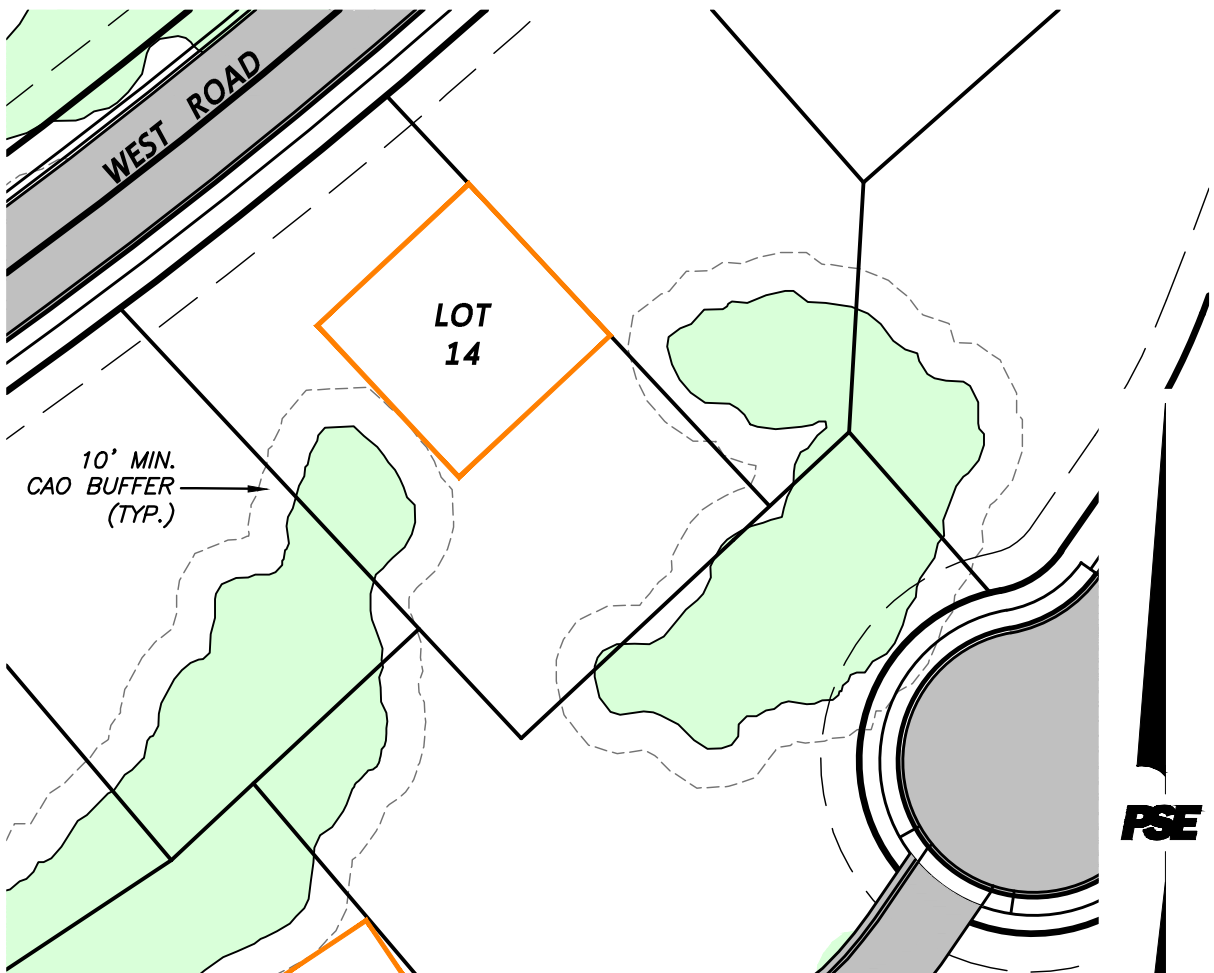
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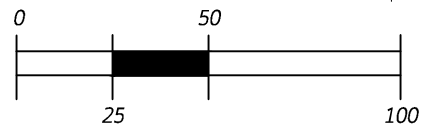
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LOT 20 - GEOLOGICAL CRITICAL AREAS EXHIBIT

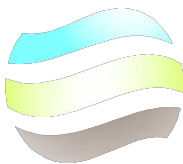
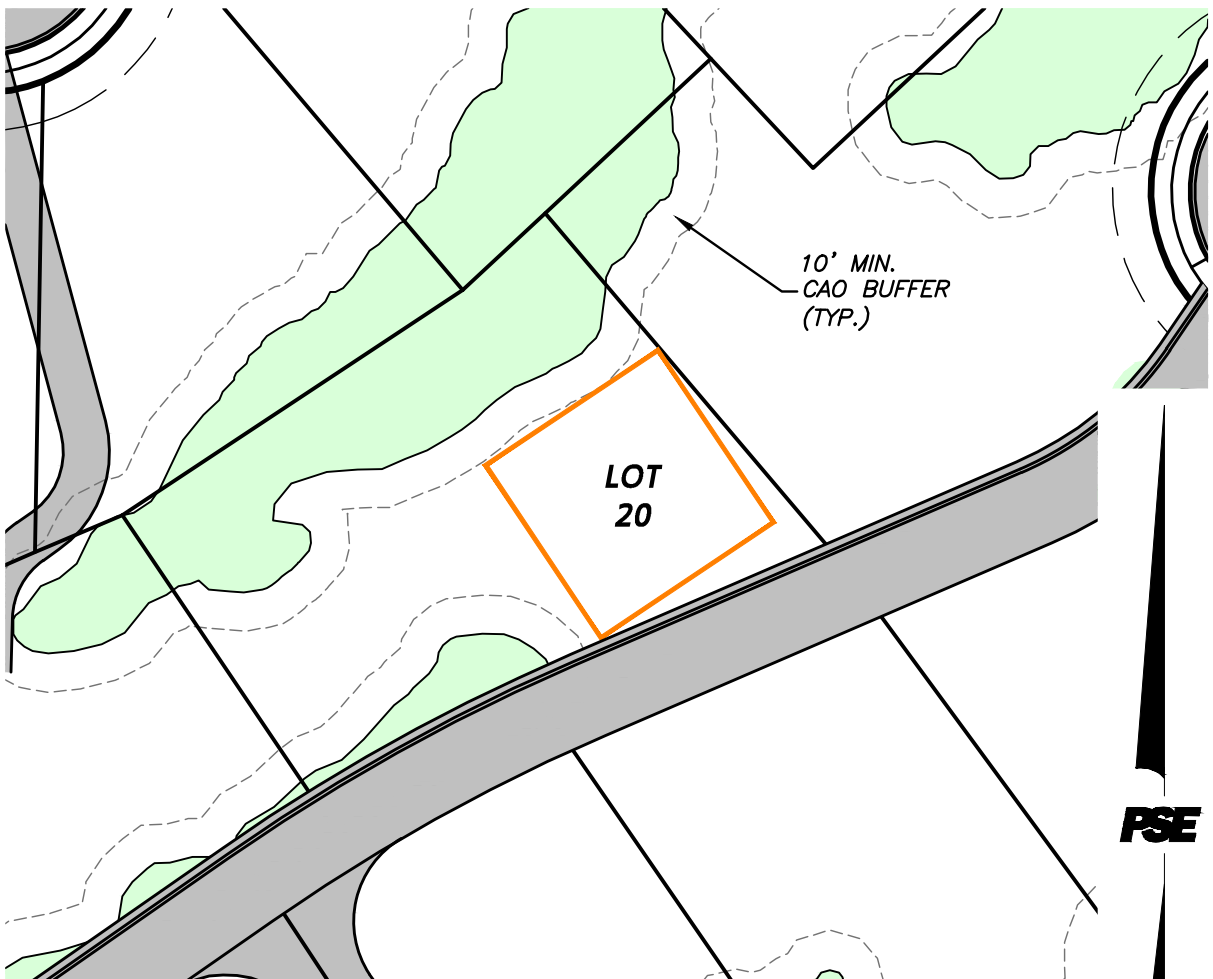
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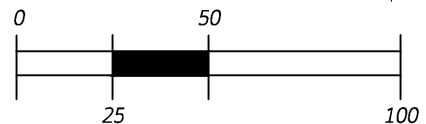
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LOTS 24, 25, & 26 - GEOLOGICAL CRITICAL AREAS EXHIBIT

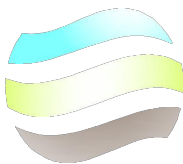
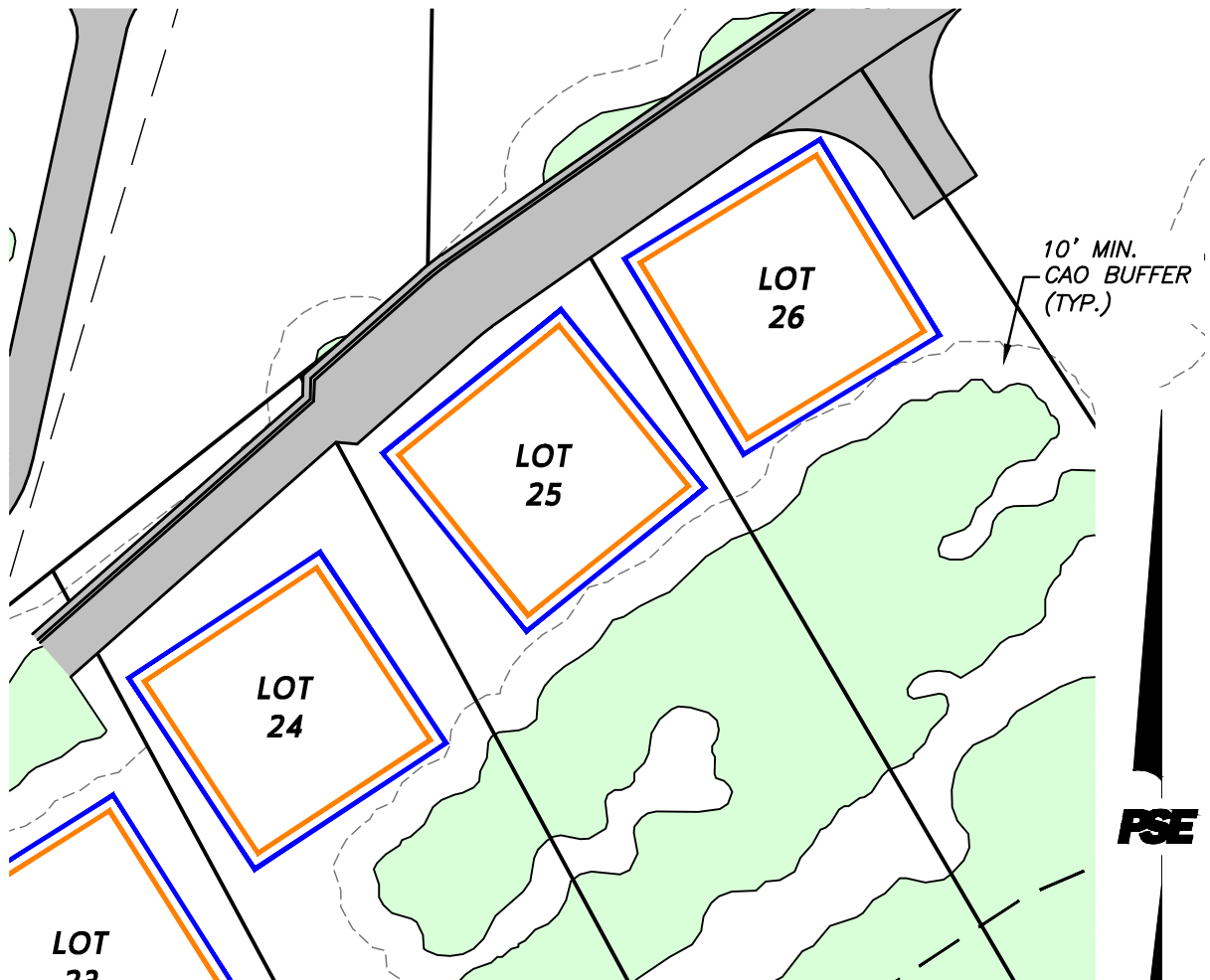
SITUATE IN A PORTION OF THE SW 1/4 OF THE SW 1/4 OF SECTION 12, TOWNSHIP 37 NORTH,
RANGE 2 EAST, W.M., CITY OF BELLINGHAM, WHATCOM COUNTY, WASHINGTON



A BLUE BOX REPRESENTS A 60'X60' BUILDING ENVELOPE
PURSUANT TO BMC 23.08.060.D.1. AN ORANGE BOX
REPRESENTS A 10% DEPARTURE (54'X54') FROM BMC
23.08.060.D.1.



= GEOLOGICALLY SIGNIFICANT CRITICAL AREA



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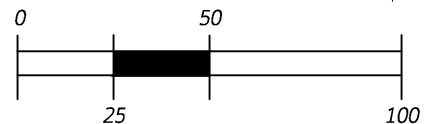
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LOTS 27, 28, 29 & 30 - GEOLOGICAL CRITICAL AREAS EXHIBIT

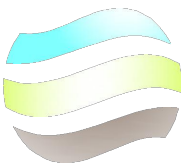
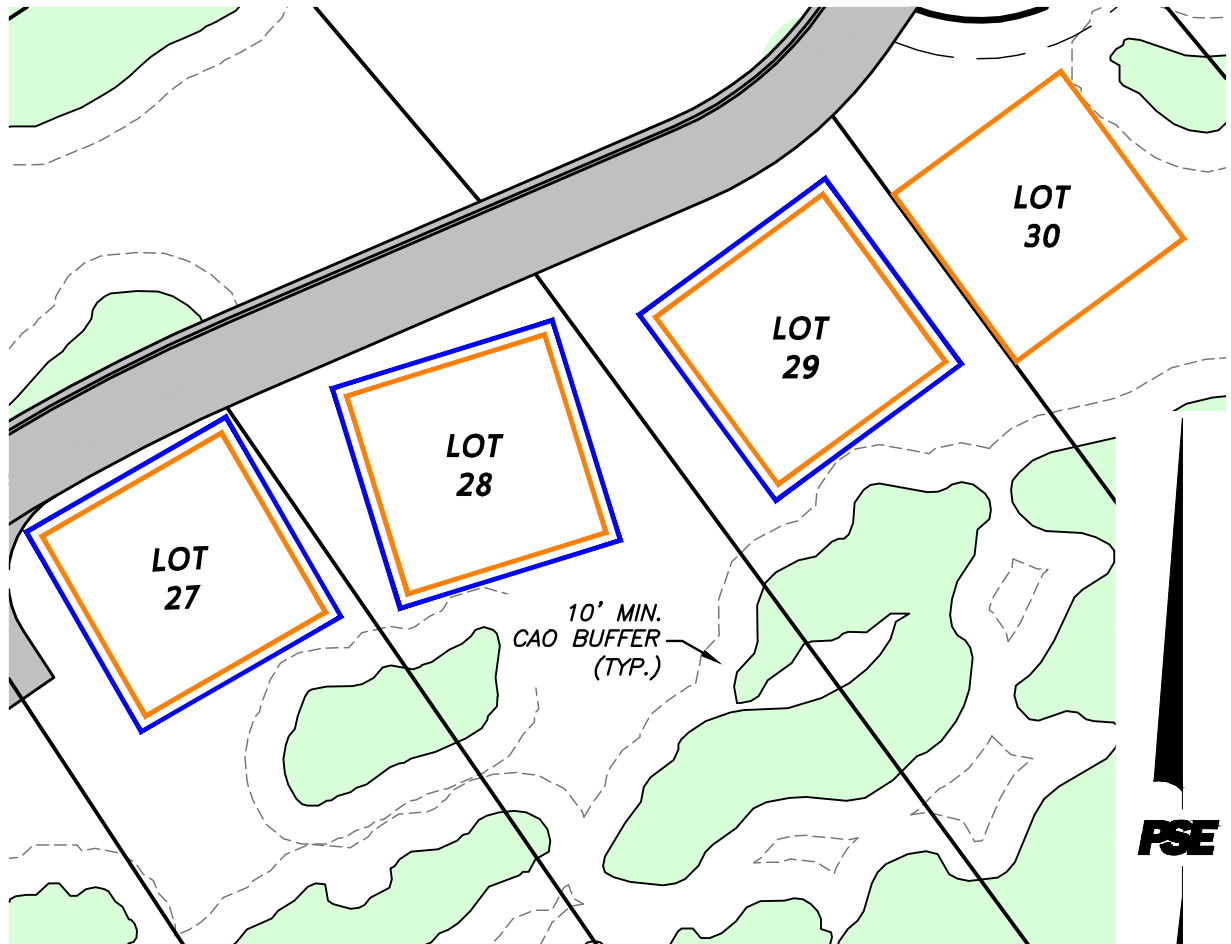
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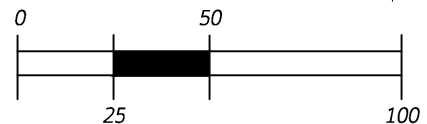
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LOTS 31 32 & 33 - GEOLOGICAL CRITICAL AREAS EXHIBIT

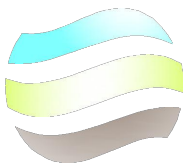
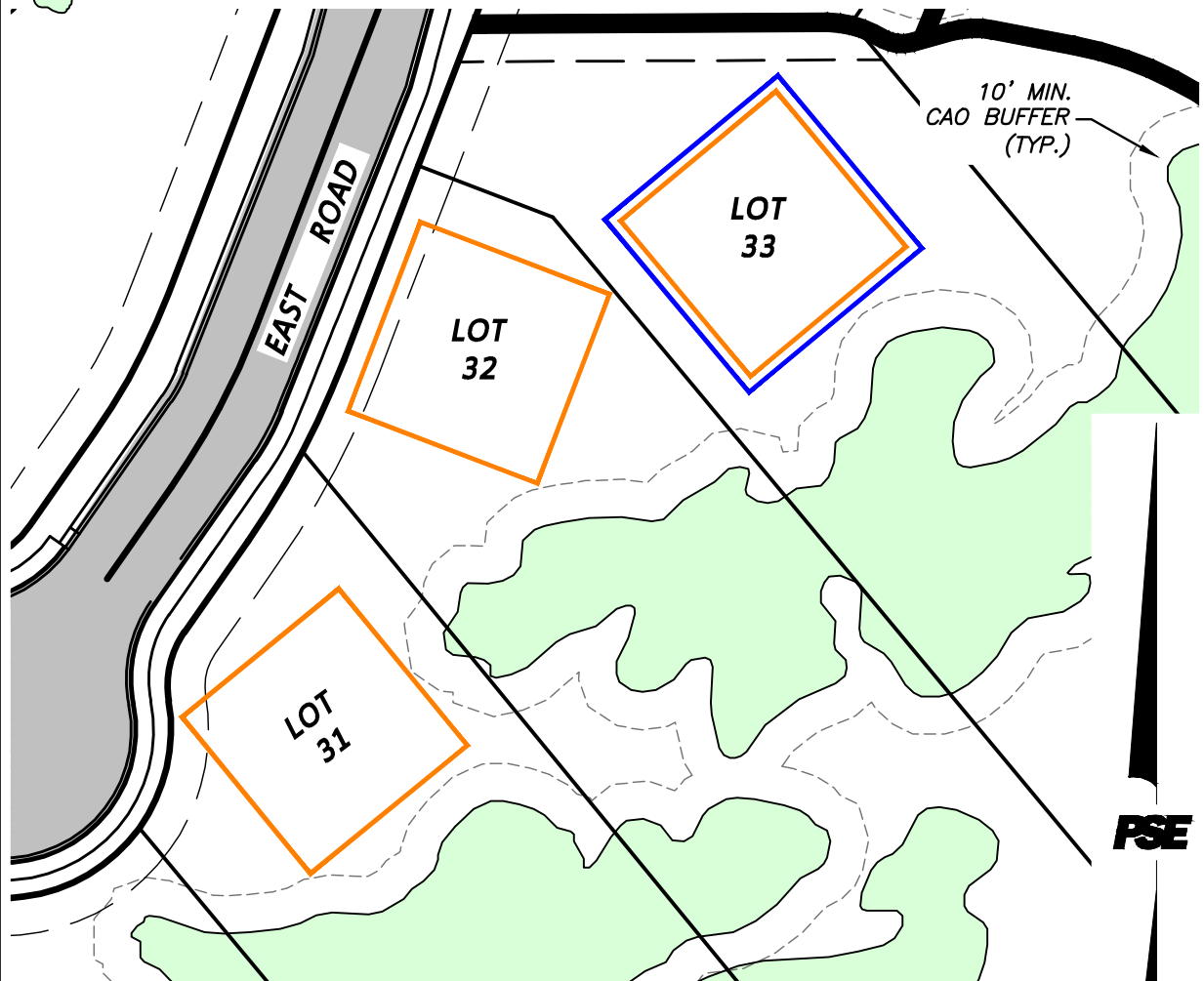
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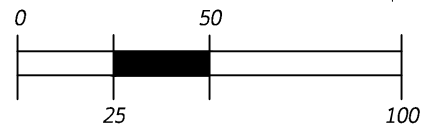
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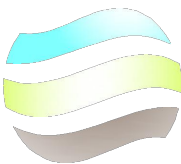
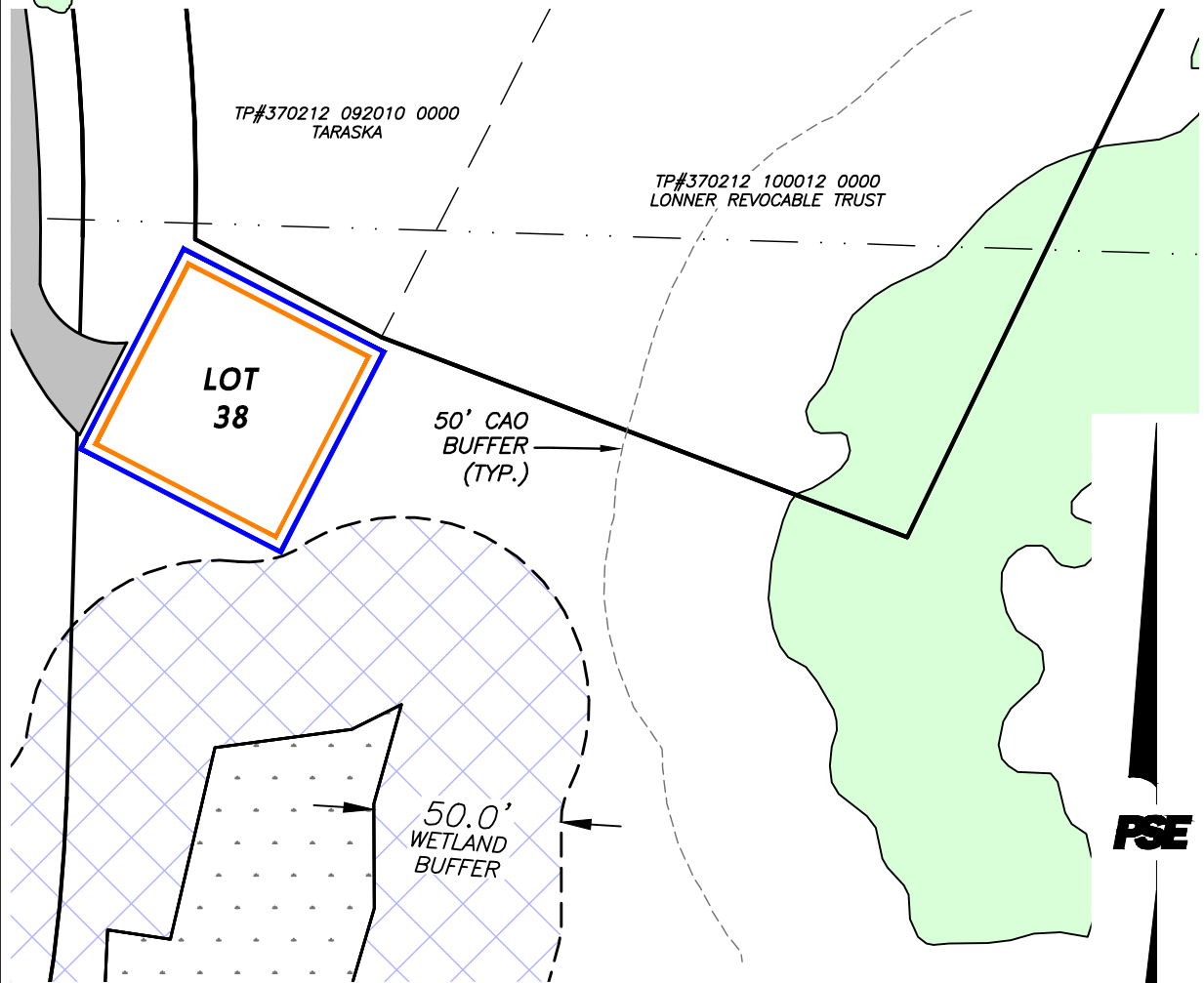
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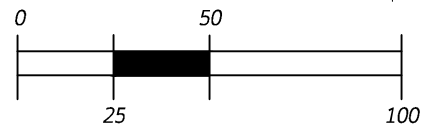
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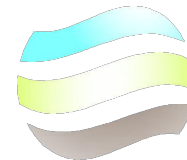
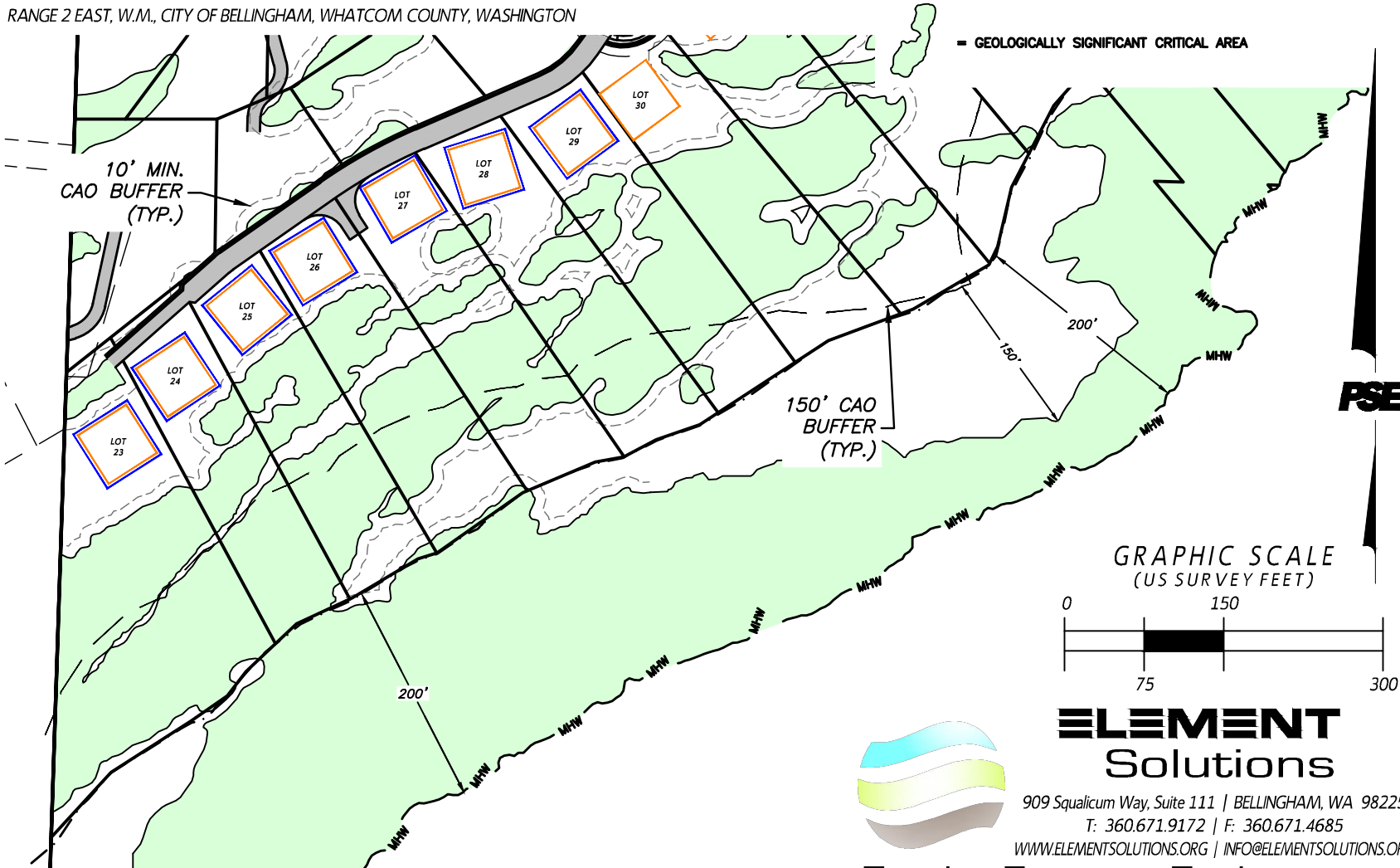
COASTAL GEOLOGICAL CRITICAL AREAS EXHIBIT

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