CITY OF
MUKILTEO

REQUEST FOR COMMENTS

DATE: March 27, 2018

	Alderwood Water District – (Dan Sheil / Scott Smith)	X	Puget Sound Clean Air Agency (Beth Carper)
	Burlington Northern Santa Fe Railway (Marvinique Hill)	X	Puget Sound Energy (Dom Amor)
	City of Edmonds (Rob Chave)		Puget Sound Regional Council
	City of Everett (Allan Giffen)		Seattle Dist. Corps of Engineers (Dept. Army-Reg. Branch)
	City of Everett (Steve Ingalsbe)		Snohomish Co. Airport/Paine Field (A. Rardin/B. Dolan)
	City of Lynnwood (Paul Krauss)		Snohomish Co. Assessor's Office ***(Ordinances Only)***
	City of Mill Creek (Tom Rogers)		Snohomish Co. Conservation District
X	City of Mukilteo (Building Official)		Snohomish Co. Environmental (Cheryl Sullivan)
X	City of Mukilteo (Fire Chief)		Snohomish Co. Fire District #1 (Kevin Zweber)
X	City of Mukilteo (Fire Marshal)		Snohomish Co. Marine Res. Comm. (Kathleen Herrmann)
X	City of Mukilteo (Engineering "In-Box")		Snohomish Co. Planning & Dev. Srvc. (Darryl Easton)
X	City of Mukilteo (Com. Dev. Dir.)**(Postcard/Notice only)**		Snohomish Co. Public Works (Shannon Flemming)
X	City of Mukilteo (Police, Cheol Kang, Myron Travis)	X	Snohomish Co. PUD: Dist. Eng. Services (Mary Wicklund)
X	Comcast of Washington (Casey Brown, John Warrick)		Snohomish Health District (Bruce A. Straughn)
	Community Transit (Kate Tourtellot)		Sound Transit Authority (Perry Weinberg)
	Dept. of Commerce (Growth Mgmt. Svcs Rev. Team)		Tulalip Tribes – (Zachary Lamebull)
	Dept. of Natural Resources (James Taylor)		Tulalip Tribes – (Richard Young)
	FAA/Air Traffic Division, ANM-0520 (Daniel Shoemaker)	X	United States Postal Service (Soon H. Kim)
	FEMA (John Graves)	X	Verizon Company of the NW, Inc. (Tim Rennick.)
	Island County MRC (Rex Porter) (*Shoreline Only)*	X	Washington Dept. of Ecology (Peg Plummer)
	Master Builders King/Sno. Counties (Mike Pattison)		Washington Dept of Fish & Wildlife (Jamie Bails)
X	Mukilteo Beacon (Editor) **(Postcard/Notice only)**		WSDOT (Scott Rodman)
X	Mukilteo School District (Cindy Steigerwald)		WSDOT (Ramin Pazooki)
X	Mukilteo School District (Josette Fisher)		WSDOT Ferries(Kojo Fordjour) (*Shoreline Only)*
X	Mukilteo Tribune (Editor) **(Postcard/Notice only))**		WRIA 7 Water Resources
X	Mukilteo Water & Wastewater District (Jim Voetberg, Manager; Rick Matthews; Kendra Chapman)	X	Planning Commission ***(Postcard Only)***
	National Marine Fishery Service	X	Adjacent Property Owners
	Office of Archaeology & Historic Pres. (Allyson Brooks)	X	Applicant/Contact Person ***(Notice Only)***
	Ogden, Murphy, Wallace (Angela Summerfield) ***(Ordinances Only)***	X	Parties of Interest
	Pilchuck Audubon Society (President)	X	Parties of Record
	Port of Everett (Graham Anderson)		Property Owners within 300' ***(Postcard/Notice Only)***
			Other:

FILE NO.: SFR-ADU-2018-001 PROPONENT: Phil Turner

PROJECT NAME: Turner Accessory Dwelling Unit

PROJECT DESCRIPTION: The proposal is to construct a 640 s.f. interior Accessory Dwelling Unit (ADU). The construction of the ADU will occur during the rebuilding of the existing single-family dwelling unit on the property that will be under a separate building permit. The proposal includes off-street parking and a separate access entrance for the accessory dwelling unit.

FILE NO.: SFR-ADU-2018-001 PROPONENT: Phil Turner

PROJECT NAME: Turner Accessory Dwelling Unit

ATTACHED IS:

X	Notice of Application		Plat Map (Reduced)
	DNS ( )	X	Site Plan (Reduced)
	Environmental Checklist	X	Location Map
X	Application		Vicinity Map
	Narrative Statement(s)	X	Other: Geotechnical Report

NOTE: ____

____

****

Please review this project as it relates to your area of concern and return your comments with this cover sheet by, Thursday, April 12, 2018 to Linda Ritter, Senior Planner, City of Mukilteo, 11930 Cyrus Way, Mukilteo, WA 98275.

Linda Ritter
Senior Planner

3/27/18
Date

****

RESPONSE SECTION:

_____ Comments Attached _____ No Comments

COMMENTS: ____

____

Signature Date

Company

DO YOU WANT A COPY OF OUR NOTICE OF DECISION YES __ NO __

CITY OF MUKILTEO

11930 Cyrus Way
Mukilteo, WA 98275
(425) 263-8000

Notice of Application
for
Accessory Dwelling Unit
at 1007 Washington Avenue
by Phil Turner

Phil Turner applied for an Accessory Dwelling Unit (ADU) with the City of Mukilteo on March 12, 2018. The application became complete on March 12, 2018. This application and all supporting documents are available at City Hall for public viewing SFR-ADU-2018-001.

Description of Proposal: The proposal is to construct a 640 s.f. interior ADU. The construction of the ADU will occur during the rebuilding of the existing single-family dwelling unit on the property that will be under a separate building permit. The proposal includes off-street parking and a separate access entrance for the accessory dwelling unit.

Location of Proposal: MUKILTEO PLAT OF BLK 061 D-01 - LOT 1 LESS ST LESS N 40FT -LOTS 2-3-4-5-6 LESS N 40FT ON EACH LOT TGW N 40FT OF LOTS 17-18-19-20-21-22; otherwise known as 1007 Washington Avenue, Mukilteo, Washington.

Environmental Documents Prepared for the Proposal:
- Geotechnical Engineering Report prepared Robinson Noble dated July 11, 2017

List of Required Permits:
- Accessory Dwelling Unit Permit
- Building Permit
- Engineering Permit
- Any State and Federal permits if applicable

Applicable Policies and Requirements
The project will be reviewed for consistency with the following policies, standards and regulations:

☐ Possession Shores Master Plan
☒ Comprehensive Plan, Shoreline Master Plan
☒ International Building Code (2012 Edition)
☒ International Fire Code (2012 Edition)
☐ Sector Plan & Amendments
☒ Mukilteo Municipal Code
☒ City of Mukilteo Development Standards

Comment Period

The application and supporting documents are available for review at the City of Mukilteo, 11930 Cyrus Way, Mukilteo, WA 98275. Contact: Linda Ritter, Senior Planner at (425) 263-8043. The public is invited to comment on the project by submitting written comments to the Planning Department at the above address by 4:30 p.m. on the date noted below.

Notice of Application Issued: Thursday, March 29, 2018

End of Comment Period: Thursday, April 12, 2018

The City will not act on this application until the end of the 14-day public comment period. Upon completion of project review the proposed application will be administratively approved, approved with conditions, or denied. You may request a copy of the final decision on the project by making a written request to the City contact person named below.

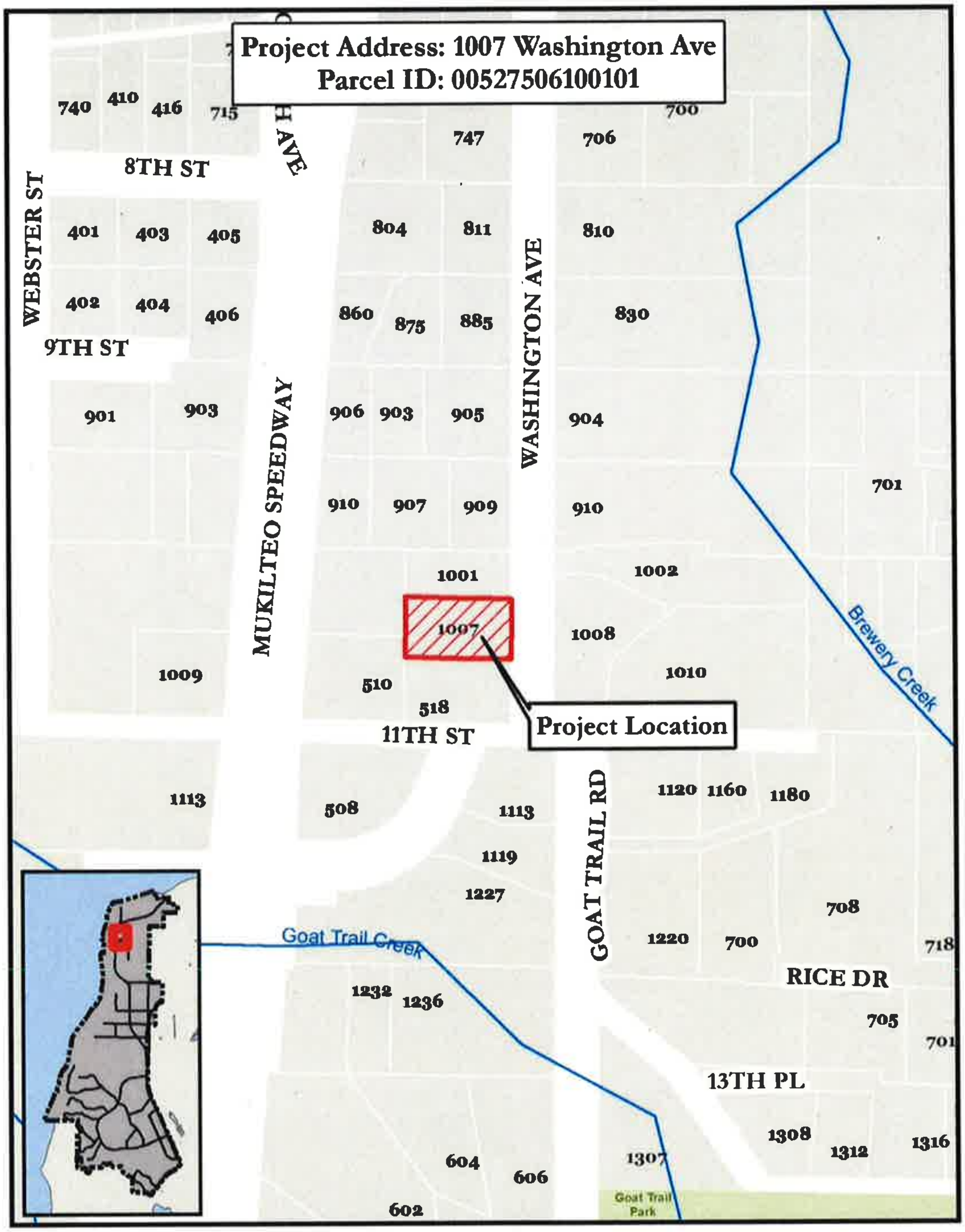
Appeals

The final decision on this project is administratively appealable. An appeal must be filed within 14 days after the final decision on the project is issued. Only persons who file written comments on the project in response to the Notice of Application are considered parties of record who may appeal the decision. If you do not file written comments within the comment period, you may not appeal the final decision.

Contact Person: Linda Ritter, Senior Planner (425) 263-8043

Signature: Linda Ritter Date: 3/26/18

Linda Ritter, Senior Planner



Location Map

Date Issued: Thursday, March 29, 2018
Date Advertised: Thursday, March 29, 2018
End Comment Period: Thursday, April 12, 2018

pc:	Applicant/Representative	CD Director	Permit Services Assistants (2)
	Reviewing Agencies	Permit Services Supervisor	Property File
	Interested Parties		

ADU

Date stamp
RECEIVED
FEB 28 2018
CITY OF MUKILTEO

CITY OF MUKILTEO

11930 Cyrus Way Mukilteo, WA 98275
Fax (425) 212-2068

Land Use Permit Application

PPR # ____
SEPA # ____
Misc # ____

Applicant: Phillip + Margrit Turner
Address: 1007 Washington Ave
Mukilteo, WA
Phone: 425-347-0829

Owner: Same
Address: "
Phone: "

Project Address: 1007 Washington Ave

Legal Description of Property: Tax Parcel 00527506100101

Key Contact Person: Phil Turner
Phone: 425-347-0829
Fax: ____

Project Type:

- ☐ Commercial
- ☐ Multi-Family
- ☐ Industrial
- ☐ Shoreline* (JARPA)
- ☐ Conditional Use*
- ☐ Variance*
- ☐ Preliminary Subdivision*
- ☐ Final Subdivision*
- ☐ Preliminary Short Plat*
- ☐ Final Short Plat*
- ☐ Sector Plan Amendment
- ☐ Waterfront Development
- ☐ Single Family Residence
- ☐ Special Use Permit*
- ☐ Reasonable Use
- ☐ Lot Line Adjustment*
- ☐ Grading*
- ☐ Binding Site Plan
- ☐ Project Rezone
- ☒ Other, Specify ADU

* Need to fill out supplemental application form with project.

Project Resume:

Existing Use: Single Family
Proposed Use: Accessory dwelling Unit
Total Site Area: 13,462
Water District: Mukilteo Water
Building Foot Print Area: 2305
Sewer District: Mukilteo Wastewater
Lot Coverage: 17%
\# of Proposed Units: 1
No. of Parking Stalls Provided: 5
Building Height: 26.1
Comp Plan Designation: Single Family Residential - High Density
Zoning: RD 7.5
Gross Floor Area by Uses: 640 ft² - ADU

Electric Vehicle Charging Units Provided: Yes ____ No X If Yes, How Many? ____

Solar Panels being installed: Yes ____ No. X If Yes, How Many

Pre-application Meeting Held: (Y/N; date) ____

The information given is said to be true under the penalty of perjury by the laws of the State of Washington.

____________________ ____________
Applicant/Authorized Agent Signature **Date**

[signature] 2/28/18
Owners Signature **Date**

RECEIVED
FEB 28 2018
CITY OF MUKILTEO

CITY OF MUKILTEO

11930 Cyrus Way, Mukilteo, WA 98275
(425) 263-8000
Fax (425) 212-2068

Accessory Dwelling Unit Supplemental Application Form

Date: ____________ Application Number: ____________

Fee Received: $__________ ☐ Cash ☐ Check ☐ Other Receipt #: ________

1. Name of Project: Turner Residence
2. Applicant is: ☒ Owner ☐ Authorized Agent for Owner

   Name: Phillip W. Turner

   Address: 1007 Washington Ave
   Mukilteo, Wa 98275

   Phone: 425 347 0829

3. Legal Description of Property (may be attached): ____________
4. Assessor's Tax Number of all property involved in the application:
   005275-061-001-01
5. Existing Zoning: RD 7.5
6. Existing Comp Plan Designation: Single Family Residential - High Density
7. Type of ADU: ☒ Interior ☐ Attached ☐ Detached
8. Number of Parking Stalls on the Property: 5
9. ADU Status: ☐ Pre-Existing ☒ New
10. Square footage of existing residence: 2305
11. Square footage of proposed ADU: 640
12. Number of Bedroom in ADU: 1

13. Drawings: All accessory dwelling units shall comply with the design standards as outlined in MMC 17.30.060. Attach two copies of building site plans and elevations showing compliance with MMC 17.30.030.

Drawing Attached: ☒ Yes ☐ No

14. Ownership Verification: Attach the owner's Affidavit of Ownership form verifying that the owner will be resides in either the principal unit or the accessory dwelling unit as the permanent residence for at least six months of each calendar year.

Affidavit of Ownership form attached: ☒ Yes ☐ No

This project is submitted to the City of Mukilteo for the purpose of obtaining its approval in accordance with the Laws of the State of Washington, Chapter 271, extraordinary session of the 1969 Legislature, and Ordinance No. 350 of the City of Mukilteo.

The information given is said to be true under the penalty of perjury by the Laws of the State of Washington.

Signatures: Owner* [signature] Date 2/28/18

Owner* __________ Date __________

Agent for Owner __________ Date __________

* NOTE: If legal owner is a corporation or partnership, proof of ability to sign for the corporation or partnership shall be submitted to the City of Mukilteo with this application.

EXHIBIT "A"

Legal Description

For APN/Parcel ID(s): 005275-061-001-01

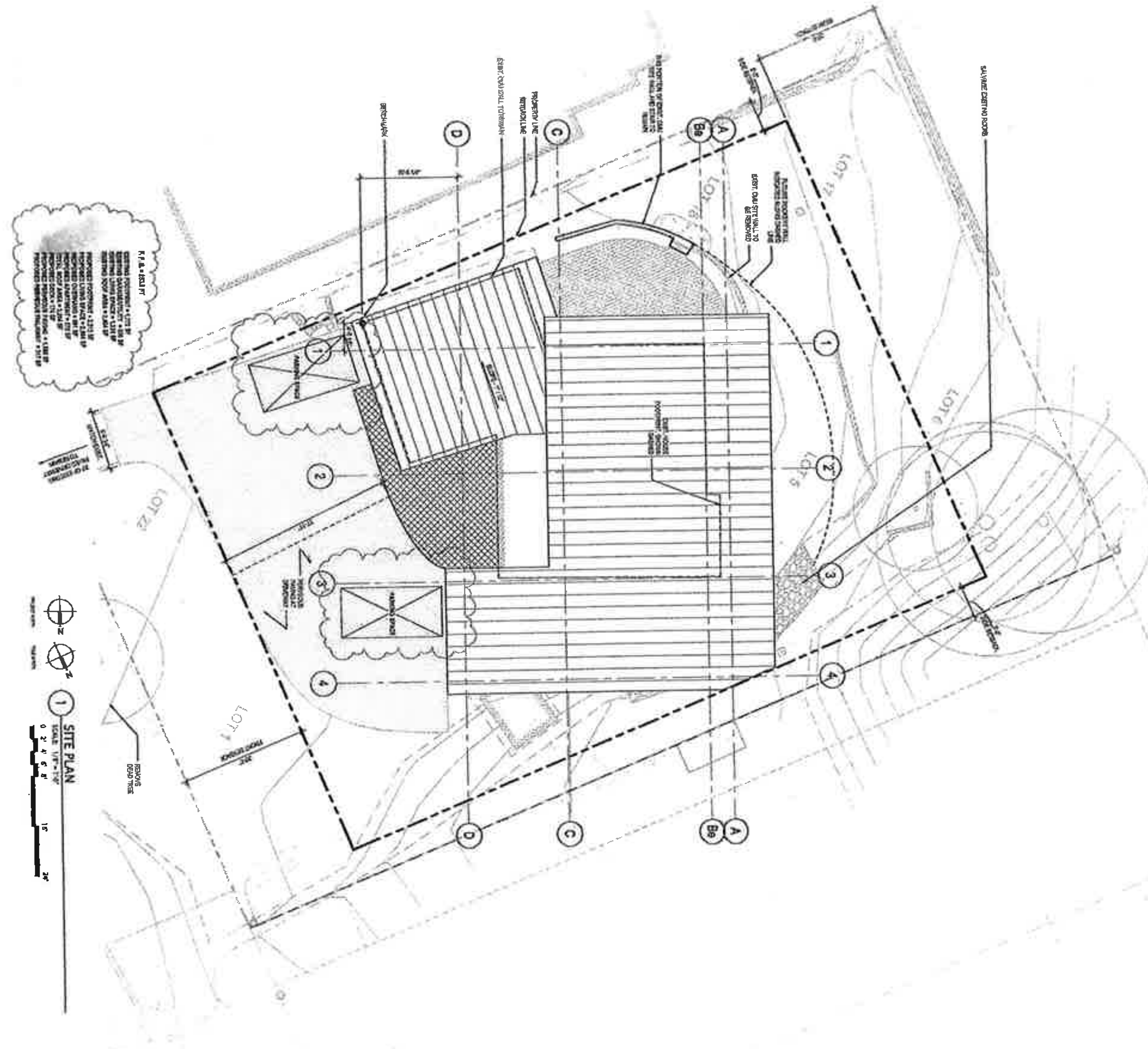
LOTS 1, 2, 3, 4, 5 AND 6, LESS NORTH 40 FEET OF EACH LOT, BLOCK 61, PLAT OF MUKILTEO, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 2 OF PLATS, PAGE 34, RECORDS OF SNOHOMISH COUNTY, WASHINGTON;

TOGETHER WITH THE NORTH 40 FEET OF LOTS 17, 18, 19, 20, 21 AND 22, BLOCK 61, PLAT OF MUKILTEO, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 2 OF PLATS, PAGE 34, RECORDS OF SNOHOMISH COUNTY, WASHINGTON;

EXCEPTING PORTION THEREOF LYING WITHIN WASHINGTON AVENUE;

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

RECEIVED
FEB 2 8 2018
CITY OF M LTEO



SITE PLAN

A1.00

NOT FOR CONSTRUCTION

PERMIT DRAWINGS

11/13/2017

principal architect TK
project manager
drawn by
checked by
job no.
date

revisions

no. date by

Olson Kundig

108 South Jackson Street, Suite 600, Seattle WA 98104, USA
T +1 206 624 5670, F +1 206 624 3730, www.olsonkundig.com

project:

TURNER RESIDENCE

1007 Washington Avenue
Mukilteo, WA 98275

ROBINSON
NOBLE

RECEIVED
FEB 28 2018
CITY OF MUKILTEO

July 11, 2017

Mr. Brandon Agnew
Agnew Homes, LLC
8102 156th Street SE
Snohomish, WA 98296

Geotechnical Engineering Report
Mukilteo Single Family Residence
1007 Washington Avenue
Mukilteo, Washington
RN File No. 3130-002A

Dear Mr. Agnew:

This letter serves as a transmittal for our report for the Mukilteo remodel project, located at 1007 Washington Avenue in Mukilteo, Washington. Development plans consist of constructing a two-story single family residence. The subsurface soils encountered at depth are capable of providing support for the planned building. Foundations shall extend down through the fill into native medium dense soil.

We appreciate the opportunity of working with you on this project. If you have any questions regarding this report, please contact us.

Sincerely,

Rick B. Powell, PE
Principal Engineer

RBP:am

Thirteen Figures
Appendix A

2105 South C Street
Tacoma, Washington 98402
P: 253.475.7711 | F: 253.472.5846

www.robinson-noble.com

17625 130th Avenue NE, Suite 102
Woodinville, Washington 98072
P: 425.488.0599 | F: 425.488.2330

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of our geotechnical engineering investigation at your proposed single-family residential project, in the Mukilteo area of Snohomish County, Washington. The site is located at 1007 Washington Avenue, as shown on the Vicinity Map in Figure 1.

You have requested that we complete this report to evaluate subsurface conditions and provide recommendations for site development. For our use in preparing this report, we have been provided with an undated preliminary lot layout of the site by Agnew Homes.

PROJECT DESCRIPTION

The development will consist of a two-story single-family residence with a detached garage to the southeast and a shed to the northeast. We have not been provided with a grading plan, but we expect that site grading may include cuts and fills of up to about 15 feet. The existing residence will be removed except for a portion of the south wall.

SCOPE

The purpose of this study is to explore and characterize the subsurface conditions and present recommendations for site development. Specifically, our scope of services as outlined in our Services Agreement, dated April 19, 2017, includes the following:

1. Review available geologic maps for the site.
2. Mark the site for utility locates.
3. Explore the subsurface soil and groundwater conditions in the area of the planned building with a hand carried, portable 'acker' drill rig.
4. Evaluate pertinent physical and engineering characteristics of the soils encountered in the borings.
5. Perform a slope stability analysis. We will analyze both static and dynamic conditions.
6. Prepare a geotechnical report containing the results of our subsurface explorations, and our conclusions and recommendations for geotechnical design elements of the project.

SITE CONDITIONS

Surface Conditions

The project site is about 0.34 acres in size and has maximum dimensions of approximately 150 feet in the east-west direction and 90 feet in the north-south direction. Access to the site is provided by Washington Avenue to the east. The site is also bordered by existing residential acreage to the north, west and south. A layout of the site is shown on the Site Plan in Figure 2.

The ground surface within the site is generally gently to steeply sloping down to the northwest. A single-family residence with an attached garage and a shed currently sit within the site. The site is vegetated mostly with a grass-covered lawn, with landscaped areas surrounding the existing residence, and contains a few small- to- medium sized trees.

An approximately 6-foot tall rockery faces the slope north of the existing residence. A drain pipe was observed exiting the bottom of the rockery onto the slope below. An approximate 2.5 foot high block wall is located about 4 feet from the face of the house on the north, west and south sides of the structure. Two timber landscape walls less than 2 feet in height are located west of the house.

Geology

Most of the Puget Sound Region was affected by past intrusion of continental glaciation. The last period of glaciation, the Vashon Stade of the Fraser Glaciation, ended approximately 14,000 years ago. Many of the geomorphic features seen today are a result of scouring and overriding by glacial ice. During the Vashon Stade, areas of the Puget Sound region were overridden by over 3,000 feet of ice. Soil layers overridden by the ice sheet were compacted to a much greater extent than those that were not. Part of a typical glacial sequence within the area of the site includes the following soil deposits from newest to oldest:

> **Artificial Fill (af)** – Fill material is often locally placed by human activities, consistency will depend on the source of the fill. The thickness and expanse of this material will be dependent on the extent of fill required to grade land to the desired elevations. Density of the fill will depend on earthwork activities and compaction efforts made during the placement of the material.

> **Recessional Outwash (Qvr)** – These deposits were derived from the stagnating and receding Vashon glacier and consist mostly of stratified sand and gravel, but include unstratified ablation and melt-out deposits. Recessional deposits were not compacted by the glacier and are typically not as dense as those that were.

> **Vashon Till (Qvt)** – The till is a non-sorted mixture of clay, sand, pebbles, cobbles and boulders, all in variable amounts. The till was deposited directly by the ice as it advanced over and eroded irregular surfaces of previously deposited formations and sediments. The till was well compacted by the advancing glacier and exhibits high strength and stability. Drainage is considered very poor in the till.

> **Advance Outwash (Qva)** – The advance outwash typically is a thick section of mostly clean, pebbly sand with increasing amounts of gravel higher in the section. The advance outwash was placed by the advancing glaciers and was overridden and well compacted by the glacier.

> **Transitional Beds (Qtb)** – These clay, silt and fine sand soil was mostly deposited in lakes some distance from the ice front and in fluvial environments prior to the advance of the ice sheet. These beds typically grade up into the overlying advance outwash. They appear firm in outcrop and can become unstable in steep slopes because of high water content and jointing.

The geologic units for this area are mapped on the Distribution and Description of Geologic Units in the Mukilteo Quadrangle, Washington, by James P. Minard (U.S. Geological Survey, 1982). The site is mapped as being underlain by deposits of glacial till with advance outwash and transitional beds mapped immediately to the west. Our site explorations encountered fill and outwash deposits.

Explorations

We explored subsurface conditions within the site on May 1, 2017, by drilling four borings with a track-mounted hollow stem auger drill rig. The borings were drilled to depths of 21.5 to 26.5 feet below the ground surface. Samples were obtained from the borings at 2.5 and 5-foot intervals using the Standard Penetration Test. This test consists of driving a two-inch outside diameter split spoon sampler with a 140-pound hammer dropping 30 inches. The number of blows required for penetration of three 6-inch intervals was recorded. To determine the standard penetration number at that depth the number of blows required for the lower two intervals are summed. These numbers are then converted to a hammer energy transfer standard which is 60 percent, N_{60}.

The borings were located in the field by an engineer from this firm who also examined the soils and geologic conditions encountered, and maintained logs of the borings. The approximate locations of the borings are shown on the Site Plan in Figure 2. The soils were visually classified in general accordance with the Unified Soil Classification System, a copy of which is presented as Figure 3. The logs of the borings are presented in Figures 4 through 10.

Subsurface Conditions

A brief description of the conditions encountered in our explorations is included below. For a more detailed description of the soils encountered, review the Boring Logs in Figures 4 through 10.

Our explorations generally encountered a surficial layer of sod that was less than 0.5 foot in thickness. Underlying the sod, we encountered fill and possible fill consisting of very loose to dense sand and silty sand with varying amounts of gravel and wood that extended to depths ranging from about 4 to 10 feet below existing ground surface. Below the fill in Borings 1 and 2 we observed loose silty sand to depths ranging from about 12 to 14 feet. Underlying the loose sand in Borings 1 and 2 and the possible fill in Borings 3 and 4 the explorations disclosed medium dense to dense silty sand and sand with silt to the depth explored in Boring 1 and to depths ranging from about 7 to 19 feet in the remaining borings. Below the medium dense sand and silty sand the borings revealed dense to very dense sand with varying amounts of silt to the depths explored.

Laboratory Testing

We completed moisture content testing on selected samples from our explorations. The moisture contents are shown on the boring logs.

Hydrologic Conditions

Shallow groundwater seepage was encountered at 23.0 feet in Boring 2. We consider this water to be perched within the cleaner sand layers of the outwash. During the wetter times of the year, we expect perched water conditions will occur as pockets of water within the outwash layer. Perched water does not represent a regional groundwater "table" within the upper soil horizons. Volumes of perched groundwater vary depending upon the time of year and the upslope recharge conditions.

CONCLUSIONS AND RECOMMENDATIONS

General

It is our opinion that the site is compatible with the planned development. The underlying medium dense to very dense glacial outwash deposits are capable of supporting the planned structures. We recommend that the foundations for the structures extend through any fill, topsoil, loose, or disturbed soils, and bear on the underlying medium dense or firmer, native glacial outwash, or on structural fill extending to these soils. Based on our site explorations, we anticipate these soils will generally be encountered at depths ranging from about 7 to 9.5 feet on the west and south sides of the planned residence to about 12 to 14 feet on the north side of the planned residence.

Geologic Hazards

General: The City of Mukilteo Municipal Code (MMC) section 17B.52A.020 designates the site as a geologic sensitive area for several types of hazards. The site-specific landslide, erosion and seismic hazards are discussed below.

Landslide Hazards: The site is mapped by the City's Geologic Features Boundary Map as being within a moderate landslide hazard. The core of the site is inferred to be composed of glacially overridden soils. We consider these soils to be of high strength and considered to be stable with regard to deep-seated slope failures. We did not observe indications of surficial seepage on the site, nor did we observe indications of deep-seated slope failures. We did observe evidence of shallow surficial slope failures in the form of a potential scarp south of the existing shed. In addition, the trunk of a mature cedar tree growing at the top of the steep slope near the northwest corner of the residence exhibited curving that would indicate past slope movement. There is a potential that the surficial soils on the steeper sections of the slope could slough over time. Any slough events are expected to be surficial, and are affected by surface water and man-made impacts. The risk of slough events can be minimized if proper drainage is installed, vegetation on the slope is maintained, and yard waste and other debris are kept off the slopes. We expect if a slough event were to occur, it would be small in scale and relatively shallow. We did not observe any indication of recent sloughing on site.

Slope Stability Analysis: We analyzed global stability using a computer program by Rocscience known as Slide, version 6.0. Slide is a two-dimensional, limit-equilibrium, slope stability program for evaluating the safety factor or probability of failure, of circular or non-circular failure surfaces in soil or rock slopes. Slide analyzes the stability of slip surfaces using vertical slice limit equilibrium methods. The sections were analyzed using the Simplified Bishops method of slices. Slide generates random potential failure surfaces and determines their corresponding factors of safety with respect to failure. The factor of safety is defined as the ratio of the internal soil strength divided by the gravity driving forces that cause failure. By generating a large number of random surfaces, the factor of safety can be obtained as the lowest number calculated.

Section 17B.52A.040.D of the MMC prescribes using a seismic event with a ten percent probability of being exceeded in fifty years. The City of Mukilteo requirements presents factor of safety benchmarks to be achieved to demonstrate that the development does not increase risk to the site and surrounding properties. These requirements and safety factor results are presented in Table 1 below.

Based on the results of our slope stability analysis, it is our opinion that the proposed alteration will not increase risk to the site and surrounding properties, provided the cut adjacent to the steep slope is stabilized with a retaining wall as described above and the new residence maintains a minimum 15-foot setback from the steep slope. We should be retained to review the design of the retaining wall to ensure our recommendations are followed.

Table 1 – Slope Stability Factors of Safety

Analysis Case	Analysis Factor of Safety	City of Mukilteo Factor of Safety Requirement
Existing Conditions, Static	1.52	1.5
Developed Condition, Static	1.70	1.5
Developed Condition, Dynamic	1.26	1.2

Existing and proposed conditions were used to calculate static and dynamic (pseudo-static) slope stability in Cross-Section A-A' as shown on Figure 2. The analyses are presented as Figures 11 through 13. Figure 11 shows the existing conditions. Figure 12 presents the proposed development 15 feet from the steep slope. Figure 13 presents the proposed development 15 feet from the top of the steep slope under seismic loads that represent a ten percent probability in fifty years. We have applied an acceleration multiplier of 0.5 in general accordance with the methods presented in *Soil Strength and Slope Stability* by Duncan and Wright (2005).

Basic development design standards are set forth in MMC Section 17B.52A.080

"A. The proposed development shall provide a safety factor of one and one-half for static conditions and one and two-tenths for dynamic conditions for seismic occurrences. Analysis of dynamic conditions shall be based on a minimum horizontal acceleration as established by the current adopted version of the International Building Code;"

The stability analysis described above shows the required safety factors have been obtained.

"B. Structures and improvements shall be clustered to avoid geologic sensitive areas and other critical areas;"

The structures have been clustered to avoid geologic sensitive areas.

"C. Structures and improvements shall minimize alterations to the natural contour of the slope and foundations shall be tiered to conform to existing topography;"

Provided the recommendations in this report are followed, alterations to the natural contour of the slope will be minimized.

"D. *Structures and improvements shall be located to preserve the most sensitive portion of the site and its natural landforms and vegetation;"*

Provided the recommendations in this report are followed, structures will be located to preserve the most sensitive portions of the site and will be set back 15 feet from the top of the steep slope.

"E. *The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;"*

Based on the results of our slope stability analysis, the proposed development will not result in greater risk and will improve the stability of the slope.

"F. *Single-family residential development shall be designed so that the impervious lot coverage does not exceed fifty percent of the site; and"*

The proposed impervious coverage does not exceed 50 percent of the site.

"G. *Stormwater runoff shall be collected, detained, and released in accordance with the city's stormwater detention requirements. At no time shall concentrated stormwater runoff be allowed to flow directly over a steep slope or impact a neighboring property. (Ord. 1295 § 10 (Exh. 1B) (part), 2011)"*

Provided the recommendations in this report are followed, concentrated stormwater runoff will not flow towards the steep slope or impact the neighboring properties.

The standard setback from a steep slope is 25 feet, the proposed lot layout provided to us includes a 15-foot setback from the steep slope. Our analysis shows that a setback of 15 feet will avoid decreasing the stability of the steep slope. According to MMC Section 17B.52A060, alterations are permitted in a geologic sensitive area where:

"A. *A site assessment has been submitted showing that the proposal will have no adverse impact on the stability or erosion susceptibility of the adjacent sensitive slope area;"*

Our slope stability analysis shows that no adverse impact will occur to the stability of the site provided that a 15-foot setback is maintained from the top of the steep slope.

"B. *The impacted slope area totals no more than twenty percent of the entire parcel;"*

The steep slope area is less than 20 percent of the entire parcel.

"C. *Only where a slope modification is approved by the public works director, the twenty-five-foot setback will not be required nor will the twenty-five-foot setback area be counted towards the twenty percent impact area as noted above;"*

The proposed plan calls for a 15-foot setback. The stability analysis shows that the 15-foot set-back will avoid decreasing the stability of the steep slope.

"D. The modification will not increase surface water discharge or sedimentation to adjacent properties beyond predevelopment conditions;"

Provided our recommendations are followed, the modification will not increase surface water or sedimentation to adjacent properties.

"E. The activity will not adversely impact other critical areas as regulated by Chapters 17B.52 through 17B.52D;"

Provided the recommendation is this report are followed the proposed development will not adversely impact other critical areas as regulated in chapter 17B.52.010 through 17B52.110.

"F. The development will not decrease slope stability on adjacent properties; and"

Our slope stability analysis shows that no adverse impact will occur to the stability of the steep slope provided that a 15-foot setback is maintained from the top of the steep slope.

"G. Stormwater runoff from any new impervious surface shall be collected in a detention system and directed to an enclosed drainage system. Where minor additions of less than one thousand square feet of new impervious areas are proposed to existing developed properties that do not have detention facilities, the stormwater runoff shall be directed to the city's storm drainage system or be designed for natural infiltration or dispersion. At no time shall concentrated stormwater runoff be allowed to flow directly over a steep slope or impact a neighboring property. (Ord. 1295 § 10 (Exh. 1B) (part), 2011)"

Project plans were in the preliminary stages at the time of this report. We recommend stormwater runoff be directed to the City's drainage system as described above.

Erosion Hazard: The erosion hazard criteria used for determination of affected areas includes soil type, slope gradient, vegetation cover, and groundwater conditions. The erosion sensitivity is related to vegetative cover and the specific surface soil types (group classification), which are related to the underlying geologic soil units. We reviewed the Web Soil Survey by the Natural Resources Conservation Service (NRCS) to determine the erosion hazard of the on-site soils. The site surface soils were classified using the SCS classification system as Alderwood-Everett gravelly sandy loam, 25 to 70 percent slopes (Unit 4). The corresponding geologic unit for these soils is glacial outwash and basal till, which is in general agreement with the soils encountered in our site explorations. The erosion hazard for the soil is listed as being severe for the moderate to steeply sloping conditions at the site.

Seismic Hazard: It is our opinion based on our subsurface explorations that the Soil Profile in accordance with the 2015 International Building Code (IBC) is Site Class C with Seismic Design

Category D. We used the US Geological Survey program "U.S. Seismic Design Maps Web Application." The design maps summary report for the 2012/15 IBC is included in this report as Appendix A.

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The underlying dense outwash soils are considered to have a very low potential for liquefaction and amplification of ground motion and seismically induced lateral spread.

The project is mapped on Faults and Earthquakes in Washington State (Jessica L. Czajkowski and Jeffrey D. Bowman, USGS OFR 2014-05) as located within the Southern Whidbey Island Fault Zone. This is a class A fault and is considered to have a low potential for surface displacement because of the recurrence interval of up to 9,000 years, the age since the last suspected deformation of 2,700 years ago and its slip-rate category of approximately 0.6 mm per year.

Site Preparation and Grading

The first step of site preparation should be to strip the vegetation, topsoil, or loose soils to expose medium dense or firmer native soils in pavement and building areas. The excavated material should be removed from the site, or stockpiled for later use as landscaping fill. The resulting subgrade should be compacted to a firm, non-yielding condition. Areas observed to pump or yield should be repaired prior to placing hard surfaces.

The on-site glacial outwash likely to be exposed during construction is considered moderately moisture sensitive, the fill is also moisture sensitive and the surface will disturb easily when wet. We expect these soils would be difficult to compact to structural fill specifications in wet weather. We recommend that earthwork be conducted during the drier months. Additional expenses of wet weather or winter construction could include extra excavation and use of imported fill or rock spalls. During wet weather, alternative site preparation methods may be necessary. These methods may include utilizing a smooth-bucket trackhoe to complete site stripping and diverting construction traffic around prepared subgrades. Disturbance to the prepared subgrade may be minimized by placing a blanket of rock spalls or imported sand and gravel in traffic and roadway areas. Cutoff drains or ditches can also be helpful in reducing grading costs during the wet season. These methods can be evaluated at the time of construction.

Structural Fill

General: All fill placed beneath buildings, pavements or other settlement sensitive features should be placed as structural fill. Structural fill, by definition, is placed in accordance with prescribed methods and standards, and is observed by an experienced geotechnical professional or soils technician. Field observation procedures would include the performance of a representative number of in-place density tests to document the attainment of the desired degree of relative compaction.

Materials: Imported structural fill should consist of a good quality, free-draining granular soil, free of organics and other deleterious material, and be well graded to a maximum size of about 3 inches. Imported, all-weather structural fill should contain no more than 5 percent fines (soil finer than a Standard U.S. No. 200 sieve), based on that fraction passing the U.S. 3/4-inch sieve. The use of on-site soil as structural fill will be dependent on moisture content control. Some drying of the native soils may be necessary in order to achieve compaction. During warm, sunny days this could be accomplished by spreading the material in thin lifts and compacting. Some aeration and/or addition of moisture may also be necessary. We expect that compaction of the native soils to structural fill specifications would be difficult, if not impossible, during wet weather.

Fill Placement: Following subgrade preparation, placement of the structural fill may proceed. Fill should be placed in 8- to 10-inch-thick uniform lifts, and each lift should be spread evenly and be thoroughly compacted prior to placement of subsequent lifts. All structural fill underlying building areas, and within a depth of 2 feet below pavement and sidewalk subgrade, should be compacted to at least 95 percent of its maximum dry density. Maximum dry density, in this report, refers to that density as determined by the ASTM D1557 compaction test procedure. Fill more than 2 feet beneath sidewalks and pavement subgrades should be compacted to at least 90 percent of the maximum dry density. The moisture content of the soil to be compacted should be within about 2 percent of optimum so that a readily compactable condition exists. It may be necessary to overexcavate and remove wet surficial soils in cases where drying to a compactable condition is not feasible. All compaction should be accomplished by equipment of a type and size sufficient to attain the desired degree of compaction.

Temporary Shoring

General: Shoring may be needed. Some options could include a soldier pile wall with or without tiebacks, a piled braced excavation, or possibly a gravity wall. We should be provided with plans indicating final finish grades, existing grades and footing depths for the structure if a gravity wall is to be used. A soldier pile with tiebacks wall may provide less encroachment into the building footprint but will require temporary construction easements to allow the anchors or nails to extend off the property. We also expect some temporary easement will be needed if a gravity wall is used. A piled braced frame excavation could be completed without construction easements but will require additional construction sequencing working around the braces. Soil nails are not well suited to excavations in loose soil or clean sands and gravels. Therefore, we do not recommend soil nails be used on this project.

Soldier Piles: If a soldier pile wall is used for shoring, active pressure acting on the piles should be calculated based on the loads provided in the **Lateral Loads** subsection of this report. The lagging can be designed for ½ of the active pressure.

Temporary and Permanent Slopes

Temporary cut slope stability is a function of many factors, such as the type and consistency of soils, depth of the cut, surcharge loads adjacent to the excavation, length of time a cut remains open, and the presence of surface or groundwater. It is exceedingly difficult under these variable conditions to estimate a stable temporary cut slope geometry. Therefore, it should be the responsibility of the contractor to maintain safe slope configurations, since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered.

For planning purposes, we recommend that temporary cuts in the near-surface weathered soils be no steeper than 1.5 Horizontal to 1 Vertical (1.5H:1V). Cuts in the dense to very dense outwash may stand at a 1H:1V inclination or possibly steeper. If groundwater seepage is encountered, we expect that flatter inclinations would be necessary.

We recommend that cut slopes be protected from erosion. Measures taken may include covering cut slopes with plastic sheeting and diverting surface runoff away from the top of cut slopes. We do not recommend vertical slopes for cuts deeper than 4 feet, if worker access is necessary. We recommend that cut slope heights and inclinations conform to local and WISHA/OSHA standards.

Final slope inclinations for granular structural fill and the native soils should be no steeper than 2H:1V. Lightly compacted fills, common fills, or structural fill predominately consisting of fine grained soils should be no steeper than 3H:1V. Common fills are defined as fill material with some organics that are "trackrolled" into place. They would not meet the compaction specification of structural fill. Final slopes should be vegetated and covered with straw or jute netting. The vegetation should be maintained until it is established.

Foundations

Shallow: Conventional shallow spread foundations should be founded on undisturbed, medium dense or firmer soil. If the soil at the planned bottom of footing elevation is not suitable, it should be overexcavated to expose suitable bearing soil. Footings should extend at least 18 inches below the lowest adjacent finished ground surface for frost protection. Minimum foundation widths should conform to IBC requirements. Standing water should not be allowed to accumulate in footing trenches. All loose or disturbed soil should be removed from the foundation excavation prior to placing concrete. Loose or disturbed soil was observed in the explorations to depths ranging from about 4 feet at the south end of the existing building to approximately 14 feet on the north side of the property. All overexcavation for foundations should extend laterally ½ the footing width on either side of the foundation.

For foundations constructed as outlined above, we recommend an allowable design bearing pressure of 2,500 pounds per square foot (psf) be used for the footing design. IBC guidelines should be followed when considering short-term transitory wind or seismic loads. Potential foundation settlement using the recommended allowable bearing pressure is estimated to be less than 1-inch total and ½-inch differential between footings or across a distance of about 30 feet. Higher soil bearing values may be appropriate with wider footings. These higher values can be determined after a review of a specific design.

Deep: Because soils suitable for bearing were disclosed at depths deeper than typical for shallow foundations, we present the following alternatives. The planned residence could be supported on stone columns and grade beams. The stone columns are excavated with an auger and rock is placed and compacted in the augered hole. Additional design parameters could be provided if this option is considered.

Small diameter pipe piles could also be used. The piles would be advanced through any loose or disturbed soil and be embedded into the dense advance outwash soil disclosed at depth. The pipe piles generally have a load capacity of 2 tons for a 2-inch diameter pile and 6 tons for a 3-inch diameter pile.

Lateral Loads

The lateral earth pressure acting on retaining walls is dependent on the nature and density of the soil behind the wall, the amount of lateral wall movement, which can occur as backfill is placed, and the inclination of the backfill. Walls that are free to yield at least one-thousandth of the height of the wall are in an "active" condition. Walls restrained from movement by stiffness or bracing are in an "at-rest" condition. Active earth pressure and at-rest earth pressure can be calculated based on equivalent fluid density. Equivalent fluid densities for active and at-rest earth pressure of 35 pounds per cubic foot (pcf) and 55 pcf, respectively, may be used for design for a level backslope. These values assume that the on-site soils or imported granular fill are used for backfill, and that the wall backfill is drained. The preceding values do not include the effects of surcharges, such as due to foundation loads or other surface loads. Surcharge effects should be considered where appropriate.

Seismic lateral loads are a function of the site location, soil strength parameters and the peak horizontal ground acceleration (PGA) for a given return period. We used the US Geological Survey program "U.S. Seismic Design Maps Web Application" to compute the PGA for the site. The design maps summary report for the 2012/15 IBC is included in this report as Appendix A. The above drained active and at-rest values should be increased by a uniform pressure of 7H and 9H psf, respectively, when considering seismic conditions. H represents the wall height.

The above lateral pressures may be resisted by friction at the base of the wall and passive resistance against the foundation. A coefficient of friction of 0.5 may be used to determine the base friction in the native glacial soils. An equivalent fluid density of 200 pcf may be used for passive resistance design. To achieve this value of passive pressure, the foundations should be poured "neat" against the native dense soils, or compacted fill should be used as backfill against the front of the footing, and the soil in front of the wall should extend a horizontal distance at least equal to three times the foundation depth. A resistance factor of 0.67 has been applied to the passive pressure to account for required movements to generate these pressures. The friction coefficient does not include a factor of safety.

All wall backfill should be well compacted. Care should be taken to prevent the buildup of excess lateral soil pressures due to overcompaction of the wall backfill.

Slabs-On-Grade

Slab-on-grade areas should be prepared as recommended in the **Site Preparation and Grading** subsection. Slabs should be supported on medium dense or firmer native soils, or on structural fill extending to these soils. Where moisture control is a concern, we recommend that slabs be underlain by 6 inches of pea gravel for use as a capillary break. A suitable vapor barrier, such as heavy plastic sheeting, should be placed over the capillary break. An additional 2-inch-thick damp sand blanket can be used to cover the vapor barrier to protect the membrane and to aid in curing the concrete. This will also help prevent cement paste bleeding down into the capillary break through joints or tears in the vapor barrier. The capillary break material should be connected to the footing drains to provide positive drainage.

Drainage

We recommend that runoff from impervious surfaces, such as roofs, driveway and access roadways, be collected and routed to an appropriate storm water discharge system. The finished ground surface should be sloped at a gradient of 5 percent minimum for a distance of at least 10 feet away from the buildings, or to an approved method of diverting water from the foundation, per IBC Section 1804.3. Surface water should be collected by permanent catch basins and drain lines, and be discharged into a storm drain system.

We recommend that footing drains be used around all of the structures where moisture control is important. The underlying dense silty sand may pond water that could accumulate in crawlspaces. It is good practice to use footing drains installed at least 1 foot below the planned finished floor slab or crawlspace elevation to provide drainage for the crawlspace. At a minimum, crawlspaces should be sloped to drain to an outlet tied to the drainage system. If drains are omitted around slab-on-grade floors where moisture control is important, the slab should be a minimum of 1 foot above surrounding grades.

Where used, footing drains should consist of 4-inch-diameter, perforated PVC pipe that is surrounded by free-draining material, such as pea gravel. Footing drains should discharge into tightlines leading to an appropriate collection and discharge point. Crawlspaces should be sloped to drain, and a positive connection should be made into the foundation drainage system. For slabs-on-grade, a drainage path should be provided from the capillary break material to the footing drain system. Roof drains should not be connected to wall or footing drains.

Utilities

Our explorations indicate that deep dewatering will not be needed to install standard depth utilities. Anticipated groundwater is expected to be handled with pumps in the trenches. We also expect that some groundwater seepage may develop during and following the wetter times of the year. We expect this seepage to mostly occur in pockets. We do not expect significant volumes of water in these excavations.

The soils likely to be exposed in utility trenches after site stripping are considered highly moisture sensitive. We recommend that they be considered for trench backfill during the drier portions of the year. Provided these soils are within 2 percent of their optimum moisture content, they should be suitable to meet compaction specifications. During the wet season, it may be difficult to achieve compaction specifications; therefore, soil amendment with kiln dust or cement may be needed to achieve proper compaction with the on-site materials.

CONSTRUCTION OBSERVATION

We should be retained to provide observation and consultation services during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, and to provide recommendations for design changes, should the conditions revealed during the work differ from those anticipated. As part of our services, we would also evaluate whether or not earthwork and foundation installation activities comply with contract plans and specifications.

USE OF THIS REPORT

We have prepared this report for Agnew Homes and its agents, for use in planning and design of this project. The data and report should be provided to prospective contractors for their bidding and estimating purposes, but our report, conclusions and interpretations should not be construed as a warranty of subsurface conditions.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report, for consideration in design. There are possible variations in subsurface conditions. We recommend that project planning include contingencies in budget and schedule, should areas be found with conditions that vary from those described in this report.

Within the limitations of scope, schedule and budget for our services, we have strived to take care that our services have been completed in accordance with generally accepted practices followed in this area at the time this report was prepared. No other conditions, expressed or implied, should be understood.

o O o

We appreciate the opportunity to be of service to you. If there are any questions concerning this report or if we can provide additional services, please call.

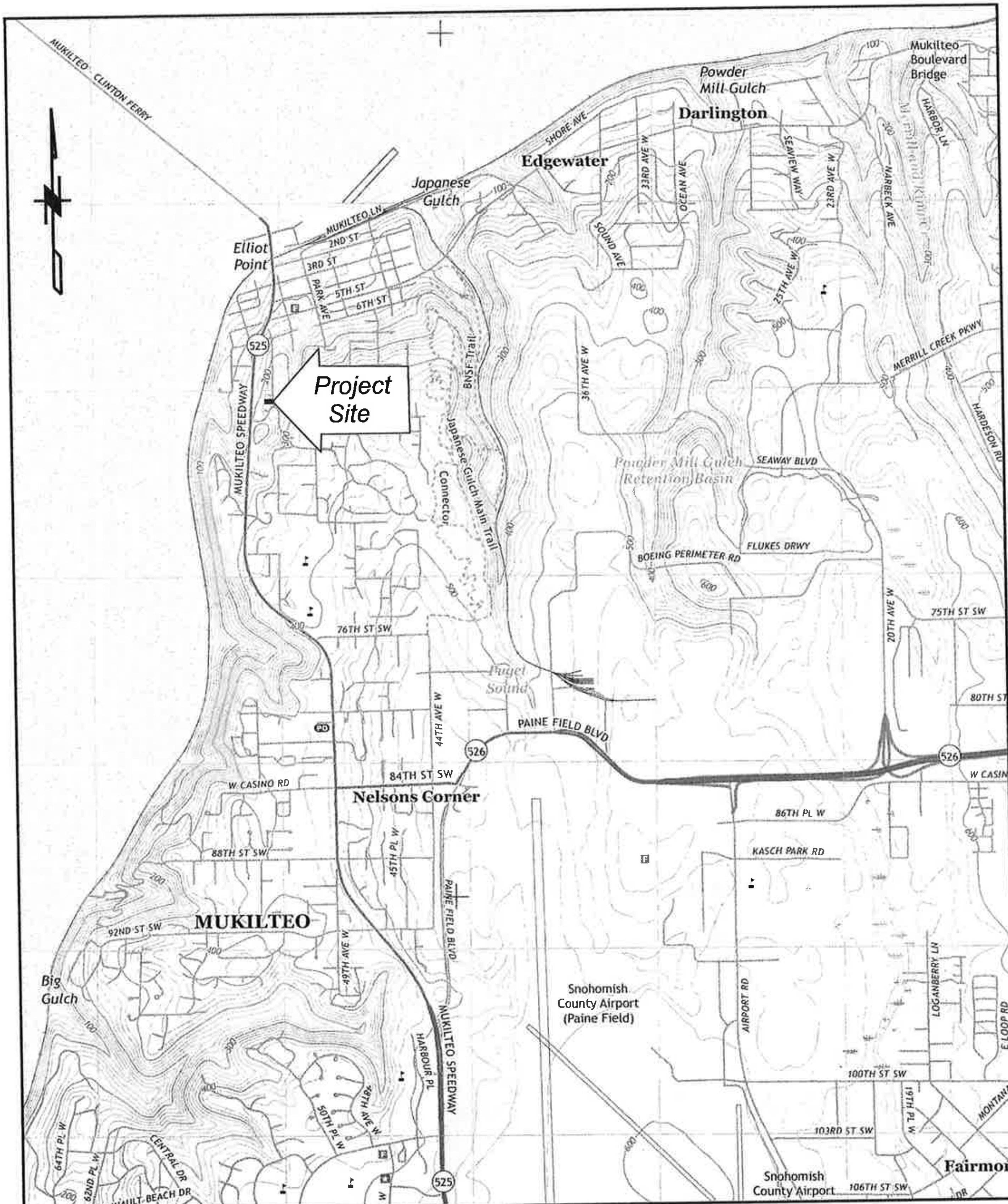
Sincerely,
Robinson Noble, Inc.

7/11/2017

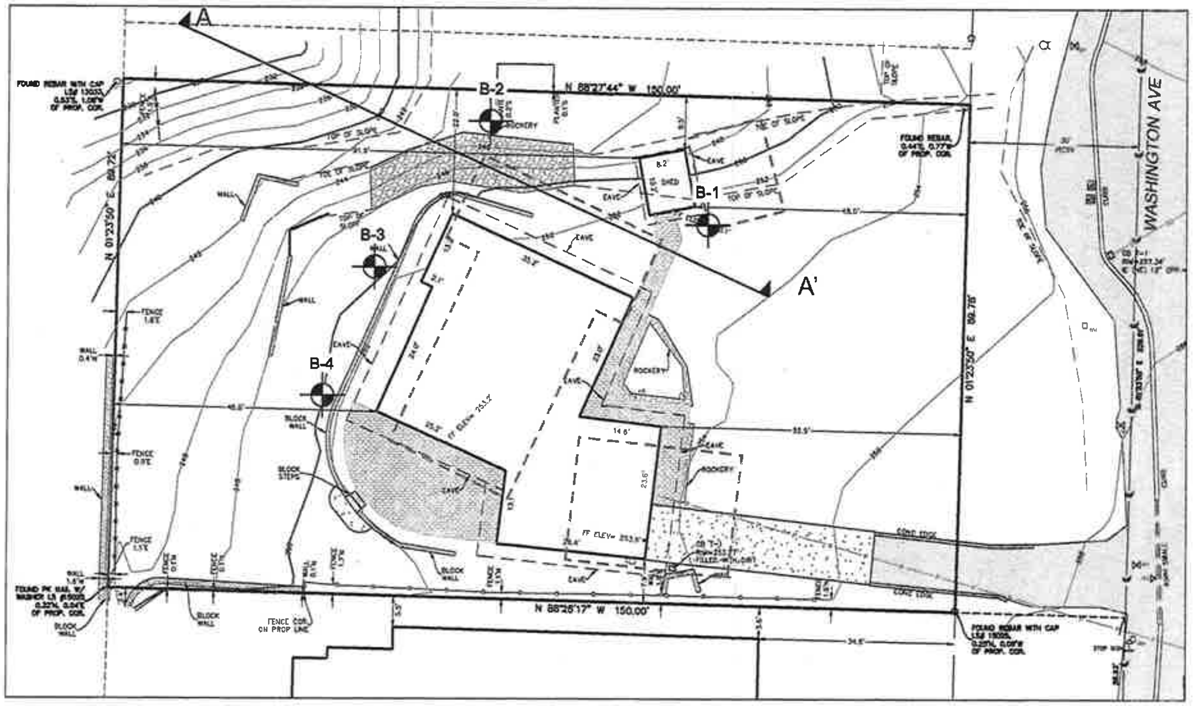
Barbara A. Gallagher, PE
Senior Engineer

BAG:RBP:am

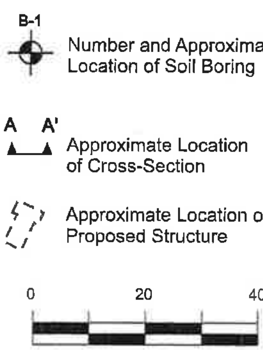
Thirteen Figures
Appendix A



ROBINSON NOBLE	Note: Basemap taken from Mukilteo 7.5-minute series. USGS 2017.	PM: BAG July 2017 3130-002A	Figure 1 **Vicinity Map** Agnew Homes: 1007 Washington Avenue, Mukilteo



LEGEND



Number and Approximate Location of Soil Boring

Approximate Location of Cross-Section

Approximate Location of Proposed Structure

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Note: Basemap taken from Topographic and Boundary Survey prepared by Terrane dated 6/7/2017.

PM: BAG
July 2017
3130-002A

Figure 2
Site Plan
Agnew Homes: 1007 Washington Avenue, Mukilteo

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE - GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE - GRAINED SOILS MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50%	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY LIQUID LIMIT 50% OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

* 1) Field classification is based on visual examination of soil in general accordance with ASTM D 2488-93.
* 2) Soil classification using laboratory tests is based on ASTM D 2487-93.
3) Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance, of soils, and/or test data.

* Modifications have been applied to ASTM methods to describe sit and clay content.

$N_{60} = N_M * C_E * C_B * C_R * C_S$
N_M = blows/foot, measured in field
$C_E = ER_m/60$, convert measured hammer energy to 60% for comparison with design charts.
C_B = adjusts borehole diameter
C_R = rod length, adjusts for energy loss in rods
C_S = Sample liner = 1.0

SOIL MOISTURE MODIFIERS

Dry- Absence of moisture, dusty, dry to the touch
Moist- Damp, but no visible water
Wet- Visible free water or saturated, usually soil is obtained from below water table

KEY TO BORING LOG SYMBOLS

∇ Ground water level

● Blows required to drive sample 12 in. using SPT (converted to N_{60})

MC (■) = % Moisture = (Weight of water) / (Weight of dry soil)

DD = Dry Density

SM — Letter symbol for soil type
— Contact between soil strata (Dashed line indicates approximate contact between soils)
ML — Letter symbol for soil type

NOTE: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual

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3130-002A

Figure 3

Agnew Homes: 1007 Washington Avenue, Mukilteo

B-1	Date	5/1/2017	Hole dia. (in)	6
	Logged by	BAG	Hole depth ft	26.5
	Driller	Geologic	Well dia. (in)	N/A
Page 1 of 2	Elevation (ft)	~252	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level
3" Sod				
Gray-brown mottled silty fine to medium sand trace gravel and wood (loose, moist) **(Fill)**	SM	18/18	2 2 2	
Gray-brown mottled silty fine to medium sand trace gravel and wood (loose, moist) **(Fill)**	SM	16/18	2 2 2	
Gray-brown mottled silty fine to medium sand trace gravel and wood (loose to medium dense, moist) **(Fill)**	SM	12/18	2 2 3	
Brown fine to medium silty sand, slight mottling (loose, moist)	SM	16/18	3 3 4	
Brown fine to medium silty sand to sand with silt, slight mottling (medium dense, moist)	SM/ SP-SM	18/18	8 10 12	
Brown fine to medium sand with silt, slight mottling (medium dense, moist)	SP-SM	18/18	8 10 12	
Brown fine to medium sand with silt, slight mottling (medium dense to dense, moist)	SP-SM	14/18	7 10 13	

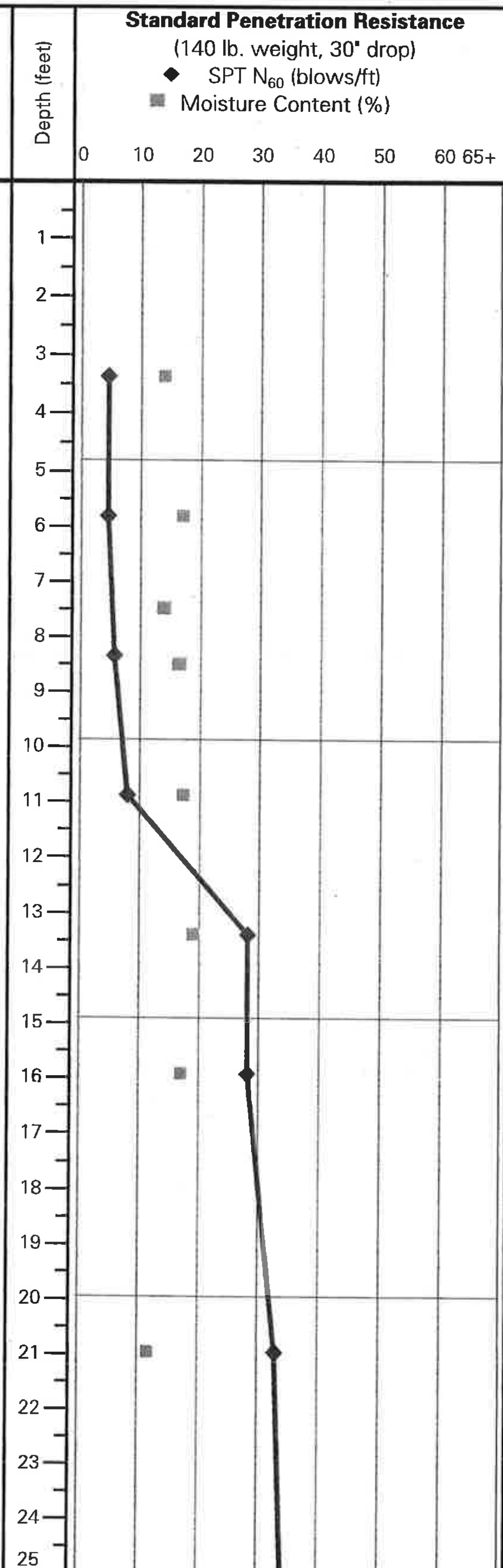

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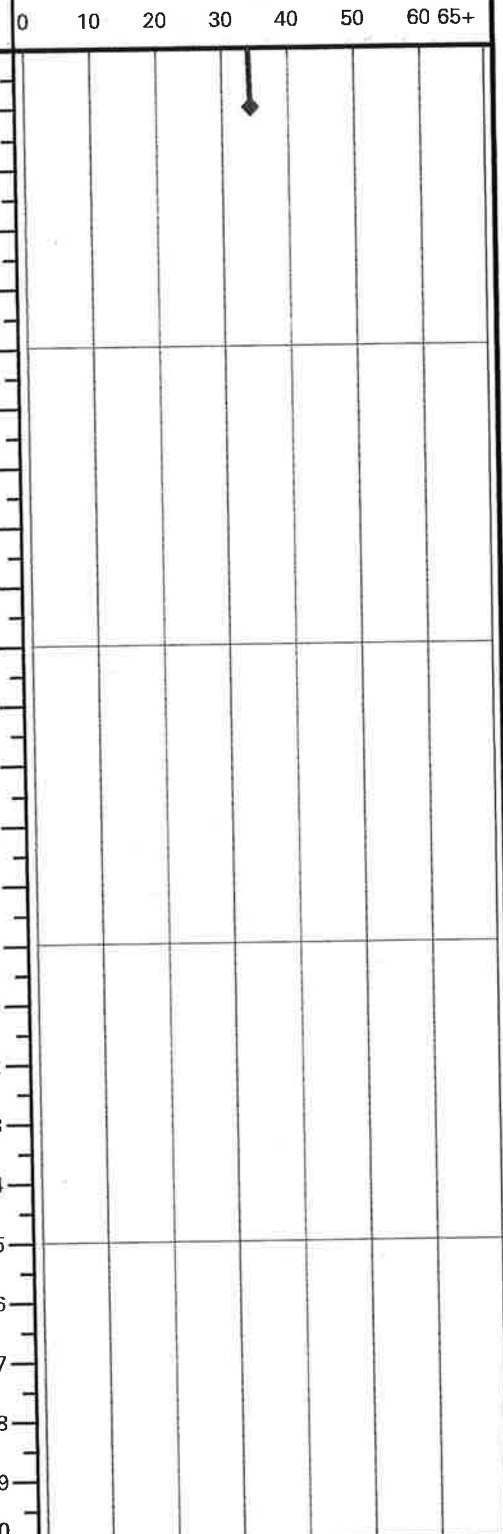
Figure 4

B-1				
Page 2 of 2	Date	5/1/2017	Hole diameter	6
	Logged by	BAG	Hole depth	26.5
	Driller	Geologic	Well diameter	N/A
	Elevation (ft)	~252	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level	Depth (feet)
Brown fine to medium sand trace to with silt, slight mottling (medium dense to dense, moist)	SP-SM /SP	6/18	8 10 14		26
Boring completed at 26.5 feet on 5/1/2017 Groundwater was not observed					27–50

Standard Penetration Resistance
(140 lb. weight, 30" drop)
◆ SPT N_{60} (blows/ft)
■ Moisture Content (%)



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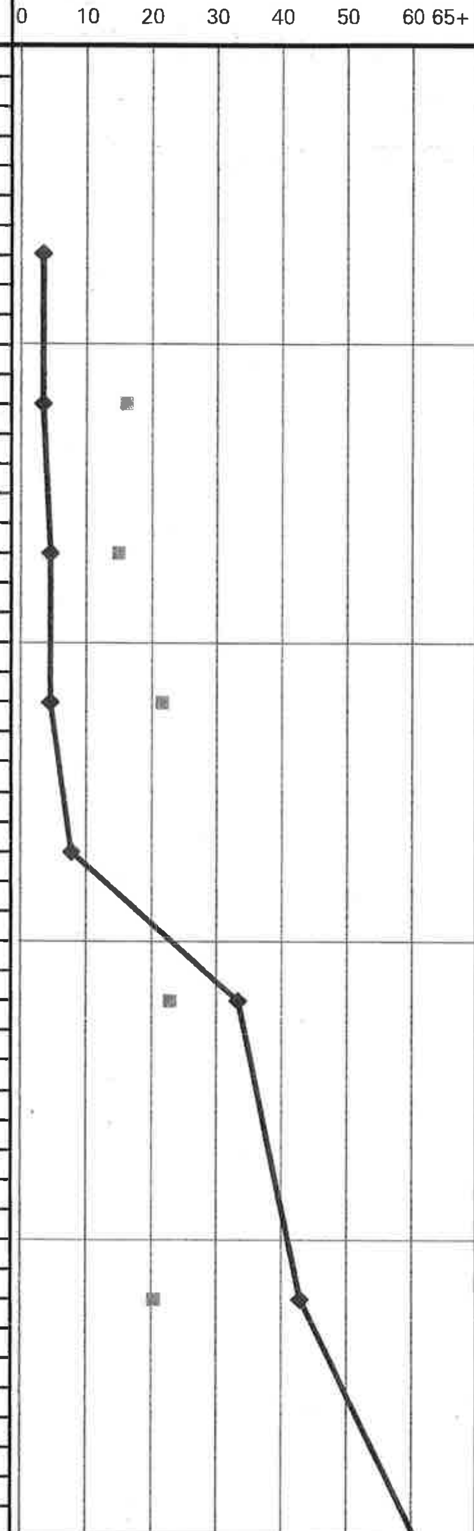
3130-002A	Figure 5

B-2	Date	5/1/2017	Hole dia. (in)	6
	Logged by	BAG	Hole depth ft	26.5
	Driller	Geologic	Well dia. (in)	N/A
Page 1 of 2	Elevation (ft)	~245	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

Standard Penetration Resistance
(140 lb. weight, 30" drop)
◆ SPT N_{60} (blows/ft)
■ Moisture Content (%)

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level	Depth (feet)
3" Sod					
Gray fine to coarse sand, trace silt (very loose, moist) **(Fill)**	SP	10/18	3 1 2		3
Brown silty sand (very loose, moist) **(Possible Fill)**	SM	8/18	2 1 2		5
Brown silty sand (loose, moist)	SM	14/18	2 2 2		8
Gray silty fine to medium sand trace to with peat and organics (loose, moist)	SM	18/18	2 2 2		10
Brown silty fine to medium sand with gravel (loose, moist)	SM	12/18	3 3 3		13
Brown silty fine to medium sand with gravel (medium dense to dense, moist)	SM	2/18	7 12 14		15
Brown silty fine to medium sand to sand with silt and gravel (dense, moist)	SM/ SP-SM		11 14 16		20
				▽	23



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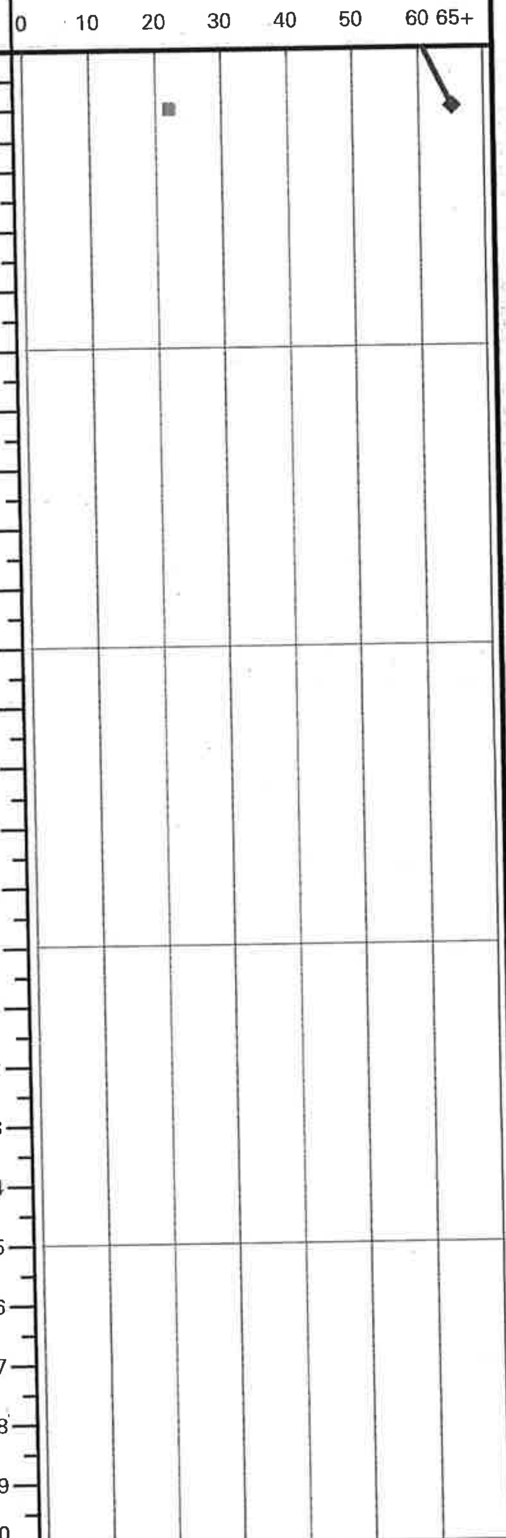
3130-002A | Figure 6

B-2				
	Date	5/1/2017	Hole diameter	6
	Logged by	BAG	Hole depth	26.5
	Driller	Geologic	Well diameter	N/A
Page 2 of 2	Elevation (ft)	~245	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level	Depth (feet)
Brownish-gray fine to medium sand with silt (very dense, moist)	SP-SM		11 19 33		26
Boring completed at 26.5 feet on 5/1/2017 Groundwater observed at 23 feet while drilling					27–50

Standard Penetration Resistance
(140 lb. weight, 30" drop)
◆ SPT N_{60} (blows/ft)
■ Moisture Content (%)



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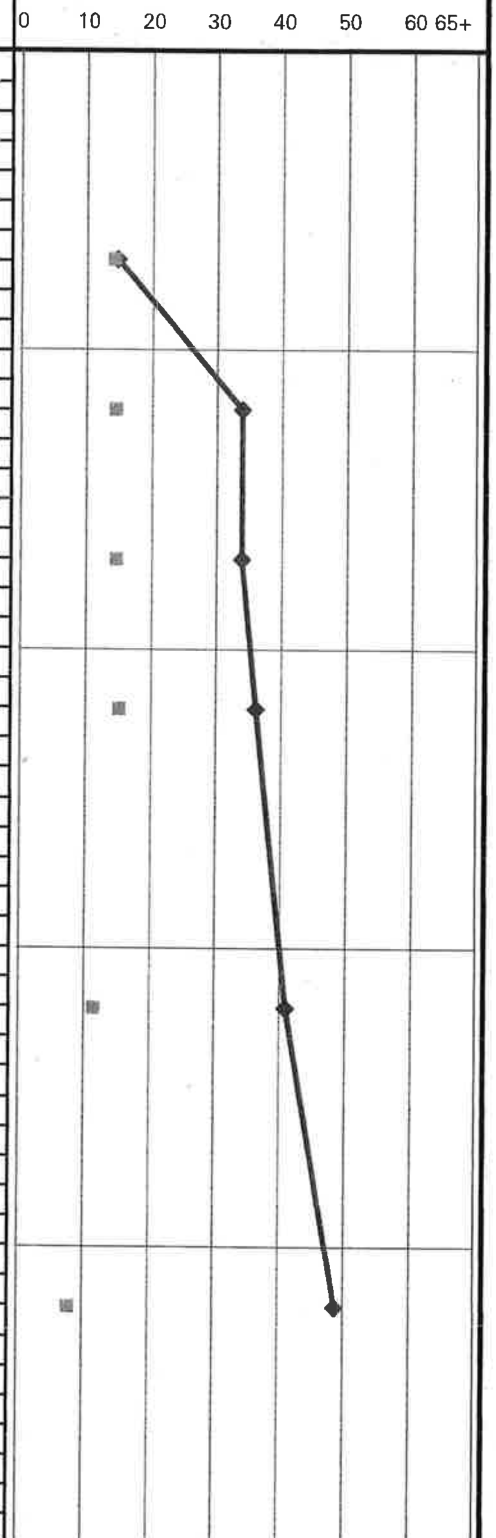
3130-002A

Figure 7

B-3	Date	5/1/2017	Hole dia. (in)	6
	Logged by	BRP	Hole depth ft	21.5
	Driller	Geologic	Well dia. (in)	N/A
Page 1 of 1	Elevation (ft)	~247	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

Standard Penetration Resistance
(140 lb. weight, 30" drop)
◆ SPT N_{60} (blows/ft)
■ Moisture Content (%)

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level	Depth (feet)
3" Sod					
Grayish-brown silty fine to medium sand with gravel trace organics (medium dense, moist) **(Possible Fill)**	SM	16/18	3 5 8		3
Gray silty fine to medium sand with gravel, trace mottling and trace clay (dense, moist)	SM	14/18	7 10 20		5
Fine to medium sand with silt to silty fine to medium sand with mottling and 1" clean sand lens (dense, moist)	SP-SM/ SM	18/18	11 13 17		7.5
Brown to gray fine to medium sand trace silt with 1" silt lense (dense, moist)	SP	18/18	12 15 17		10
Gray fine to medium sand trace silt (dense, moist)	SP	18/18	12 14 18		15
Gray fine to medium sand trace silt (dense, moist)	SP	18/18	10 14 20		20
Boring completed at 21.5 feet on 5/1/2017 Groundwater was not observed					



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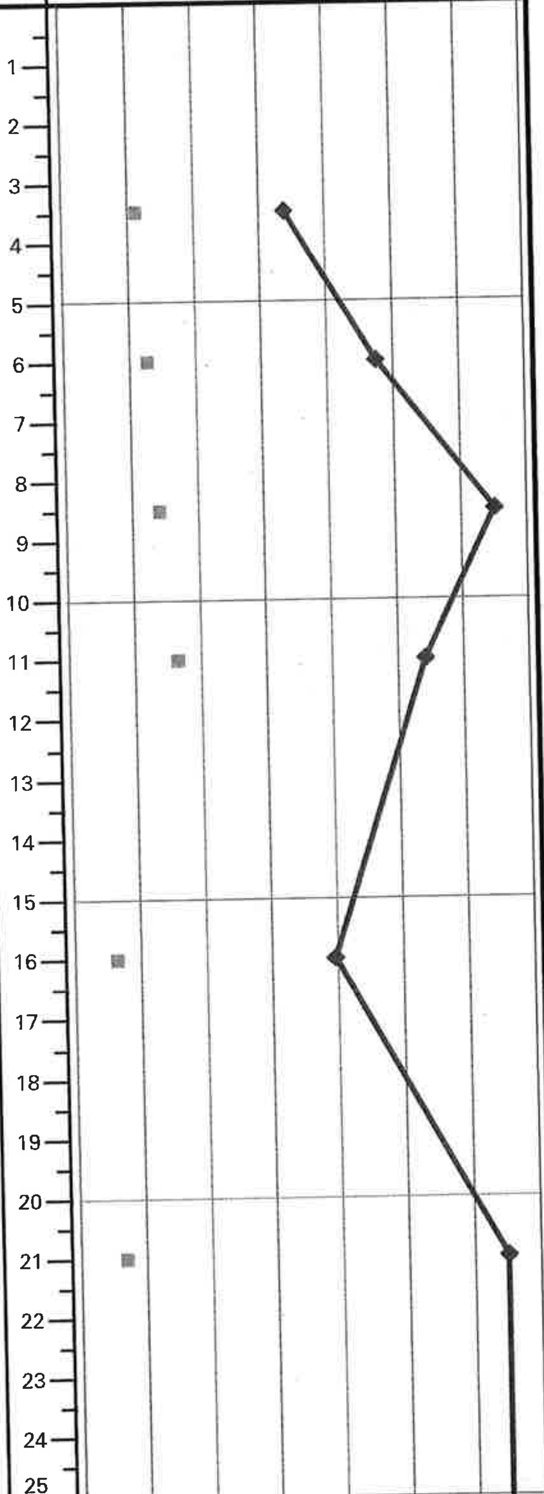
3130-002A | Figure 8

B-4				
Page 1 of 2	Date	5/1/2017	Hole dia. (in)	6
	Logged by	BRP	Hole depth ft	26.5
	Driller	Geologic	Well dia. (in)	N/A
	Elevation (ft)	~250	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

Standard Penetration Resistance
(140 lb. weight, 30" drop)
◆ SPT N_{60} (blows/ft)
■ Moisture Content (%)

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level	Depth (feet)
3" Sod					0
Gray slightly mottled silty fine sand with gravel (dense, moist) **(Possible Fill)**	SM	18/18	10 14 16		3
Gray mottled silty fine to medium sand trace gravel with 4" layer of gray mottled silty fine sand trace organics (dense, moist)	SM	18/18	12 17 25		5.5
Grayish-brown silty sand trace gravel, organics and lenses of fine to coarse sand (very dense, moist)	SM	18/18	19 22 43		8
Gray silty fine to medium sand trace gravel (dense to very dense, moist)	SM	18/18	17 23 25		10.5
Gray fine to medium sand trace silt (dense, moist)	SP	18/18	10 14 17		15.5
Gray fine to medium sand trace silt with gray and dark gray bands (dense to very dense, moist)	SP	18/18	11 21 25		20.5



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3130-002A	Figure 9

B-4	Date	5/1/2017	Hole diameter	6
	Logged by	BRP	Hole depth	26.5
	Driller	Geologic	Well diameter	N/A
Page 2 of 2	Elevation (ft)	~250	Well depth	N/A
	Sample Liner	No	Hammer Eff.	86%

Standard Penetration Resistance
(140 lb. weight, 30" drop)
◆ SPT N_{60} (blows/ft)
■ Moisture Content (%)

LITHOLOGY / DESCRIPTION	U.S.C.	Sample Recovery/ Driven Interval (in)	N- Blow Counts (blows/6")	Static Water Level	Depth (feet)
Gray fine to medium sand trace silt (dense, moist)	SP	18/18	12 17 24		26
Boring completed at 26.5 feet on 5/1/2017 Groundwater was not observed					27–50

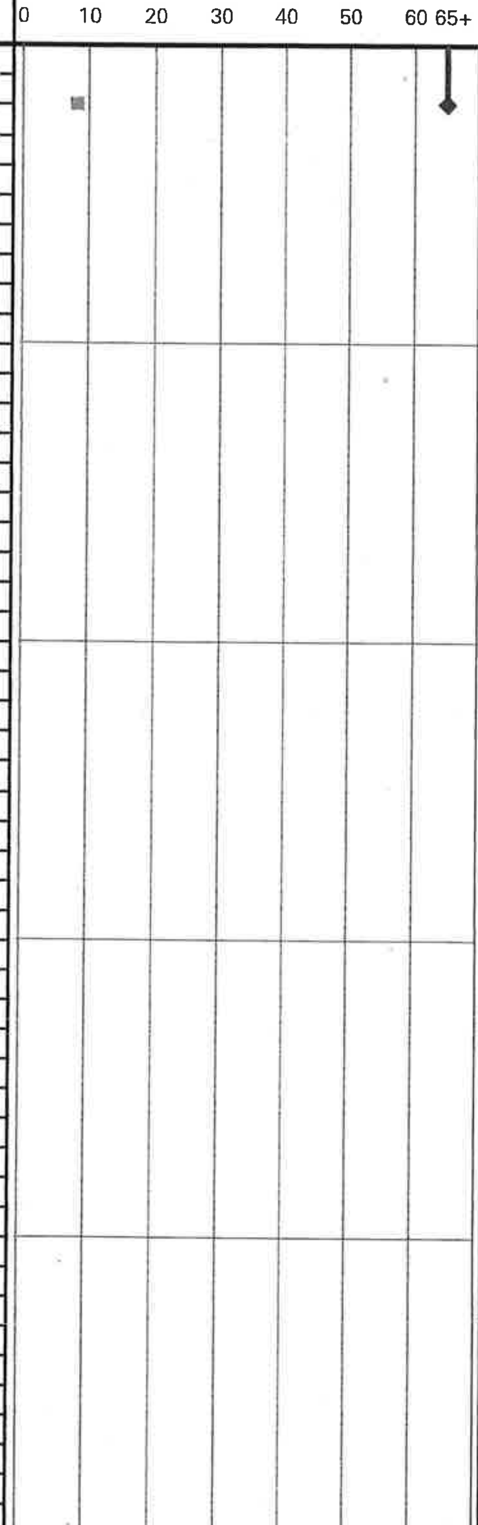

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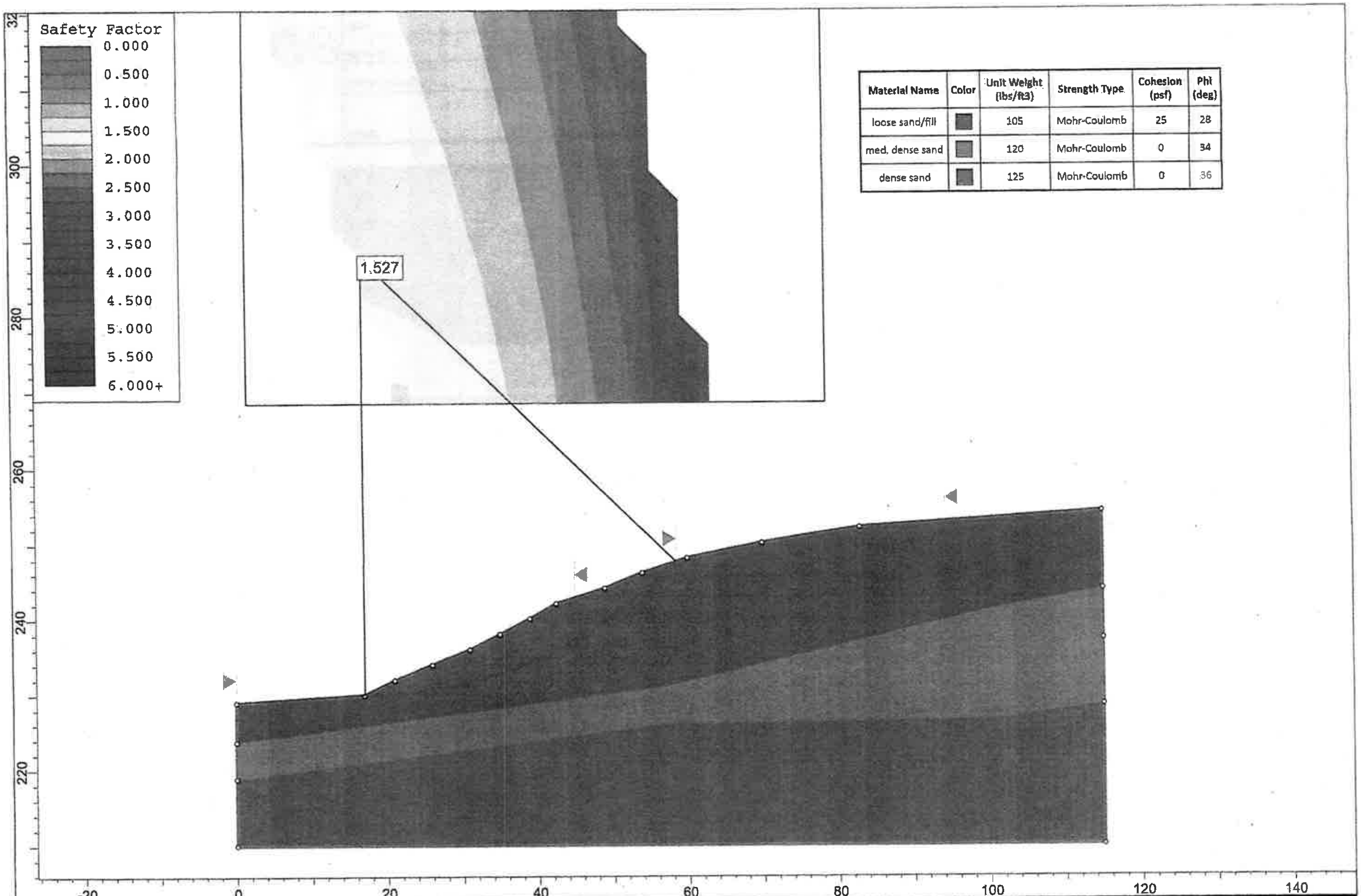
Figure 10



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
loose sand/fill		105	Mohr-Coulomb	25	28
med. dense sand		120	Mohr-Coulomb	0	34
dense sand		125	Mohr-Coulomb	0	36

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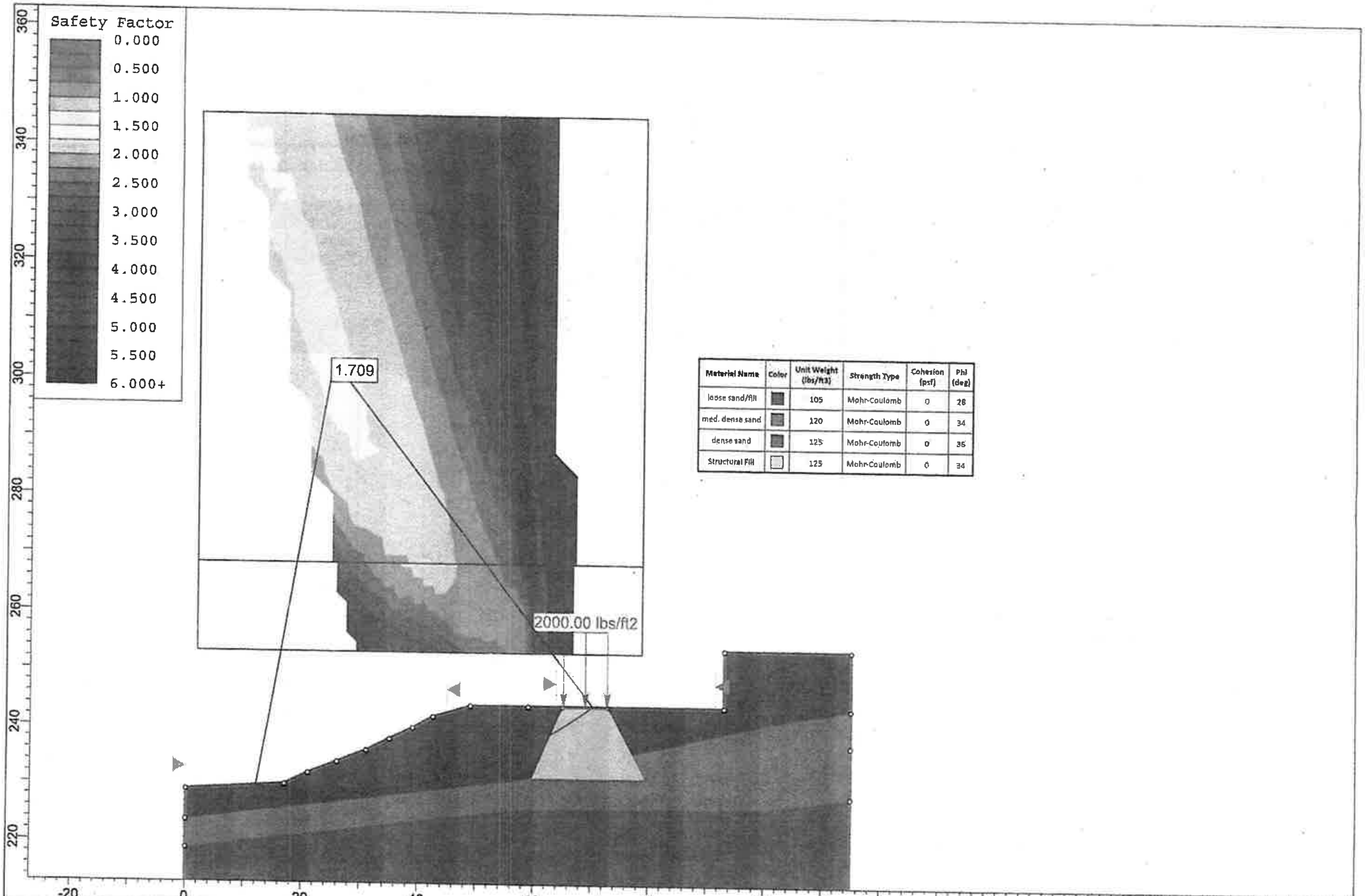
Project	Agnew Homes 1007 Washington Ave Mukilteo		
Analysis Description	A-A' Existing		
Drawn By	BRP	Scale	1:200
Company	Robinson Noble		Figure 11
Date	6/30/2017, 11:56:27 AM	File Name	Slide analysis A-A' Existing.slim

SLIDEINTERPRET 6.039

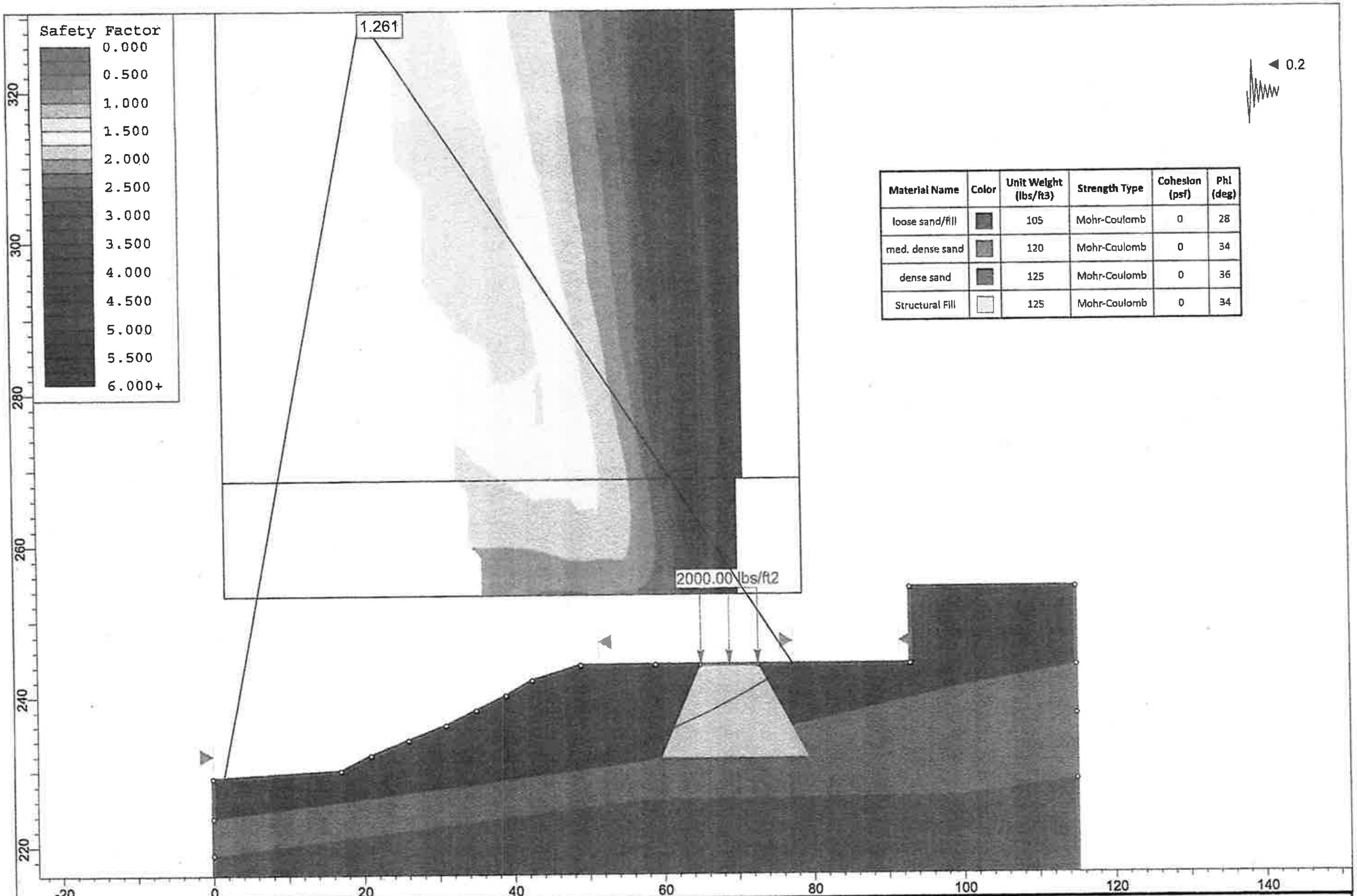


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
loose sand/fill		105	Mohr-Coulomb	0	28
med. dense sand		120	Mohr-Coulomb	0	34
dense sand		125	Mohr-Coulomb	0	36
Structural Fill		125	Mohr-Coulomb	0	34

rocscience

SLIDEINTERPRET 6.039

Project	Agnew Homes 1007 Washington Ave Mukilteo		
Analysis Description	A-A' Proposed Development with 15-foot setback		
Drawn By BRP	*Scale* 1:262	*Company* Robinson Noble	Figure 12
Date 6/30/2017, 11:56:27 AM		*File Name* Slide analysis A-A' Proposed Development.slim	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
loose sand/fill		105	Mohr-Coulomb	0	28
med. dense sand		120	Mohr-Coulomb	0	34
dense sand		125	Mohr-Coulomb	0	36
Structural Fill		125	Mohr-Coulomb	0	34

rocscience

Project	Agnew Homes 1007 Washington Ave Mukilteo
Analysis Description	A-A' Proposed Development with seismic load
Drawn By	BRP
Scale	1:200
Company	Robinson Noble
	Figure 13
Date	6/30/2017, 11:56:27 AM
File Name	Slide analysis A-A' Proposed Development with seismic.slim

SLIDEINTERPRET 6.039

APPENDIX A

USGS Design Maps Summary Report

User–Specified Input

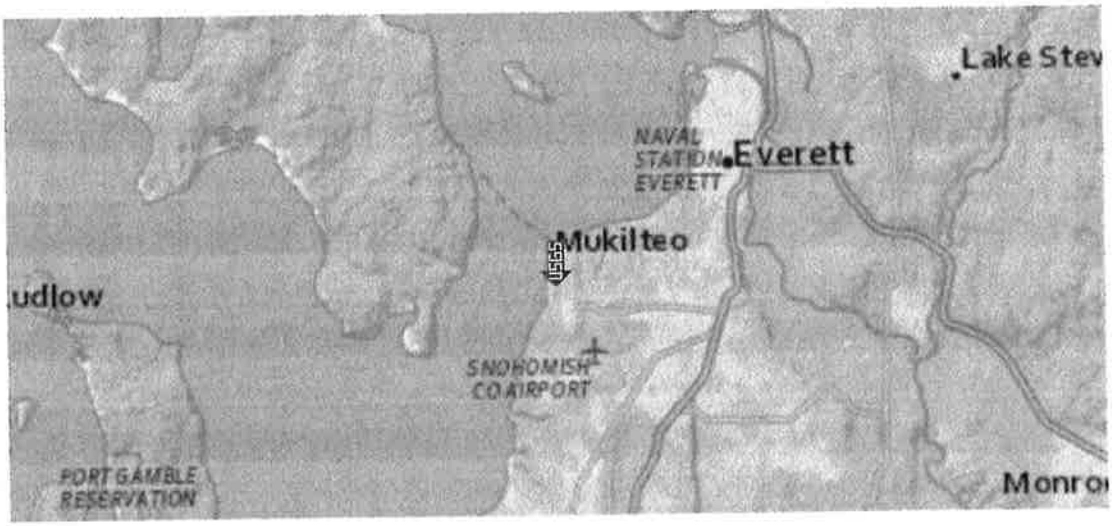
Report Title Agnew Homes - 1007 Washington Avenue
Wed June 21, 2017 21:14:16 UTC

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 47.94063°N, 122.30457°W

Site Soil Classification Site Class D – "Stiff Soil"

Risk Category I/II/III



USGS–Provided Output

S_S = 1.466 g S_{MS} = 1.466 g S_{DS} = 0.977 g

S_1 = 0.569 g S_{M1} = 0.853 g S_{D1} = 0.569 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.