

Geologic Report
for
Commercial Property

XXX 7th Ave NE
Parcel No. 142601-3-115-2005
Poulsbo, Washington

August 29, 2022
Project #22225

Prepared For:

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8/29/2022

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1.0 INTRODUCTION

Envirotech Engineering, PLLC (Envirotech) has completed this geologic report for a commercial property located at XXX 7th Ave NE, identified as parcel number 142601-3-115-2005 in Poulsbo, Washington. As presented herein, this assessment includes information pertaining to the project in this Introduction Section; observations of the property and surrounding terrain in the Surface Conditions Section; field methods and soils descriptions in the Subsurface Investigation Section; and, assessments for landslides, erosion, seismic hazards, and other considerations in the Conclusions Section.

An initial geological/ geotechnical evaluation of the project was conducted by Envirotech on 8/9/2022. It was determined that development activity is within an area of geologic concern per the City of Poulsbo Ordinance 16.20.410, and subsequently, the project requires a Geologic Report pursuant to Ordinance 16.20.760.

During the evaluation and site visit by Envirotech, surface and subsurface conditions were assessed in order to determine if further geotechnical studies are required. After completion of the field work and applicable Project research, Envirotech prepared this geological assessment.

1.1 Project Information

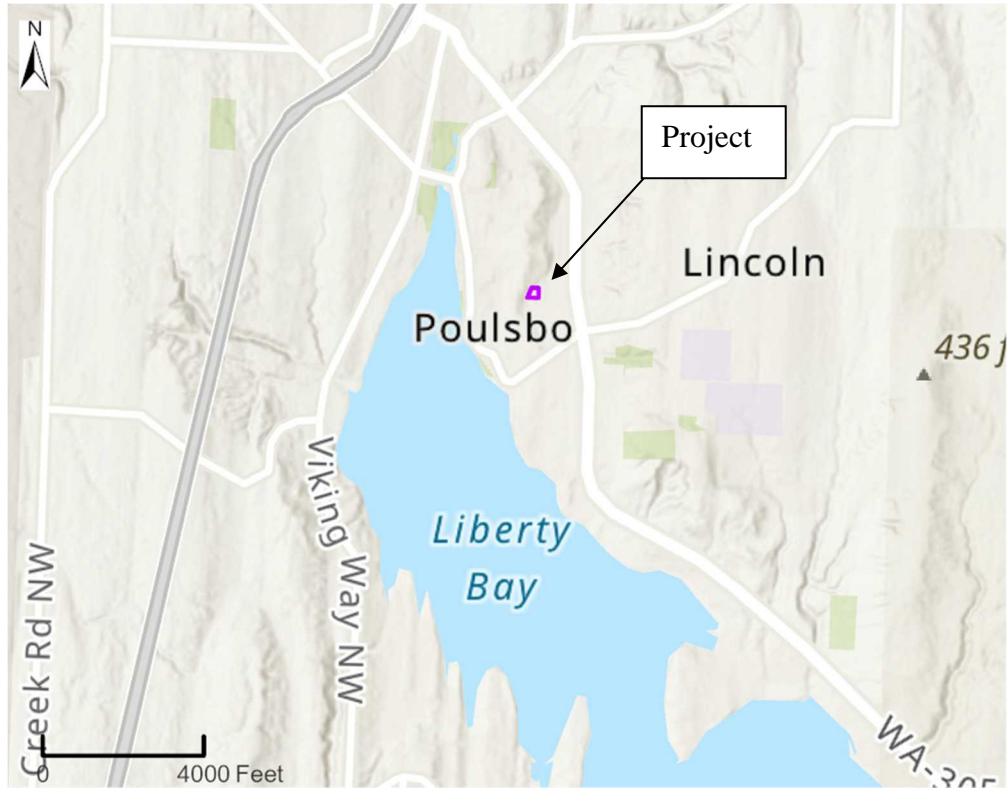
Information pertaining to the project was provided by the proponent of the property, and observations from a field visit by Envirotech. The proposed development is expected to consist of a commercial complex including a building, paved parking, utilities, stormwater management, and other ancillary features typical of this type of development. Due to past grading, the owner will assure that any fill areas are tested and approved to support the development, or the fill will be removed or replaced. Approximate site development area with relation to existing site features are illustrated in the Site Map in Appendix A.

1.2 Purpose of Investigation and Scope of Work

The purpose of this geologic report was to evaluate the project in order to confirm that the proposed development is outside of any landslide hazard area and its associated buffers and setbacks as determined in the prevailing ordinance. The investigation included characterizing the general project surface and subsurface conditions, and evaluating the suitability of the soils to support the planned site development. In order to fulfill the purpose of investigation, the geological/geotechnical program completed for the proposed improvements of the project include:

- Review project information provided by the project owner's representative;
- Conduct a site visit to document the site conditions that may influence the construction and performance of the proposed improvements;
- Define general subsurface conditions of the site by observing soils within test pit excavations, review well logs from existing wells near the project, and evaluate geological maps depicting the site geology for the vicinity of the project;
- Perform soils testing, such as visual classifications, to determine selected index properties of the soils;
- Complete an engineering assessment supported by planned site alterations and the surface and subsurface conditions that were identified by the field investigation, soil testing, and

- applicable project research; and,
- Establish engineering conclusions based on findings and anticipated project.



Vicinity Map from Washington Department of Natural Resources

2.0 SURFACE CONDITIONS

Information pertaining to the existing surface conditions for the project was gathered on 8/9/2022 by a representative with Envirotech. During the site visit, site features were documented that may influence construction or reveal potential geological hazards. This Surface Conditions Section provides information on general observations, vegetation, topography, drainage and slope/ erosion conditions for the project and surrounding areas.

2.1 General Observations

The property is accessed from a shared easement via 7th Ave NE, an existing paved roadway within the city limits of Poulsbo. The roadway is connected by the access road to the east end of the property. The project is vacant land with evidence of past clearing and grading. Beyond the project, both commercial and residential development exists. The lot currently consists mostly of blackberry, weeds, and grass and other typical vegetation common to this area.

2.2 Topography

The property, including areas of development, has varying natural slopes ascending to the northwest. The entire property where development will occur is nearly flat. The ascending slope has grades averaging 18% with isolated areas of less than 8% and more than 30%.

2.3 Surface Drainage

The natural drainage from the site appears to sheet flow towards the east. Indications of significant scour or erosion from surface drainage were not observed on the property where development is expected to occur. Some surface seeping from the hillside was observed.

2.4 Slope and Erosion Observations

The existing moderate slopes near the project signal a potential landslide or erosion hazard area. Some indicators that may suggest past slope movements include:

- Outwash of sediments near the bottom of the slope,
- Fissures, tension cracks or naturally stepped land masses on the face or top of the slope, and parallel to the slope,
- Fine, saturated subsurface soils,
- Old landslide debris,
- Significant bowing or leaning trees, or,
- Slope sloughing or calving.

The above mentioned indicators, or other signs of significant mass wasting on the property or within the general vicinity of the project were not observed or discovered during research. Indications of past landslides, current unstable slopes, deep-seated slope problems, or surficial slope failures were not observed during the site visit.



0 180 Feet
Aerial Photo from Kitsap County Website

3.0 SUBSURFACE INVESTIGATION

Information on subsurface conditions pertaining to the project was gathered during research and a site reconnaissance. The site visit was accomplished on 8/9/2022 by a representative with Envirotech. Specific information on field methods, sampling, field testing, subsurface conditions, and results from soil testing are presented in this section of the report. Appendix B has pertinent information on subsurface conditions for the project, including test pit log representative of the site soils, and USDA soil descriptions.

3.1 Field Methods, Sampling and Field Testing

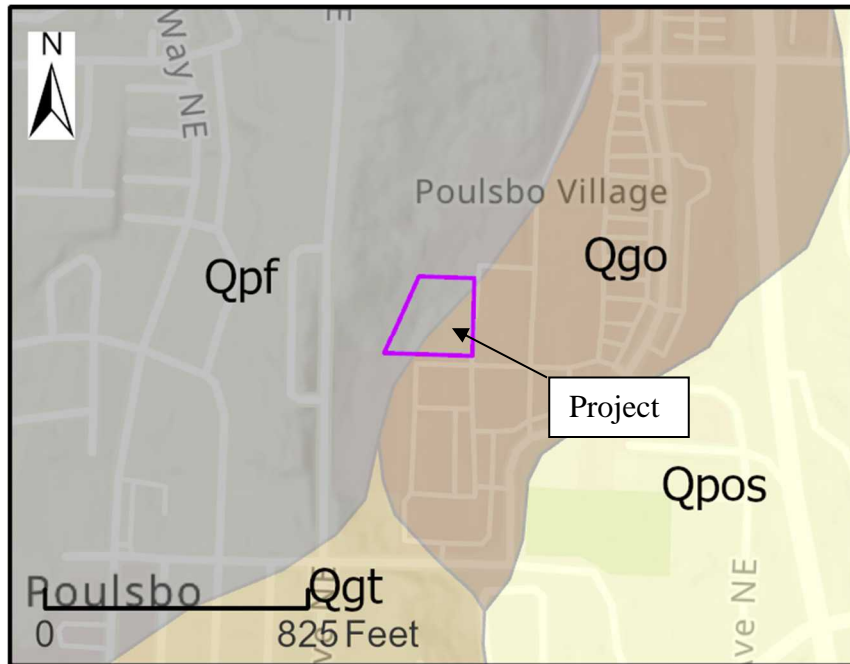
Information on subsurface conditions for the project was accomplished by probing anticipated foundation areas with hand tools, and observing soils within test pit excavations and/ or earth cuts. Information on subsurface conditions also included reviewing geological maps within the project vicinity, and water well reports originating from nearby properties. No soil samples were collected for this project. Envirotech measured the relative density of the in-situ soils by gauging the resistance of hand tools.

3.2 Geologic Conditions

In general, soils at the project are composed of materials from glacial advances. The geologic conditions as presented in the "Geologic Map of Washington," compiled by J. Eric Schuster, 2002 indicates Quaternary sediments, Q_g. Quaternary sediments are generally unconsolidated deposits, and dominantly deposited from glacial drift, including alluvium deposits. This project is located within the Puget Lowland. Typically, "lower tertiary sedimentary rocks unconformably overlie the Crescent Formation." as revealed in the Geologic Map. Initial sedimentary rocks were formed from shales, sandstones and coal deposits from rivers. During the Quaternary period, the Puget Lowland was covered by numerous ice sheets, with the most recent being the Fraser glacier with a peak of approximately 14,000 years ago. Upon the glacial retreat, the landscape was formed by glacial erosion glacial drift deposits.

The "Geologic map of the Seabeck and Poulsbo 7.5-minute quadrangles, Kitsap and Jefferson Counties, Washington" by Polenz, Michael; Cakir, Recep; Paulin, G. L.; Stone, K. A.; Contreras, T. A; Petro, G. T., 2013, provides the following caption(s) for the project area:

Unit	Age	Description
Qpf	Pleistocene	Silt, locally ranging to clay or sand, with rare dropstones; dark to pale gray, commonly bluish-gray, with some exposures ranging to brown; compact. Most exposures are horizontally laminated, but some appear structureless.
Qgo	Pleistocene	Sand and pebble and cobble gravel, some silt and clay; clasts and matrix mostly fresh, but commonly iron-stained to brown, red, and yellow, and in some exposures more weathered than recent alluvium; clasts subrounded to well rounded; moderately sorted.



Washington State Department of Natural Resources

3.3 Specific Subsurface Conditions

The following subsurface conditions are estimated descriptions of the project subgrade utilizing information from the depth of penetration at all testing, sampling, observed and investigated locations. Soils for this project were described utilizing the Unified Soil Classification System (USCS). Using the USCS in conjunction with estimated relative densities and other anticipated engineering properties of the soil, susceptibility for potential landslides, erosion and seismic hazards may be assessed.

Native soils within the upper 2 feet of natural ground were observed to be silty clay with fine sand (CL-ML). Up to 3 feet of fill was observed throughout the site.

According to the “Soil Survey of Kitsap County,” by the United States Department of Agriculture, Soil Conservation Service, the site soils are described as Kitsap silt loam, 30, with 15% to 30% slopes, and Norma fine sandy loam, 37.

Expanded and specific subsurface descriptions, other than what is provided in this section, are provided in the soil logs located in Appendix B of this report.



Soil Survey From USDA Natural Resources Conservation Service

3.3.1 Groundwater

From the water well report(s) and knowledge of the general area, permanent groundwater is at least 50 feet directly below the property at the building pad location. Surface seepage was observed on the adjacent hillside. Perched groundwater at shallow depths was not noted on-site where development will occur.

4.0 ENGINEERING CONCLUSIONS

The following sections present engineering assessments and conclusions concerning the project. These conclusions have been made available based on the planned construction activities as outlined in the Introduction Section of this report; general observations of drainage and topography as summarized in the Surface Conditions Section; and soil conditions that were identified by the field investigation and soils testing as outlined in the Subsurface Investigation Section. Conclusions for the project that is provided herein, includes pertinent information for landslide, erosion and seismic hazards.

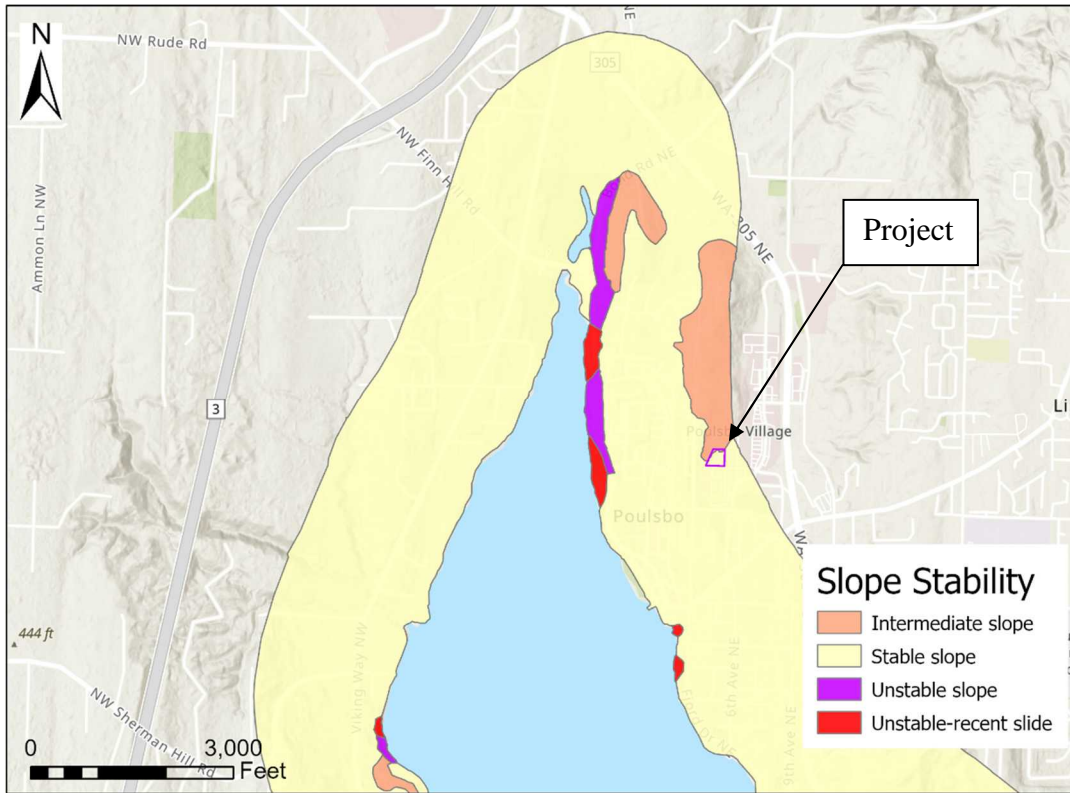
4.1 Landslide Hazards

For the planned development, as provided in the Introduction Section, surface and subsurface conditions as presented in this report, it is Envirotech's opinion that the proposed development is not subjected to or cause adverse impacts to a landslide hazard area or its associated buffer or setbacks.

Landslides are natural geologic processes, and structures near slopes possess an inherent risk of adverse settlement, sliding or structural damage due to these processes. Geotechnical engineering cannot eliminate these risks for any site with sloping grades because gravity is constantly inducing strain on the sloping soil mass. Excessive wet weather and/ or earthquakes will exacerbate these strains. Geotechnical engineering considers excessive wet weather and 'design' earthquakes in order to provide an acceptable factor of safety for developing on or near sloping terrain. These factors of safeties are based on engineering standards such as defining engineering properties of the soil, topography, water conditions, seismic acceleration and surcharges.

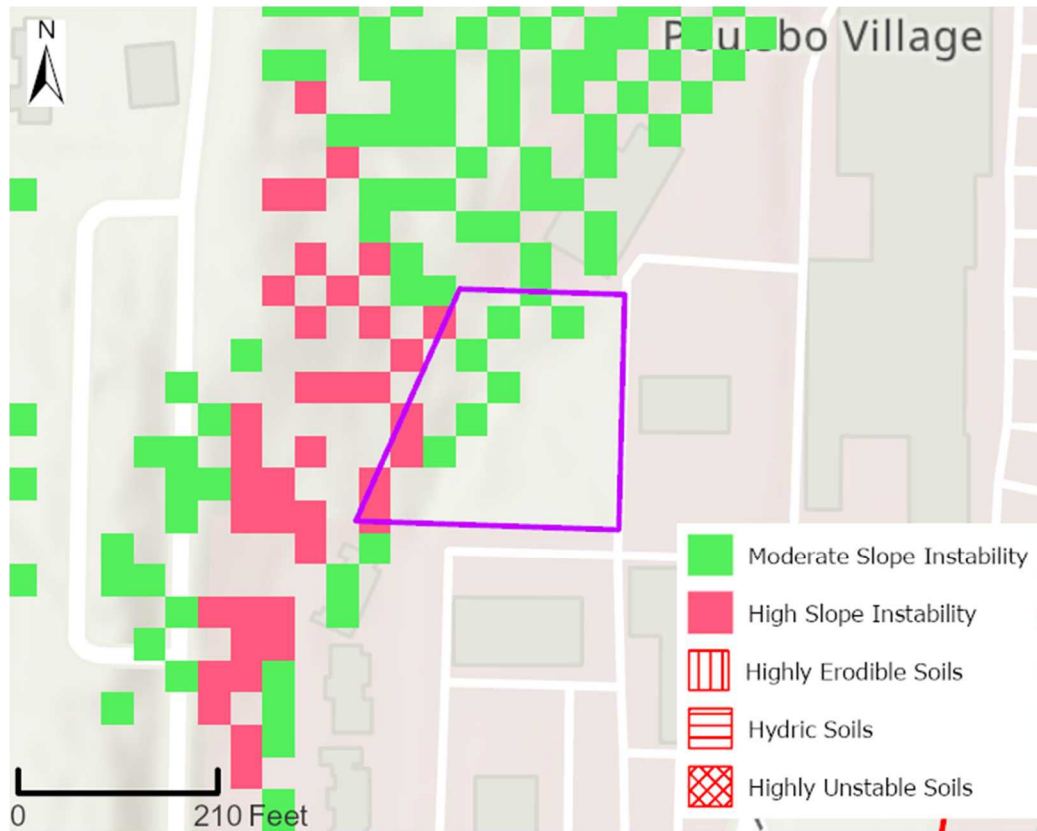
Surface sloughing or other types of surficial slope movements usually do not affect the deep-seated structural capability of the slope. However, excessive and/or repeated surficial slope movements, if not repaired, may represent a threat to the structural integrity of the slope. Maintenance of the slope should be completed if the situation does arise in order to prevent the possibility of further surficial or deep seated slope movements that may be damaging to life or property.

According to the Coastal Zone Atlas of Kitsap County, Washington, the project is within and near terrain labeled 'Stable' and 'Intermediate' regarding potential landslide activity. Stable slopes are generally not prone to landslides due to small grades and accommodating geology. Historically, intermediate terrains have no known landslides. However, this site is considered inherently hazardous due the existing geology and/ or topography, and additional analyses and recommendations concerning the slopes are presented herein. A Stability Map from the Coastal Zone Atlas for the general area of this project is provided below:



Map from Washington State Department of Ecology Website

According to the Department of Natural Resources (DNR) Interactive mapping, previous landslide activity is not recorded on or within the influence of the project. Per the Resource Map from DNR, the project is not within terrain labeled 'highly unstable' or 'highly erodible' relating to soils. DNR labeled portions of this project as medium slope instability with relation to slopes. This delineation is primarily dependent upon slopes and convergence. Secondly, lithology and precipitation are modeled within this delineation. In summary, this designation is based on mapping without field observations or knowledge of the specific site geology or soils. A resource map from DNR is provided below:



Map from Washington State Department of Natural Resources Website

Past landslide activity or high slope instability indicators near the proposed development was not revealed during the project research. In addition, detrimental landslide activity or potential high landslide indicators were not observed during the site visit as outlined in the Surface and Subsurface Conditions Sections of this report.

4.2 Erosion Hazards and Control

Based on the USCS description of the project soils, the surface soils are considered moderately erodible. According to the Resource Map from the Washington State DNR, as provided above, the project is not within terrain labeled ‘highly erodible.’

Temporary and/ or permanent erosion control measures are required for any site when land disturbance is involved. Erosion control will mostly depend on the timeliness of construction, moisture content of the soil, and amount of rainfall during construction. Soil erosion typical to the existing conditions and planned disturbance of this project include wind-borne silts during dry weather, and sediment transport during prolonged wet weather. Sediment transport of disturbed soils could be from stormwater runoff or tracking off-site with construction equipment. Although an engineered erosion control plan is not warranted for this project, Best Management Practices (BMP’s) should be employed during and after construction. Ordinary BMP’s includes silt fencing, protection of drainage outlets and vegetating denuded areas.

Erosion control information and specifications may be found in the applicable “Stormwater Management Manual for Western Washington,” prepared by the Washington State Department of Ecology Water Quality Program and its equivalent local jurisdiction drainage manual.

4.3 Seismic Hazards

Soils immediately below the expected foundation depth for this project are generally Type D, corresponding to the International Building Code (IBC) soil profiles. According to the IBC, the regional seismic zone is 3 for this project. The estimated peak ground acceleration ranges from 0.50g to 0.60g. This estimation is based on the United States Geological Survey (USGS) National Seismic Hazard project in which there is an estimated 2% probability of exceedance within the next 50 years.

There are no known faults beneath this project. The nearest Class ‘A’ or ‘B’ fault to this property is the Dabob Bay Fault. This fault is a Class ‘B’, and is located less than 5 miles to the southwest of the project. This information is supported by the USGS Quaternary Fault and Fold Database for the United States.

The potential for liquefaction and other earthquake induced hazards are believed to be low for this project. This is based on subsurface conditions such as soil characteristics and the lack of a permanent and substantial shallow water table. Subgrade characteristics that particularly contribute to problems caused by seismic events include submerged and confined, poorly-graded granular soils. Although gravel- and silt-sized soil particles could be problematic, fine and medium grained sands are typically subjected to these types of seismic hazards.

4.4 Slope Impacts

Considering the planned construction as summarized in the Introduction Section of this report; the aforementioned surface and subsurface conditions for the project; the slope stability assessment provided herein; and our engineering conclusions, it is our opinion that the project is not within a landslide hazard area, and that the proposed site alterations will not encourage a landslide hazard.

Additional methods and practices that avoid and/or reduce slope impacts include following best management practices for site development drainage.

4.5 Upland/ Slope Drainage Control and Groundwater Control

Positive drainage should be provided in the final design for all planned buildings. Drainage shall include sloping the ground surface, driveways and sidewalks away from the project structures. All constructed surface and subsurface drains should be adequately maintained during the life of the structure. If drainage problems occur during or after construction, additional engineered water mitigation will be required. This may include a combination of swales, berms, drain pipes, infiltration facilities, or outlet protection in order to divert water away from the structures to an appropriate protected discharge area.

Although some seepage was observed, this project does not appear to experience significant subsurface drainage or surface runoff that would be detrimental to the development. It is our opinion that groundwater or surface drainage is not a limiting factor for this project. Drainage

control per City development standards should be sufficient for this project.

4.6 Vegetation Management

Vegetation may be cleared on the subject property, and it is our opinion that clearing will not be problematic with relation to landslides. Denuded areas should be re-vegetated per standard practice.

Conclusions in this report are based on the type and location of the anticipated development, and existing on-site and off-site conditions. Site development that significantly deviates from the anticipated improvements presented in this report, or nearby development that influences this project may require geotechnical design recommendations.

5.0 CLOSURE

Based on the project information and site conditions as presented in this report, it is Envirotech's opinion that additional geotechnical studies are not required to further evaluate this project.

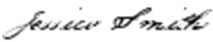
Due to the inherent natural variations of the soil stratification and the nature of the geotechnical subsurface exploration, there is always a possibility that soil conditions encountered during construction are different than those described in this report. Therefore, it is recommended that either a qualified engineer observes and documents the construction, or Envirotech is promptly notified if project and subsurface conditions found on-site are not as presented in this report so that we can re-evaluate our recommendations.

This report presents a geological/ geotechnical assessment, and is intended only for the owner, or owners' representative. Furthermore, this report is only valid for the project information and location described herein.

The services described in this report were prepared under the responsible charge of Michael Staten, a professional engineer with Envirotech. Michael Staten has appropriate education and experience in the field of geotechnical engineering in order to assess landslide hazards, earthquake hazards, and general soil mechanics.

Please contact Michael Staten at 360-275-9374 if you have any questions, comments, or require additional information.

Sincerely,
Envirotech Engineering


Jessica Smith, M.S.
Staff Geologist


Michael Staten, P.E.
Geotechnical Engineer

APPENDIX A

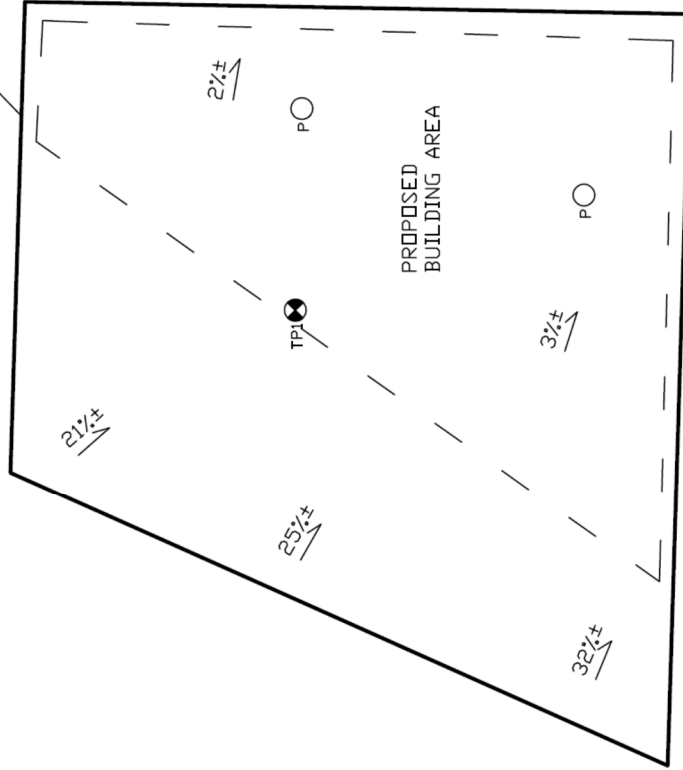
SITE PLAN



SCALE: 1 INCH = 60 FEET



PROPERTY LINE



NOTES:
 1. SLOPE INDICATORS WERE FIELD MEASURED BY ENVIRTECH, AND/OR EXTRAPOLATED FROM A PUBLIC LIDAR SOURCE WHERE APPROPRIATE.
 2. BOUNDARIES ON THIS SITE PLAN WERE NOT PREPARED BY A LICENSED SURVEYOR. LOCATIONS OF SITE FEATURES AND GEOLOGICAL/SUBSURFACE DESIGNATIONS AS SHOWN HERE, WITH RELATION TO THE PROPERTY LINES MUST BE VERIFIED BY THE OWNER. THE CONCLUSIONS AND RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL/ GEOLOGICAL REPORT ARE BASED ON GEOLOGIC AND SPECIFIC SUBSURFACE FEATURES THAT MAY BE LOCATED ON AND OFF THE PROPERTY, AND ARE NOT NECESSARILY BASED OFF OF PROPERTY LINES SHOWN ON THIS SITE PLAN.

LEGEND

- SLOPE INDICATOR
- PO
- TPI

PROJECT/ OWNER/ LOCATION:
 COMMERCIAL PROPERTY
 GEOLOGICAL ASSESSMENT

TIM RYAN
 XXX 7TH AVE NE
 PARCEL 142601-3-115-2005
 POU LSBO, WASHINGTON

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SITE PLAN

APPENDIX B

SOIL INFORMATION

Kitsap County Area, Washington

30—Kitsap silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2h8l
Elevation: 0 to 400 feet
Mean annual precipitation: 37 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kitsap and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces
Parent material: Lacustrine deposits with volcanic ash in the upper part

Typical profile

H1 - 0 to 5 inches: ashy silt loam
H2 - 5 to 35 inches: silty clay loam
H3 - 35 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.08 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Forage suitability group: Sloping to Steep Soils (G002XN702WA)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Kitsap County Area, Washington
Survey Area Data: Version 14, Sep 10, 2018

Mason County, Washington

Nd—Norma sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2hmf
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Norma and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norma

Setting

Landform: Depressions, drainageways
Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: ashy sandy loam
H2 - 6 to 14 inches: ashy sandy loam
H3 - 14 to 30 inches: sandy loam
H4 - 30 to 60 inches: stratified loamy sand to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Wet Soils (G002XN102WA)
Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Mason County, Washington
Survey Area Data: Version 17, Aug 31, 2021