LAND USE PERMIT APPLICATION – BALANCE OF COUNTY
COOS COUNTY PLANNING DEPARTMENT

COMPLETED BY STAFF	
Received By: BB Date Submitted: 6/24/19 Application No.: ACU-19-024 Fee: $ 1,479 Fee Paid: $ 1,479 Receipt No.: 209978	☐ COMP PLAN AMENDMENT ☐ ZONE CHANGE ☐ TEXT AMENEDMENT CONDITIONAL USE REVIEW ☐ HEARINGS BODY ☐ ADMINISTRATIVE ☐ VARIANCE ☐ LAND DIVISION * ☐ HAZARD REVIEW * ☐ FARM OR FOREST REVIEW * ☐ FAMILY/MEDICAL HARDSHIP* ☐ HOME OCCUPATION/COTTAGE INDUSTRY ***Supplemental Application required** STAFF NOTES:

Please type or clearly print all of the requested information below. Please be sure to include any supplemental application for if required.

I. APPLICANT
Name: Mark Kirn
Mailing Address: PO Box 399
City Myrtle Point State OR Zip 97458
Daytime Phone 541 410-6997
Email: mkirn82@gmail.com

II. OWNER(S)
Name: Mark Kirn
Mailing Address: same
City " State " Zip "
Daytime Phone "
Email: "

III. PROPERTY - If multiple properties are part of this review please check here ☐ and attached a separate sheet with property information.

Location or Address: 0 Parsonage ln, Broadbent, OR 97414
No. Acreage 0.57 Tax Acct. 1173600

Township:	Range:	Section:	¼ Section:	1/16 Section:	Tax lot:
☒ S	29S	☒ W 12	☒ 33	☒ 0	2100

Zone: RC Water Service Type: Well
Sewage Disposal Type: Septic System
School District: Myrtle Point (41) Fire District: Myrtle Point

IV. REQUEST SUMMARY (Example: "To establish a template dwelling in the Forest Zoning District.") To construct a single family dwelling on a Residential Commercial zoned lot.

V. ATTACHED WRITTEN STATEMENT. With all land use applications, the "burden of proof" is on the applicant. It is important that you provide information that clearly describes the nature of the request and indicates how the proposal complies with all of the applicable criteria within the Coos County Zoning and Land Development Ordinance (CCZLDO). You must address each of the Ordinance criteria on a point-by-point basis in order for this application to be deemed complete. A planner will explain which sections of the Ordinance pertain to your specific request. The information described below is required at the time you submit your application. The processing of your application does not begin until the application is determined to be complete. An incomplete application will postpone the decision, or may result in denial of the request. Please mark the items below to ensure your submittal is complete.

Application Check List: Please make off all steps as you complete them.

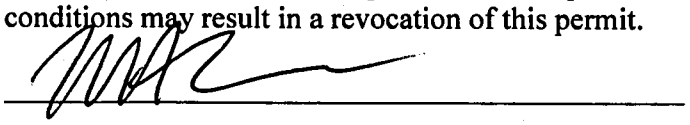
A. ☐ A written statement of intent, attached to this application, with necessary supporting evidence which fully and factually describes the following:
   1. ☐ A complete explanation of how the request complies with the applicable provisions and criteria in the Zoning Ordinance. A planner will explain which sections of the Ordinance pertain to your specific request. You must address each of the Ordinance criteria on a point-by-point basis in order for this application to be deemed complete.
   2. ☐ A description of the property in question, including, but not limited to the following: size, vegetation, crops grown, access, existing buildings, topography, etc.
   3. ☐ A complete description of the request, including any new structures proposed.
   4. ☐ If applicable, documentation from sewer and water district showing availability for connection.

B. ☒ A plot plan (map) of the property. Please indicate the following on your plot plan:
   1. ☒ Location of all existing and proposed buildings and structures
   2. ☒ Existing County Road, public right-of-way or other means of legal access
   3. ☒ Location of any existing septic systems and designated repair areas
   4. ☒ Limits of 100-year floodplain elevation (if applicable)
   5. ☒ Vegetation on the property
   6. ☒ Location of any outstanding physical features
   7. ☒ Location and description (paved, gravel, etc.) of vehicular access to the dwelling location

C. ☒ A copy of the current deed, including the legal description, of the subject property. Copies may be obtained at the Coos County Clerk's Office.

I certify that this application and its related documents are accurate to the best of my knowledge. I am aware that there is an appeal period following the date of the Planning Director's decision on this land use action. I understand that the signature on this application authorizes representatives of the Coos County Planning Department to enter upon the subject property to gather information pertinent to this request. If the application is signed by an agent, the owner's written authorization must be attached.

If this application is refereed directly to a hearings officer or hearings body I understand that I am obligated to pay the additional fees incurred as part of the conditions of approval. I understand that I/we are not acting on the county's behalf and any fee that is a result of complying with any conditions of approval is the applicants/property owner responsibility. I understand that conditions of approval are required to be complied with at all time and an violation of such conditions may result in a revocation of this permit.



RECORDING REQUESTED BY:
GRANTOR:
Stone Family Revocable Living Trust
PO Box 37
Broadbent, OR 97414

GRANTEE:
Mark E. Kirn and Nicole W. Reaves-Kirn
403 Railroad Ave.
Myrtle Point, OR 97458

SEND TAX STATEMENTS TO:
Mark E. Kirn and Nicole W. Reaves-Kirn
PO Box 399
Myrtle Point, OR 97458

AFTER RECORDING RETURN TO:
Mark E. Kirn and Nicole W. Reaves-Kirn
PO Box 399
Myrtle Point, OR 97458

Escrow No: 360615013316-TTCOO42
29-12-33 2100 A1173600
29-12-33 2200 A1173601
94786 Parsonage Ln
Broadbent, OR 97414

COOS COUNTY, OREGON **2015-008669**
$56.00 **09/25/2015 09:00:27 AM**
Terri L.Turi, Coos County Clerk Pgs=3

AFTER RECORDING
RETURN TO
Ticor Title Insurance
300 West Anderson Ave - Box 1075
Coos Bay, OR 97420-0233

STATUTORY WARRANTY DEED

Robert E. Stone and Darcie M. Stone, Trustees of the Stone Family Revocable Living Trust, Grantor, conveys and warrants to

Mark E. Kirn and Nicole W. Reaves-Kirn, as tenants by the entirety, Grantee, the following described real property, free and clear of encumbrances except as specifically set forth below, situated in the County of Coos, State of Oregon:

See Attached Exhibit "A"

THE TRUE AND ACTUAL CONSIDERATION FOR THIS CONVEYANCE IS $152,500.00. (See ORS 93.030)

Subject to and excepting:
2015/16 taxes, covenants, conditions, restrictions, easements, rights of way, homeowners association assessments, if any, and matters now of record.

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010.

Order No.: 360615013316-TTCOO42

EXHIBIT "A"

Beginning at a point 13.0 feet East and 189.0 feet North of the Southwest corner of Section 33, Township 29 South, Range 12 West of the Willamette Meridian, Coos County, Oregon; thence along the Northerly boundary of that parcel of land described in Book 236, Page 730, Deed Records of Coos County, Oregon, in a Southeasterly direction for a distance of 153.2 feet; thence North parallel with the West boundary of said Section 33 for a distance of 181.4 feet, more or less, thence West 150.00 feet; thence South parallel with the West boundary of said Section 33 for a distance of 150.00 feet to the point of beginning.

ALSO:
Beginning at a point 13 feet East and 154 feet North of the Southwest corner of Section 33, Township 29 South, Range 12 West of the Willamette Meridian, Coos County, Oregon; thence South 154 feet to the South line of said section; thence East along said South line 250 feet; thence due North 100 feet; thence in a Northwesterly direction 255 feet, more or less, to the point of beginning. ALSO: Beginning at a point 13 feet East and 154 feet North of the Southwest corner of said Section 33, said point being the Northwest corner of the above described parcel; thence Southeasterly along the North boundary of the above described parcel to the Northeast corner of said parcel; thence due North 35 feet; thence in a Northwesterly direction 255 feet, more or less on a line parallel with the northerly boundary of the above described parcel to a point 35 feet North of the point of beginning; thence South 35 feet to the point of beginning; EXCEPT: a 24 foot by 35 foot parcel in the Northeast corner thereof described as follows: Beginning at the Northeast corner of the last described parcel; thence South 35 feet; thence Northwesterly 24 feet; thence due North 35 feet; thence Southeasterly 24 feet to the point of beginning.

DATED: 9-24-15

Stone Family Revocable Living Trust

BY: _____
Robert E. Stone, Trustee

BY: _____
Darcie M. Stone, Trustee

State of OREGON

COUNTY of Coos

This instrument was acknowledged before me on Sept 24, 2015

by Robert E. Stone and Darcie M. Stone as Trustees of the Stone Family Revocable Living Trust.

_____, Notary Public - State of Oregon

My commission expires: 5-26-18

OFFICIAL STAMP
TONYA LEANNE TUCKER
NOTARY PUBLIC-OREGON
COMMISSION NO. 928590
MY COMMISSION EXPIRES MAY 26, 2018

Coos County Planning Department
Coos County Courthouse Annex, Coquille, Oregon 97423
Mailing Address: Planning Department, Coos County Courthouse, Coquille, Oregon 97423

(541) 396-7770
FAX (541) 396-1022 / TDD (800) 735-2900
Jill Rolfe, Planning Director

CONSENT

On this 26th day of June, 2019,

I, Nicole Reaves-Kirn
(Print Owners Name as on Deed)

as owner/owners of the property described as Township 29, Range 12,

Section 33, Tax Lot 2100, Deed Reference 2015-008669

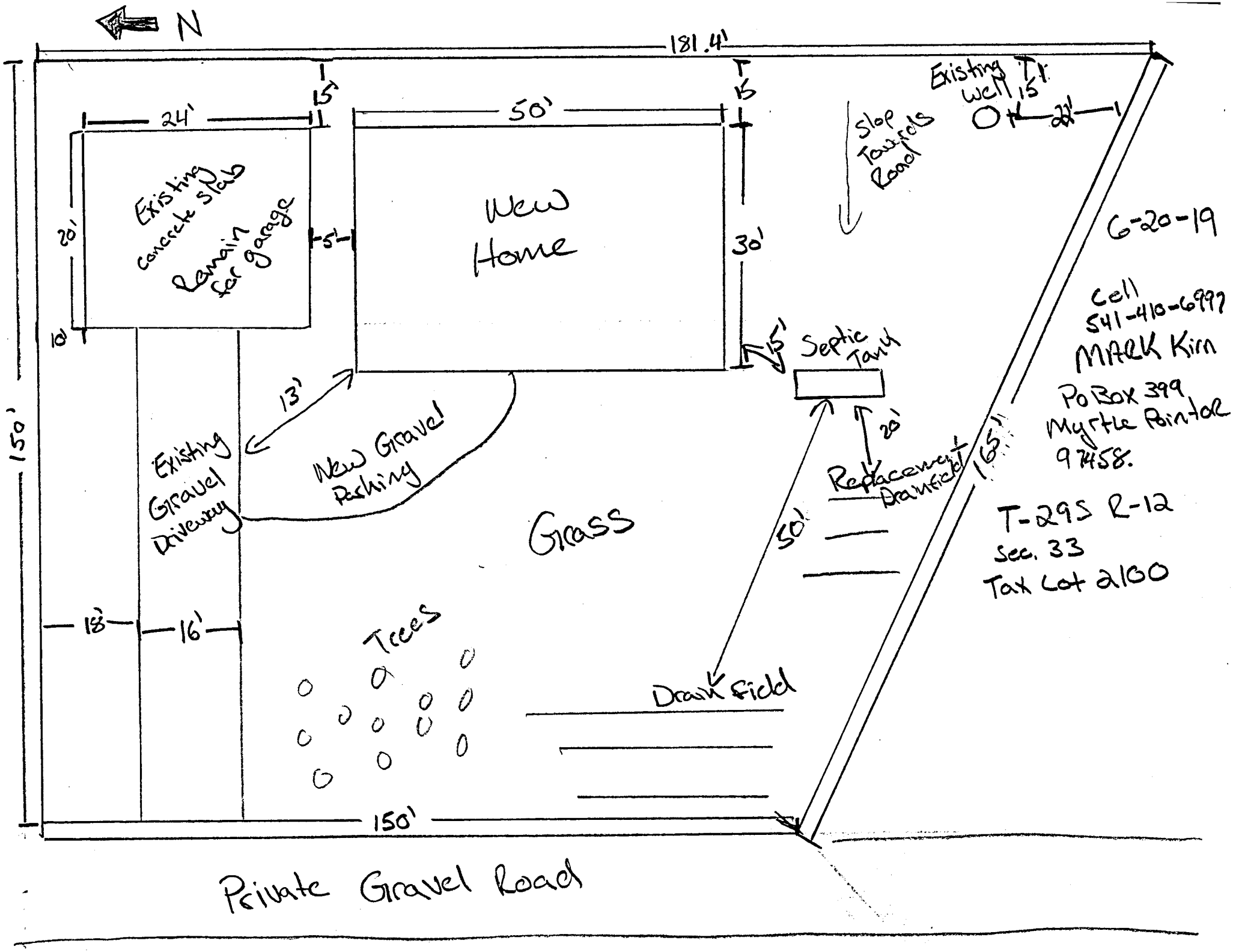
Hereby grant permission to Mark E. Kirn so that a(n)
(Print Name)

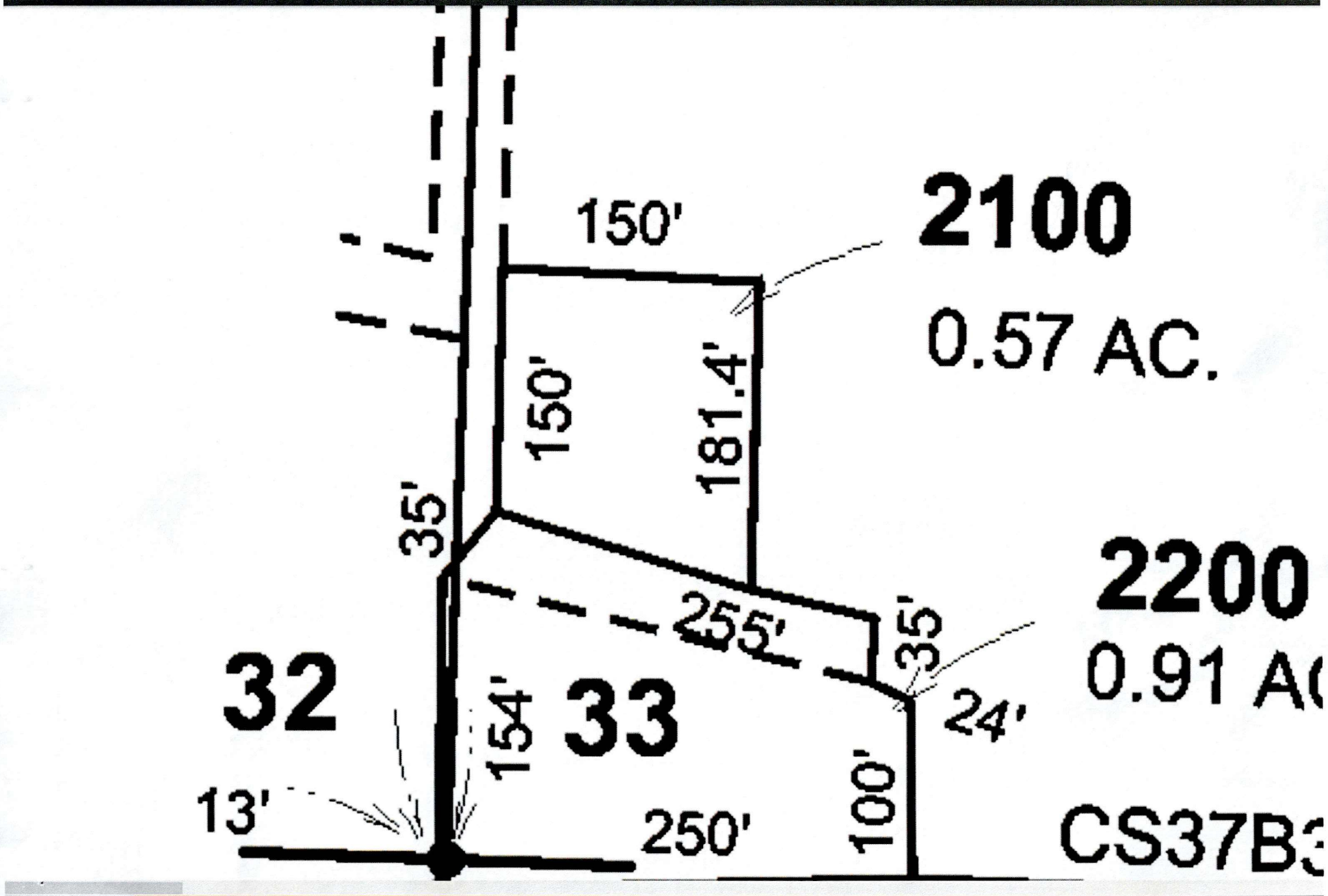
Conditional Use application can be submitted to the Coos
(Print Application Type)

County Planning Department.

Owners Signature/s

Nicole Reaves-Kirn


N
181.4'
150'
15'
24'
50'
15'
Existing concrete slab
Remain for garage
20'
New Home
30'
5'
10'
Slop Towards Road
Existing well
15'
22'
6-20-19
Cell 541-410-6997
MARK Kirn
PO Box 399
Myrtle Point OR
97458.
T-29S R-12
Sec. 33
Tax Lot 2100
15'
Septic Tank
20'
13'
Existing Gravel Driveway
New Gravel Parking
Replacement Drainfield
165'
50'
Grass
18'
16'
Trees
Drain field
150'
Private Gravel Road



CASCADIA GEOSERVICES, INC.
190 6th Street
PO Box 1026
Port Orford, Oregon 97465
D. 541-332-0433
C.541-655-0021
Email: info@cascadiageoservices.com
www:cascadiageoservices.com

Geotechnical Site Assessment for Residential Development
Parsonage Road
Broadbent, Oregon
T29S R12W Sec 33, TL 2100

Prepared for Mr. Mark Kirn
PO Box 399
Myrtle Point, Oregon 97458
Sent via e-mail: Mkirn82@gmail.com

April 4, 2018
CGS Project No 18041

INTRODUCTOIN

Cascadia Geoservices, Inc. (CGS) is pleased to submit this Geotechnical Site Assessment Report for a portion of your Parsonage Road property located in Broadbent, Oregon (see Figure 1, Location Map). The home site (site or subject property) is part of a previously developed site with an existing foundation and slab. We understand that you are proposing to develop the site with a single-family residence. This report summarizes our project understanding, site investigation including subsurface explorations and provides our conclusions and recommendations for developing the site.

PROJECT UNDERSTANDING

Our understanding is based on telephone correspondence with you beginning on February 12, 2018 and on a site visit to the subject property on February 14, 2018 at which time a geologic reconnaissance of the site was conducted and samples of an existing cut were collected.

We understand that the proposed development is a single-family residence. The site is currently occupied by an existing slab with perimeter foundation. We understand that you are proposing to use the existing slab for a detached garage and to build a residence within the cut pad south of the slab. We further understand that you are planning to build a single-story wood frame structure with a footprint of 55 X 30 feet. And, we understand that the new residential structure will be built with the finished floor about 24 inches above the existing cut pad elevation. We understand that no deep excavations (such as for a basement) or deep fills are planned. As of the date of this report, CGS has not been provided construction documents for the development.

SURFACE/SUBSURFACE DESCRIPTION

The site is located within the Coast Range Physiographic region of southwestern Oregon and is part of Tax Lot 2100, T29S, R12W, Sec 33. Tax Lot 2100 is .57 acres. The building site is generally level to gently sloping (less than 10°) to the west (Photo 1) and is bordered to the north by Parsonage Road and to the west, south and east by undeveloped land. The site is at an elevation of 204 feet Above Mean Sea Level and is part of a broad, gentle slope.

Based on mapping done by others[1],[2], soils at the site consist of silt loam (36C—McCurdy silt loam, 3 to 15 percent slopes). These soils are moderately well drained and are derived from alluvium. These overlay bedrock deposits of the Roseburg Formation (Lower Eocene) which consist of rhythmically bedded hard sandstone and softer siltstone.

The building pad has been excavated and leveled and was observed to be 54 feet long (measured north to south) by 23.5 feet wide (measured east to west) (Photo 2). The excavated pad is bordered on the east by a 52-inch-high cut-slope that averages 1 Horizontal to 1 Vertical (1H:1V) (Photo 3). Exposed in the cut slope from 0 to 28 inches below ground surface is soft to medium stiff brown organic silt. Based on mapping done by others[1], we infer that this is McCurdy silt loam. Below this along a gradational contact is stiff light tan clay. The clay was determined in the field to be medium plasticity, medium toughness of thread. Based on mapping done by others[2], we infer that the clay is decomposed bedrock siltstone of the Roseburg Formation.

A pocket penetrometer was used by CGS to test the relative consistency of the surficial soils collected from the excavated pad. In general, the brown organic silt collected from 0 to 28 inches bgs in the excavated cut produced a pocket penetrometer reading of less than 1.0 tsf[3] and was determined to be soft to medium stiff. The underlying tan clay produced a pocket penetrometer reading of from 1.0 to 1.5 tsf and was determined to be stiff. A fiberglass probe was used to probe the clay exposed in the cut to check for variability in consistency of the soils.

The clay was observed to be wet due to ponding surface water which has collected on the excavated pad

The 1H:1V cut slope and excavated pad were observed to be stable at the time of our site visit with no ground cracks or scarps visible.

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[1] USDA United State Department of Agriculture. Natural Resource Conservation Service Web Soil Survey retrieved from http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

[2] Beaulieu, J. D., & Hughes, P. W. (1975). Environmental Geology of Western Coos and Douglas Counties, Oregon. Oregon Department of Geology and Mineral Industries, Bulletin 87 (p. 148).

[3] compressive strength with pocket penetrometer; in tons per square foot (tsf)

LABORATORY ANALYSIS

Selected samples collected from the excavated cut were packaged in moisture tight bags and shipped to our laboratory in Woodland, Washington where they were classified in general accordance with the Unified Soil Classification System, Visual-Manual Procedure. In addition, water content (ASTM D698) and Atterberg Limits (ASTM D4318) were determined for a select sample. The results are summarized below in Table 1. The Lab Analysis Reports for the sample are provided at the back of this report as Attachment 1.

TABLE 1 - Laboratory Analysis

Sample Number	Test Pit	Depth Feet (bgs)	Soil Description	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	USCS Symbol[2]
SS-1	HA-1	1.0	Clay	30.0	42	30	12	CL

Based on the Plasticity Index and on the Liquid Limit, the soil exposed in the bottom of the cut are classified as low plasticity clays. We infer that the liquid limit indicates the clays' intrinsic water-holding capacity and that the clay can absorb significant additional amounts of water if the existing moisture conditions change during construction. Our experience with these soils, which are derived from weathering of sedimentary rocks, is that they typically exhibit low to moderate volume change in response to changing moisture content.

GROUNDWATER

Based on a review of well logs in the area[4], a well which was drilled on the subject property in 1995, encountered groundwater at 32 feet bgs. It should be noted that groundwater levels will rise during periods of heavy rainfall and associated slope runoff. We also anticipate that limited perched groundwater may be present at or near the contact of native soils and underlying bedrock deposits. We infer that groundwater follows topography and that the hydraulic gradient is to the west. We further note that

[4] Oregon Department of Water Resources (ODWR) retrieved from http://www.oregon.gov/OWRD

we did not observe evidence of near surface groundwater such as hydric soils or plants on the site.

During our site visit, we observed that several inches of groundwater has collected on the leveled site (Photo 1 and 2). We infer that this is surface water which has drained off of the slope to the east and has collected on the site due to poor drainage of the clay soils.

SEISMIC DESIGN CRITERIA

The subject property is located in an area that is highly influenced by regional seismicity due to its proximity to the Cascadia Subduction Zone (CSZ). Recent studies[5] indicate that the southern CSZ has generated maximum credible earthquakes with a Moment Magnitude (Mm) of 8.7 or greater every 200 to 300 years. Time dependent probabilities currently range up to 40% in 50 years for a southern segment rupture.

The seismic design criteria for this project is based on the 2015 National Earthquake Hazard Reduction Program (NEHRP) and is taken from the USGS Design Maps Summary Report.[6] The seismic design criteria, in accordance with the IBC, are summarized in Table 2 below.

Table 2: 2015 NEHRP Seismic Design Parameters

Seismic Design Parameters	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	S_s = 1.488 g	S_1 = 0.767 g
Site Class	D = Stiff Soil (Determined)	
Site Coefficient	F_a = 1.0	F_v = 1.7
Adjusted Spectral Acceleration	S_{MS} = 1.488 g	S_{M1} = 1.303 g
Design Spectral Response Acceleration Parameters	S_{DS} = .992 g	S_{D1} = 0.869 g
Peak Ground Acceleration	PGA = 1.1 g	

[5] Goldfinger, C., et al. (2012). Turbidite Event History—Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone. U.S. Geologic Survey (USGS), Professional Paper: 1661-F.

[6] USGS Design Maps Summary Report accessed from their website at http://ehp2earthquake.wr.usgs.gov/designmaps in May 2016.

GEOLOGIC HAZARDS

Based on a review of the Statewide Landslide Information Layer for Oregon (SLIDO2)[7], the site is within a previously identified landslide complex which covers an area of approximately 230 acres. Upon further review, it is CGS's opinion that the gently sloping area where the site is located is not part of an active landslide area. We base this on the observed topography of the site and on the soils and decomposed bedrock exposed in the excavated building pad.

A review of LIDAR[8] for the area, a surveying technology that reveals topography by illuminating the ground with laser light, indicates that the site is generally level to gently sloping and that the site is sparsely developed with residential development. The LIDAR indicates that there are no breaks in topography, re-routed drainages and no anomalous landforms indicative of recent slope movement on the subject property. Based on a review of US Geological Survey Maps[9], there are no geologically young faults in the area which will impact the site.

There is now a consensus among earth scientists that much of the western US coastline, including the entire southern Oregon coast, is in an area which has been seismically active in the recent geologic past. Our understanding of these forces is evolving and has been heightened by witnessing recent earthquakes and tsunamis in similar tectonic settings in Northern Indonesia (2005) and in Northern Japan (2011). In order to protect people living in seismically active areas within the state, the state has recently updated and released the 2017 Oregon Residential Specialty Code.[10] It is our opinion that new homes such as you are proposing to build should adopt these updated standards.

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[7] (SLIDO). Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Landslide Information Database for Oregon, from http://www.oregongeology.org/sub/slido/index.htm

[8] (LIDAR). Oregon Department of Geology and Mineral Industries (DOGAMI) LIDAR from http://www.oregongeology.org/lidar/index.htm

[9] U.S. Geologic Survey (USGS), Quaternary Faults Web Mapping Application, retrieved May 15, 2017 from http://earthquake.usgs.gov/hazards/qfaults/imsintro.php

[10] Oregon Residential Specialty Code, 2014, State of Oregon, viewed on December 26, 2015 at http://ecodes.biz/ecodes_support/free_resources/oregon/11_residential/11_orresidential_main.html

Liquefaction

Liquefaction potential was assessed based on the information obtained from our site observations and using the parameters suggested in the 2015 ODOT Geotechnical Design Manual. According to our seismic analysis, the site will experience a Peak Ground Acceleration (PGA) during a design seismic event of 1.1 g. Based on the nature of the soils encountered in our hand augered borings and the indicated depth to groundwater, it is our opinion that the soils at the site have a low liquefaction potential.

Based on recent mapping and modeling done by the State of Oregon[11], the site is not within the Tsunami Inundation Zone. It is uncertain whether regionally, access roads will be impacted during a tsunami. As a matter of safety procedure, CGS recommends that you check Local Resources and the State of Oregon's Department of Mineral Industries (DOGAMI) Tsunami Resource Center for current information regarding Tsunamis preparedness and emergency procedures.

SETBACK

The 2017 Oregon Residential Specialty Code[10], Section R. 403.1.9.1 (code) requires that buildings adjacent to descending slope surfaces be founded in firm material with an embedment and setback from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. When determining setbacks, the code recommends a minimum setback of at least the smaller of H/2 and 15 feet from ascending slopes[12].

Based on our surface and subsurface observations and on current building codes[10], we recommend that the perimeter house foundation be setback from the pad cut a minimum of 5 feet. This distance should be measured from the base of the slope. We have shown these setbacks on Figure 2, Site Map. As an alternative the perimeter footing can be moved to within a minimum 18 inches of the cut slope and the area between the perimeter foundation and the cut be backfilled with compacted free draining granular fill.

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[11] Local Source (Cascadia Subduction Zone) Tsunami Inundation Map Port Orford, Oregon. 2012. STATE OF OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES view at http://www.oregongeology.org

[12] H= the height of the slope

DISCUSSION AND RECOMMENDATIONS

Feasibility

It is CGS's opinion that the proposed structure can be supported on conventional spread footings provided the site is prepared in accordance with our recommendations. We base these recommendations on our work experience involving similar sites in similar settings. The use of conventional shallow foundations is feasible provided that the footings are set on the stiff light tan clay encountered at 28.0 inches bgs in the cut and exposed in the floor of the excavated building pad.

We further recommend that the eastern perimeter foundation be set back 5 feet from the ascending cut slope. We have shown these setbacks on Figure 2, Site Map. And, we recommend that the pad be graded to provide positive drainage away from the structure and back of the pad and that either a diversion terrace or subsurface drain be installed above the cut bank east of the pad to divert slope runoff away from the site. Please contact our office for additional assistance with designing these.

If construction occurs during wet weather, we recommend that a thin layer of compacted, crushed rock be placed over the footing subgrades to help protect them from disturbance due to foot traffic and the elements.

DESIGN

Spread Footing Design Recommendations

All surfaces with building foundations or pavement areas should be prepared in accordance with the Site Preparation section of this report. The building foundations may be installed on either stiff tan clay or on engineered fill which is set on these soils. Continuous wall and isolated spread footings should be at least 2 and 3 feet wide, respectively. The bottom of exterior footings should be at least 18 inches below the lowest adjacent exterior grade. The bottom of interior footings should be established at least 12 inches below the base of the floor slab.

Footings bearing on stiff tan clay should be sized for an allowable bearing capacity of 1,500 pounds per square foot (psf). This is a net bearing pressure. The weight of the footing and overlying backfill can be disregarded in calculating footing sizes. The recommended allowable bearing pressure applies to the total of dead plus long-term-

live loads, and this bearing pressure may be doubled for short-term loads such as those resulting from wind or seismic forces.

Based on CGS's estimates, and assuming the subgrade is properly prepared, total post-construction settlement was calculated to be less than one (1) inch, with post-construction differential settlement of less than 0.5 inches over a 50-foot span for maximum column and perimeter footing loads of less than 75 kips and 3 kips per linear foot.

Lateral loads on footings can be resisted by passive earth pressure on the sides of the structures and by friction at the base of the footings. An allowable passive earth pressure of 200 pounds per cubic foot (pcf) may be used for footings confined by native soils and new structural fills. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance. For footings in contact with native soils, use a coefficient of friction equal to 0.35 when calculating resistance to sliding.

A CGS geotechnical engineer (or their representative) should confirm suitable bearing conditions and evaluate all footing subgrades. Observations should also confirm that loose or soft material, organics, unsuitable fill and old topsoil zones are removed. Localized deepening of footing excavations may be required to penetrate any deleterious materials.

As previously discussed, if construction occurs during wet weather, we recommend that a thin layer of compacted, crushed rock be placed over the footing subgrades to help protect them from disturbance due to foot traffic and the elements.

The footings should be founded below an imaginary line projecting at a 1 horizontal to 1 vertical (1H:1V) slope from the base of any adjacent, parallel utility trenches. The footings must be embedded so that a minimum of 40 feet of horizontal distance is between the face of the footings and the moderate to steep slopes to the north and west.

Floor Slabs

Satisfactory subgrade support for building floor slabs can be obtained from the stiff tan clay subgrade prepared in accordance with our site preparation recommendations. Once prepared, an 8-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade. Imported granular material should be

crushed rock or crushed gravel that is fairly well graded between coarse and fine, contains no deleterious materials, has a maximum particle size of one (1) inch, and has less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. Material recommendations are provided below.

Retaining Structures

CGS's retaining wall design recommendations are based on the following assumptions: 1) the walls are conventional, cantilevered, retaining walls; 2) the walls are less than 8 feet in height; 3) the backfill is drained; and 4) the backfill has a slope flatter than 4H:1V. Evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

Unrestrained site walls that retain native soils or structural fill should be designed to resist equivalent fluid pressures of 34 pcf where back slopes are flatter than 4H:1V. If retaining walls are restrained from rotation prior to being backfilled, the equivalent fluid pressure should be increased to 50 pcf. For embedded building walls, a superimposed seismic lateral force should be calculated based on a dynamic force of $6H^2$ pounds per lineal foot of wall (where H is the height of the wall in feet) and applied at 0.6H from the base of the wall. If other surcharges (e.g., slopes steeper than 4H:1V, foundations, vehicles, etc.) are located within a horizontal distance from the back of a wall equal to twice the height of the wall, then additional pressures will need to be accounted for in the wall design. Our office should be contacted for appropriate wall surcharges based upon actual magnitude and configuration of the applied loads.

The wall footings should be designed in accordance with the guidelines provided in the Spread Footing Design Recommendations section of this report.

These design parameters have been provided assuming that back-of-wall drains will be installed to prevent buildup of hydrostatic pressures behind all walls. If a drainage system is not installed, then our office should be contacted for revised design forces.

The backfill material placed behind the walls and extending a horizontal distance equal to at least half of the height of the retaining wall should consist of granular retaining wall backfill as specified in the Structural Fill section of this report.

A minimum 12-inch-wide zone of drain rock extending from the base of the wall to within 6 inches of finished grade should be placed against the back of all retaining walls. Perforated collector pipes should be embedded at the base of the drain rock.

The drain rock should meet the requirements provided in the Structural Fill section of this report. The perforated collector pipes should discharge at an appropriate location away from the base of the wall. The discharge pipe(s) should not be tied directly into storm water drain systems unless measures are taken to prevent backflow into the wall's drainage system.

Settlements of up to one (1) percent of the wall height commonly occur immediately adjacent to the wall, as the wall rotates and develops active lateral earth pressures. Consequently, we recommend that construction of flat work adjacent to retaining walls be postponed at least four weeks after backfilling of the wall, unless survey data indicates that settlement is complete prior to that time.

CONSTRUCTION

Site Preparation

If detected, near-surface root zones should be stripped and removed from the project site in all proposed building, fill, and pavement areas, and for a 5-foot margin around such areas. The stripping depths will be variable and will likely vary based on proximity to existing trees and shrubs and on the thickness of the overlying fill. The actual stripping depth should be based on field observations at the time of construction. Stripped material should be disposed of or stockpiled for use in landscaped areas.

Trees and shrubs should be removed from all improvement areas. In addition, root balls should be grubbed out to the depth of the roots, which may exceed 3 feet bgs. Depending on the methods used to remove the root balls, considerable disturbance and loosening of the subgrade could occur during site grubbing. We recommend soil disturbed during grubbing operations be removed to expose firm, undisturbed subgrade. The resulting excavations should be backfilled with structural fill.

Building and wall foundations, floor slabs, and pavements can be installed on either firm bedrock subgrade or engineered fill. The existing surficial fill at the site has a variable consistency and is not suitable for construction. The old fill and any soft areas should be removed to a firm layer and replaced with structural fill.

Probing

Following stripping, excavation, and site preparation and prior to placing structural fills, the exposed excavated surface and the footing or slab subgrade should be evaluated by probing. A member of our geotechnical staff should carry out the probing. Soft or loose zones identified during the field evaluation should be compacted to an unyielding condition or be excavated and replaced with structural fill.

Wet-Weather/Wet-Soil Conditions

Trafficability on the exposed soils may be difficult during or after extended wet periods or when the moisture content of the surface soil is more than a few percentage points above optimum. Soils disturbed during site-preparation activities, or soft or loose zones identified during probing should be removed and replaced with compacted structural fill.

Excavation

Subsurface conditions at the project site show predominately stiff tan clay to the depths explored. Excavations in these soils may be readily accomplished with conventional earthwork equipment.

Trench cuts in native materials should stand vertical to a depth of approximately 4 feet, provided no groundwater seepage is present in the trench walls. Open excavation may be used to excavate trenches with depths between 2 and 8 feet with the walls of the excavation cut at a slope of 1H:1V, provided groundwater seepage is not present and with the understanding that some sloughing may occur. The trenches should be flattened to 1. 5H:1V if excessive sloughing occurs or seepage is present.

Groundwater was not encountered during site exploration. However, during the wet months of the year, some shallow perched groundwater may be expected. If shallow groundwater is observed during construction, use of a trench shield (or other approved temporary shoring) is recommended for cuts that extend below groundwater seepage or if vertical walls are desired for cuts deeper than 4 feet. If shoring or dewatering is used, CGS recommends that the type and design of the shoring and dewatering systems be the responsibility of the contractor, who is in the best position to choose systems that fit the overall plan of operation. These excavations should be made in

accordance with applicable Occupational Safety and Health Administration and State regulations.

Final Grading

As indicated, the footing backfill should be graded to drain away from the structure and away from the slopes north of the house.

Building Codes

We recommend that your home design be reviewed for adherence to the local building codes as set forth in the 2017 Oregon Residential Specialty Code.

MATERIALS

Fills should be placed over subgrade that has been prepared in conformance with the Site Preparation section. A wide range of material may be used as structural fill; however, all material used should be free of organic matter or other unsuitable materials and should meet the specifications provided in the 2015 Oregon Standard Specifications for Construction, Oregon Department of Transportation (ODOT, SS 2015), depending on the application. A brief characterization of some of the acceptable materials and our recommendations for their use as structural fill is provided below.

Native Soils

The native soils are suitable for use as general fill, provided they are properly moisture conditioned and meet the requirements of ODOT SS 00330.12 – Borrow Material. Fills derived from native soils should not be placed beneath footings or building slabs. In order to adequately compact the soil, it may be necessary to moisture condition the soil to within 2 to 3 percentage points of the optimum moisture content.

When used as structural fill, native soils should be placed in lifts with a maximum uncompacted thickness of 6 to 8 inches and compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557.

Imported Granular Material

Imported granular material used during periods of wet weather or for access roads, building pad or footing subgrades, staging areas, etc., should be pit or quarry run rock, crushed rock, or crushed gravel and sand, and should meet the specifications provided

in ODOT SS 00330.12 – Borrow Material, and ODOT SS 00330.13 – Selected General Backfill. The imported granular material should also be fairly well graded between coarse and fine material and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve.

Imported granular material should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and be compacted to not less than 92 percent of the maximum dry density, as determined by ASTM D 1557. During the wet season or when wet subgrade conditions exist, the initial lift should be approximately 18 inches in uncompacted thickness and should be compacted by rolling with a smooth-drum roller without using vibratory action.

Where imported granular material is placed over soft-soil subgrades, we recommend a geotextile be placed as a barrier between the subgrade and imported granular material. Depending on site conditions, the geotextile should meet ODOT SS 02320.10 – Geosynthetics, Acceptance, for soil separation or stabilization. The geotextile should be installed in conformance with ODOT SS 00350.40 – Geosynthetic Construction, General Requirements.

Trench Backfill

Trench backfill placed beneath, adjacent to, and for at least 2 feet above utility lines (i.e., the pipe zone) should consist of well-graded granular material with a maximum particle size of 1.5 inches and less than 10 percent by weight passing the U.S. Standard No. 200 Sieve and should meet the standards prescribed by ODOT SS 00405.12 – Pipe Zone Bedding. The pipe zone backfill should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department.

Within roadway alignments or beneath building pads, the remainder of the trench backfill should consist of well-graded granular material with a maximum particle size of 2.5 inches, less than 10 percent by weight passing the U.S. Standard No. 200 Sieve, and should meet standards prescribed by ODOT SS 00405.14 – Trench Backfill, Class A or B. This material should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local

building department. The upper 2 feet of the trench backfill should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557.

Outside of structural improvement areas (e.g., roadway alignments or building pads), trench backfill placed above the pipe zone may consist of general fill materials that is free of organics and materials over 6 inches in diameter, and meet the standards prescribed by ODOT SS 00330.12 – Borrow Material, and ODOT SS 00405.14 – Trench Backfill, Class C, D, or E. This general trench backfill should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department.

Stabilization Material

Stabilization rock should consist of imported granular material that is well graded, angular crushed rock consisting of 4- or 6-inch-minus material with less than 2 percent passing the U.S. Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material.

Retaining Wall Backfill

Backfill material placed behind retaining walls and extending a horizontal distance of 0.5H, where H is the height of the retaining wall, should consist of select granular material meeting the requirements of ODOT SS 00510.12 – Granular Wall Backfill. We recommend the select granular wall backfill be separated from general fill, native soil, and/or topsoil using a geotextile fabric which meets the requirements provided in ODOT SS 02320.10 – Geosynthetics, Acceptance. The geotextile should be installed in conformance with ODOT SS 00350.40 – Geosynthetic Construction, General Requirements.

The wall backfill should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D 1557. However, backfill located within a horizontal distance of 3 feet from the retaining walls should only be compacted to approximately 90 percent of the maximum dry density, as determined by ASTM D 1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactors). If flat work (sidewalks or pavements) will be placed atop the wall backfill, we

recommend that the upper 2 feet of material be compacted to 92 percent of the maximum dry density, as determined by ASTM D 1557.

Trench and Retaining Wall Drain Backfill

Backfill in a 2-foot zone against the back of retaining walls and for subsurface trench drains should consist of drain rock meeting the specifications provided in ODOT SS 00430.11 – Granular Drain Backfill Material. The drain rock should be wrapped in a geotextile fabric that meets the specifications provided in ODOT SS 02320.10 – Geosynthetics, Acceptance, for soil separation and/or stabilization. The geotextile should be installed in conformance with ODOT SS 00350.40 – Geosynthetic Construction, General Requirements.

Footing Base

Imported granular material placed at the base of retaining wall footings should be clean crushed rock or crushed gravel, and sand that is fairly well graded between coarse and fine. The granular materials should contain no deleterious materials, have a maximum particle size of 1.5 inches, and meet the requirements of ODOT SS 00330.14 – Selected Granular Backfill. The imported granular material should be placed on one lift and compacted to not less than 92 percent of the maximum dry density, as determined by ASTM D 1557.

Floor Slab Base Aggregate

Base aggregate for floor slabs should be clean crushed rock or crushed gravel. The base aggregate should contain no deleterious materials, meet specifications provided in ODOT SS 00330.14 – Selected Granular Backfill, and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. The imported granular material should be placed in one lift and compacted to at least 95 percent of the maximum dry density, as determined by ASTM D 1557.

CONSTRUCTION OBSERVATIONS

Satisfactory pavement and earthwork performance depends on the quality of construction. Sufficient monitoring of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. We recommend that a representative from CGS be retained to

observe general excavation, stripping, fill placement, footing subgrades, and subgrades and base rock for floor slabs and pavements.

Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

PROFESSIONAL QUALIFICATIONS

To view our professional qualifications, please visit our web site at www.cascadiageoservices.com

LIMITATIONS

This report has been prepared for the exclusive use of the addressee, and their agents, and is intended for their use only. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without the expressed written consent of the Client and Cascadia Geoservices Inc.

The opinions, comments, and conclusions presented in this report are based upon information derived from our literature review, historical topographic map and aerial photograph review, and on our site observations. Conditions between, or beyond, our site observations may vary from those encountered. It is possible that soil, rock, or groundwater conditions could vary between or beyond the points explored.

The scope of services for this subsurface exploration and reports did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, if conditions have changed due to natural causes or construction operations at or adjacent to the site, or if the basic project scheme is significantly modified from that assumed, this report should be reviewed to determine the applicability of the conclusions and recommendations. Land use, site conditions (both

on and off site), or other factors may change over time and could materially affect our findings. Therefore, this report should not be relied upon after two years from its issue, or in the event that the site conditions change.

The southern Oregon coast is subject to intense Pacific Ocean storms, subduction zone earthquakes, and tsunamis. As such, we cannot predict nor preclude the possibility of a catastrophe. By necessity, the current and future owners of this property must assume the risks associated with any "act of God" and hold harmless their realtors, professional consultants, contractors, and involved regulatory agencies.

We appreciate the opportunity to provide our services and trust that this report meets your requirements at this time. Please contact us at 541-655-0021 so we can further assist in any way.

Sincerely,

Cascadia Geoservices, Inc.

Eric Oberbeck, CEG
Expires May 31, 2018

Frederick G. Thrall, PE, GE
Expires June 30, 2018

Photos

Figures

Figure 1, Site Location

Figure 2, Site Reconnaissance Map

Attachments

Attachment 1 – Laboratory Test Sheets

CASCADIA Geoservices — Geologists and Engineers	Mark Kirn Parsonage Road Broadbent, Oregon	**Photographic Log**
	Date: April, 2018	Cascadia Geoservices, Inc. Project No: 18041

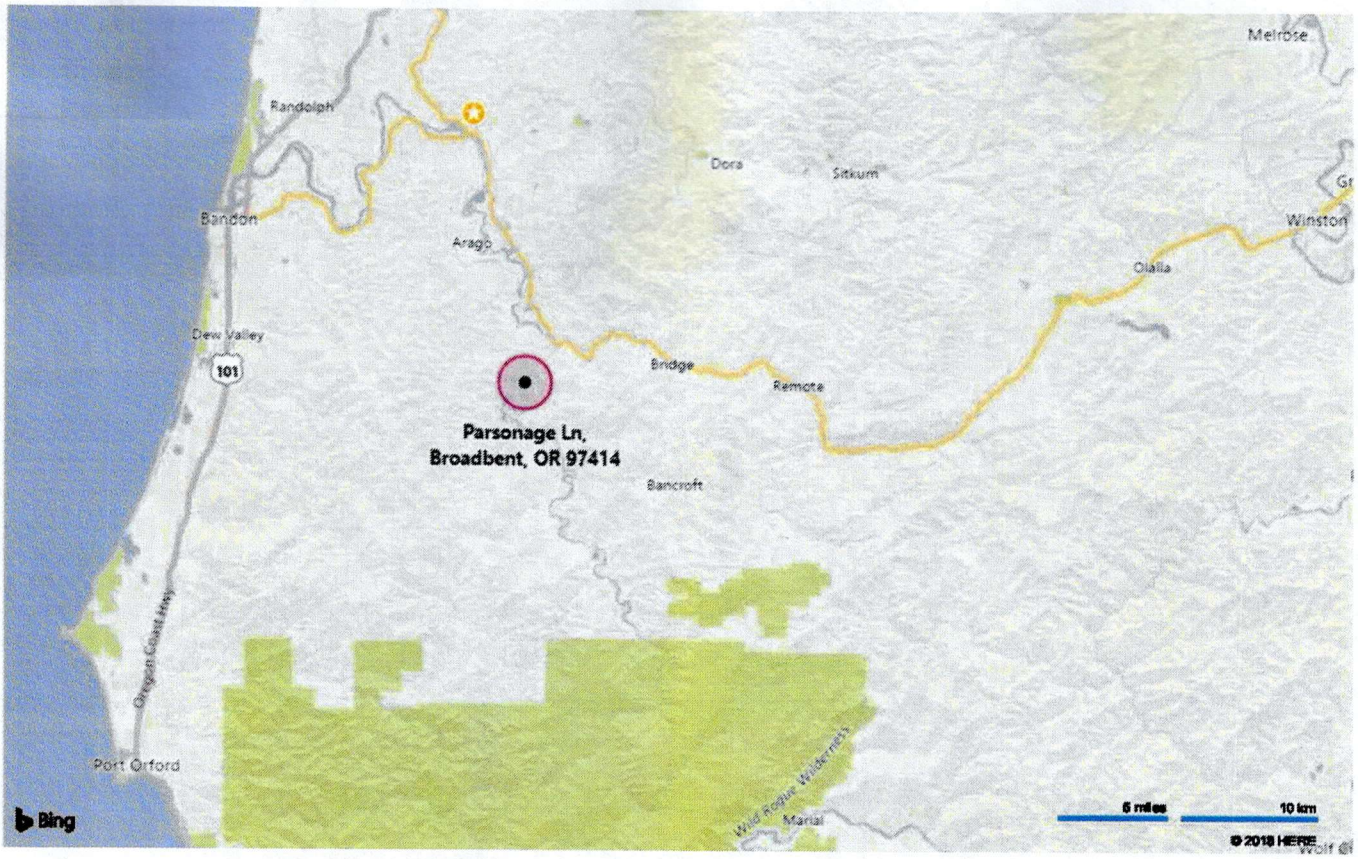
Photo No:	**1**
Direction Photo is Taken: South	
Photo Description:	
The building site is generally level to gently sloping (less than 10°) to the west	

Photo No:	**2**
Direction Photo is Taken: North	
Photo Description:	
The building pad has been excavated and leveled and was observed to be 54 feet long (measured north to south) by 23.5 feet wise (measured east to west)	

CASCADIA Geoservices – Geologists and Engineers	Mark Kirn Parsonage Road Broadbent, Oregon	**Photographic Log**
	Date: April, 2018	Cascadia Geoservices, Inc. Project No: 18041

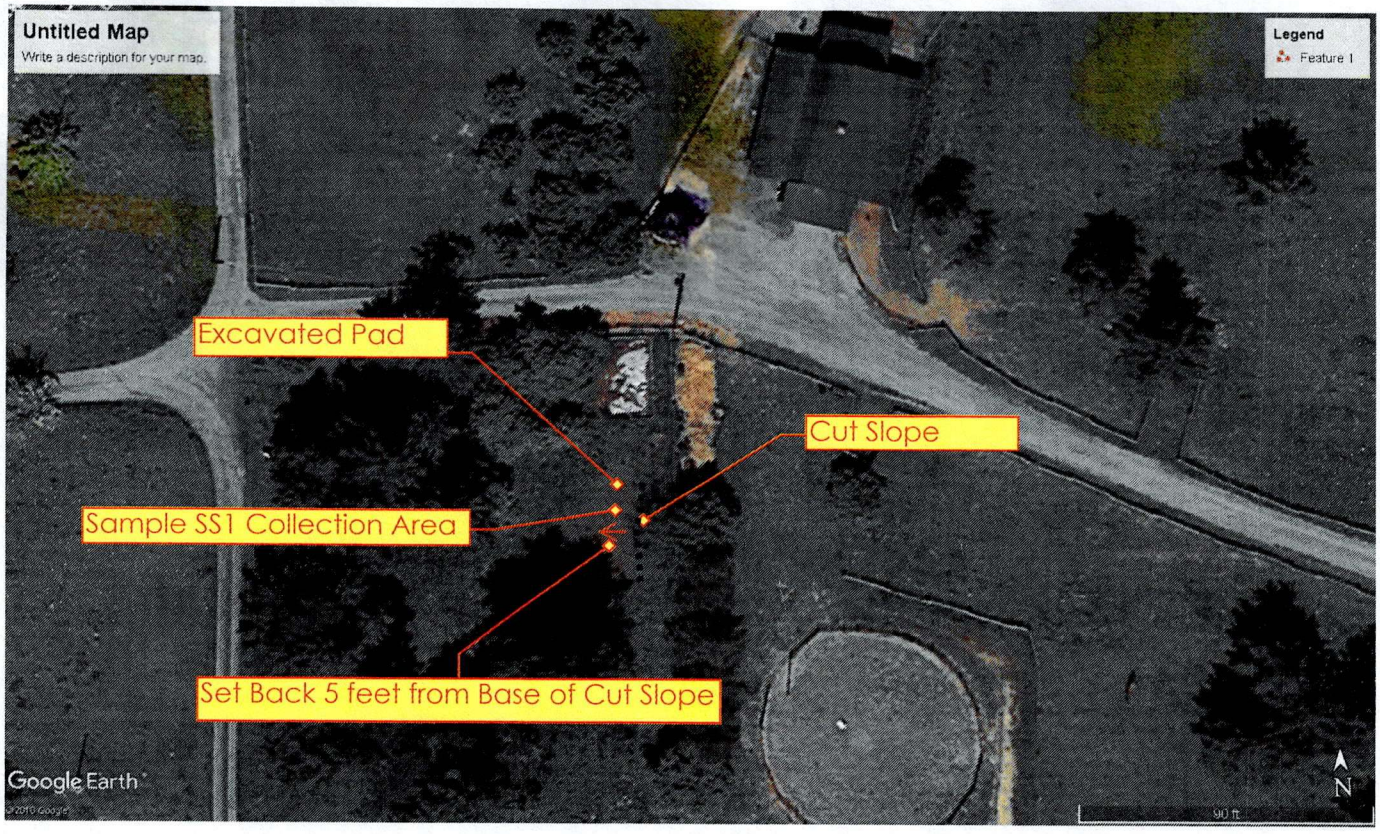
Photo No:	**3**
Direction Photo is Taken: East	
Photo Description:	
The excavated pad is bordered on the east by a 52-inch-high cut-slope.	

Photo No:	
Direction Photo is Taken:	
Photo Description:	



Prepared for Mr. Mark Kirn

CASCADIA Geoservices Geologists and Engineers	Project: 18041 April , 2017	**Location Map** Geotechnical Site Evaluation Report Parsonage Road Broadbent, Oregon	**Figure 1**



Prepared for Mr. Mark Kirn

CASCADIA Geoservices Geologists and Engineers	Project: 18041 April , 2017	**Site Map** Geotechnical Site Evaluation Report Parsonage Road Broadbent, Oregon	**Figure 2**

Water Content Determination

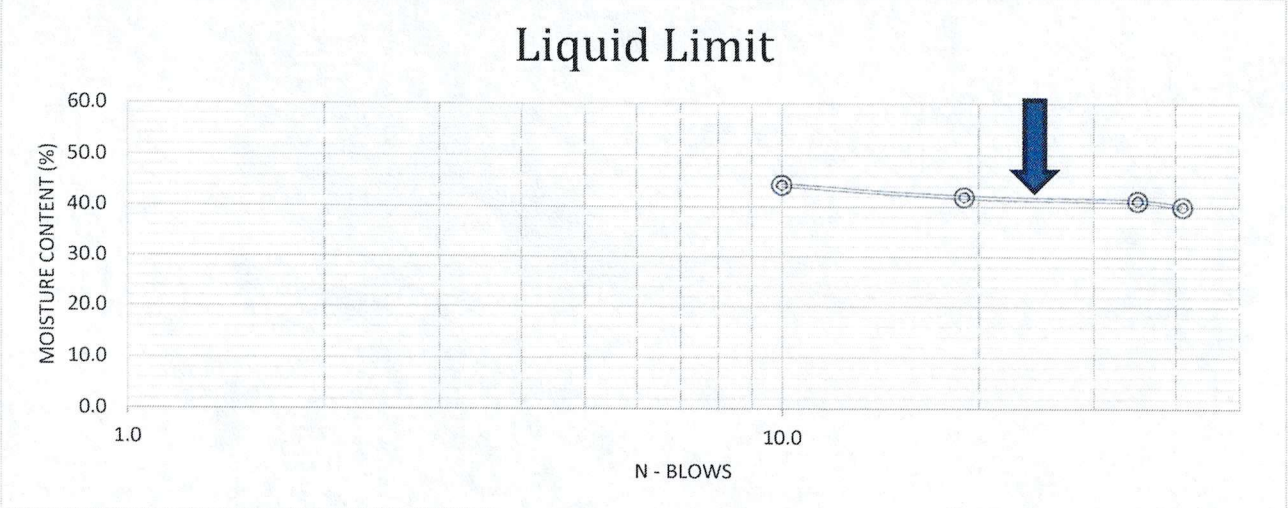
ASTM D2216

Project Name: Kirin			**Project Number: 18020**		
Recorded By: J Thrall			**21-Feb-18**		
Remarks:					
Sample Designation	**SS-1**				
Sample Depth					
Pan Number	**L**				
Wt. Wet Soil +Pan (g)	73.7				
Wt. Dry Soil +Pan (g)	61.35				
Wt. Water (g)	12.35				
Wt. Pan (g)	20.17				
Wt. Dry Soil (g)	41.18				
Water Content (%)	30.0				
Sample Designation					
Sample Depth					
Pan Number					
Wt. Wet Soil +Pan (g)					
Wt. Dry Soil +Pan (g)					
Wt. Water (g)					
Wt. Pan (g)					
Wt. Dry Soil (g)					
Water Content (%)					
Sample Designation					
Sample Depth					
Pan Number					
Wt. Wet Soil +Pan (g)					
Wt. Dry Soil +Pan (g)					
Wt. Water (g)					
Wt. Pan (g)					
Wt. Dry Soil (g)					
Water Content (%)					

Atterberg Limits Determination

ASTM D4318

Project Name: Kirin		**Project Number: 18013**		
Recorded By: J Thrall		**Date: February 22, 2018**		
Sample Designation: SS-1				
Remarks:				
Test Number	**1**	**2**	**3**	**4**
Liquid Limit				
Pan Number	**B**	**A**	**C**	**D**
Wt. Wet Soil +Pan (g)	61.34	59.14	52.49	56.09
Wt. Dry Soil +Pan (g)	48.71	47.65	43.06	45.79
Wt. Water (g)	12.63	11.49	9.43	10.3
Wt. Pan (g)	20.13	20.21	20.11	20.01
Wt. Dry Soil (g)	28.58	27.44	22.95	25.78
Water Content (%)	44.2	41.9	41.1	40.0
Number of Drops (N)	10.0	19.0	35.0	41.0
Plastic Limit				
	E	**F**	**G**	
Wt. Wet Soil +Pan (g)	46.61	37.76	37.01	
Wt. Dry Soil +Pan (g)	40.3	33.74	33.14	
Wt. Water (g)	6.31	4.02	3.87	
Wt. Pan (g)	19.77	20.26	20.06	Plastic Limit (%)
Wt. Dry Soil (g)	20.53	13.48	13.08	Average (%)
Water Content (%)	30.7	29.8	29.6	30.0



Liquid Limit (%)	42
Plastic Limit (%)	30
Plastic Index (%)	12