LaVIELLE GEOTECHNICAL P.C.

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December 15, 2013 our ref: 13-2582.046

The Springs Living
15677 NE Oregon St
Sherwood, Oregon 97213

RE: GEOTECHNICAL INVESTIGATION
SOUTH SIDE ADDITION TO THE SPRINGS LIVING
15677 NE OREGON ST.
SHERWOOD, OREGON

Greetings:

In accordance with your request the present herein our recommendations for parameters that may be used in the design of proposed new buildings foundations. The site is a vacant lot in a former agricultural area.

The soil exposed in shallow test pits and hand auger borings was a Medium Stiff, Brown,Clayey Silt. Groundwater was found below a depth of 4 feet. The material encountered in our exploration had sufficient cohesion to roll a thread 1/8" to 1/4" inch diameter. Our interpretation is that this material would not liquefy as a result of seismic shaking. Other materials at greater depth may lack the cohesion that is mentioned here. However based on our experience in the area it is our opinion that the site has a low risk of liquefaction.

Wall foundations should be designed based on the following recommended values.

Maximum Allowable Bearing Pressures:

2,000 psf	Medium Stiff, Brown Clayey Silt
2,000 psf	Compacted Fill (95% of ASTM:D-1557) founded above-mentioned soil.

These values may be increased by 1/3 for short-term wind and seismic loadings.

Estimated Settlement for Foundation in the Silt:

Total Settlement:	3/4 inches
Differential Settlement:	1/2 inches

Foundation Setback from Slope Faces:

All foundations should setback from face of slopes a minimum of 7 feet horizontally.

Foundation Minimum Embedment: 18 inches

Lateral Load Resistance:

Passive Resistance:	250 pcf, Equivalent fluid
Coefficient of Friction:	0.35

Note: The values for lateral load resistance do not include any factor of safety. The top foot of depth should be neglected in design computations of the passive capacity unless the soil is confined beneath a pavement or slab.

Foundations are underlain by at least 6 inches of 1½-inch minus crushed gravel. If the 0.5 value is used in design, the structural drawings must show the crushed gravel layer and must require special inspection of the gravel layer by a geotechnical engineer before constructing forms.

Passive pressure may be used to resist sliding during seismic loading if the ground in front of the foundation is level for at least 7 feet or three times the height of the surface generating passive resistance. The seismic passive resistance may be calculated using an equivalent fluid weight of 250 pcf. This seismic passive equivalent fluid weight was calculated using the Mononobe-Okabe method with $\delta=\frac{1}{2}\varphi'$ and a pseudostatic horizontal acceleration equal to a_{max}.

Only two-thirds of the passive resistance should be used if friction and passive resistance are combined to resist lateral forces.

The minimum recommended factors of safety for seismic design of sliding, overturning, and bearing capacity are taken as 75% of the values recommended for statically loaded structures. Therefore, the minimum static factors of safety for sliding, overturning, and bearing capacity of 1.5, 1.5, and 2.0 are reduced to 1.1, 1.1, and 1.5, respectively, when evaluating seismic stability.

Excavations & Slopes

It is our understanding that excavations as deep as 2.5 feet are expected. These excavations may be completed without shoring if the following measures are taken.

Temporary excavations should be cut at an inclination of 1H:4V (horizontal:vertical), or flatter. Permanent cut slopes should be left at inclinations no steeper than 2H:1V. Stormwater should be controlled and directed well away from the cuts. The up slope area should be covered with plastic sheeting.

The cuts should not be left open for longer than 1.5 weeks. If this limited time cannot be met the contractor shall be prepared to install shoring or to backfill excavation. The contractor should walk the perimeter of the excavations at least daily looking for evidence of instability. If instability is detected the geotechnical engineer should be contacted immediately.

Earthworks

In general the soils onsite appear to be well over their optimum moisture content and highly moisture sensitive and therefore they are not suited for use in structural fills except during warm dry weather.

If fill material is imported to the site we recommend the import material should be a clean sand and gravel that contains less than 5% passing the No. 200 sieve, based on the minus 3/4 inch fraction. This type of material can typically be placed and compacted in wet weather conditions.

Any fill placed beneath building foundations, or pavements should be placed in maximum 8 inch loose lifts and compacted to at least 95% of the ASTM D 1557 laboratory standard. We recommend a large steel wheeled vibratory roller be used to compact the imported granular fills while a sheepsfoot roller is best for compacting the fine grained soils. If density tests taken in the fills indicate compaction is not be being achieved, the fill should be scarified, moisture conditioned and recompacted.

Any fill placed on slopes steeper than 5H:1V should be properly keyed and benched and compacted.

We are available to discuss projects.

Sincerely,
LaVIELLE GEOTECHNICAL PC
Craig C. LaVielle, PE/GE

Expires 12/31/14

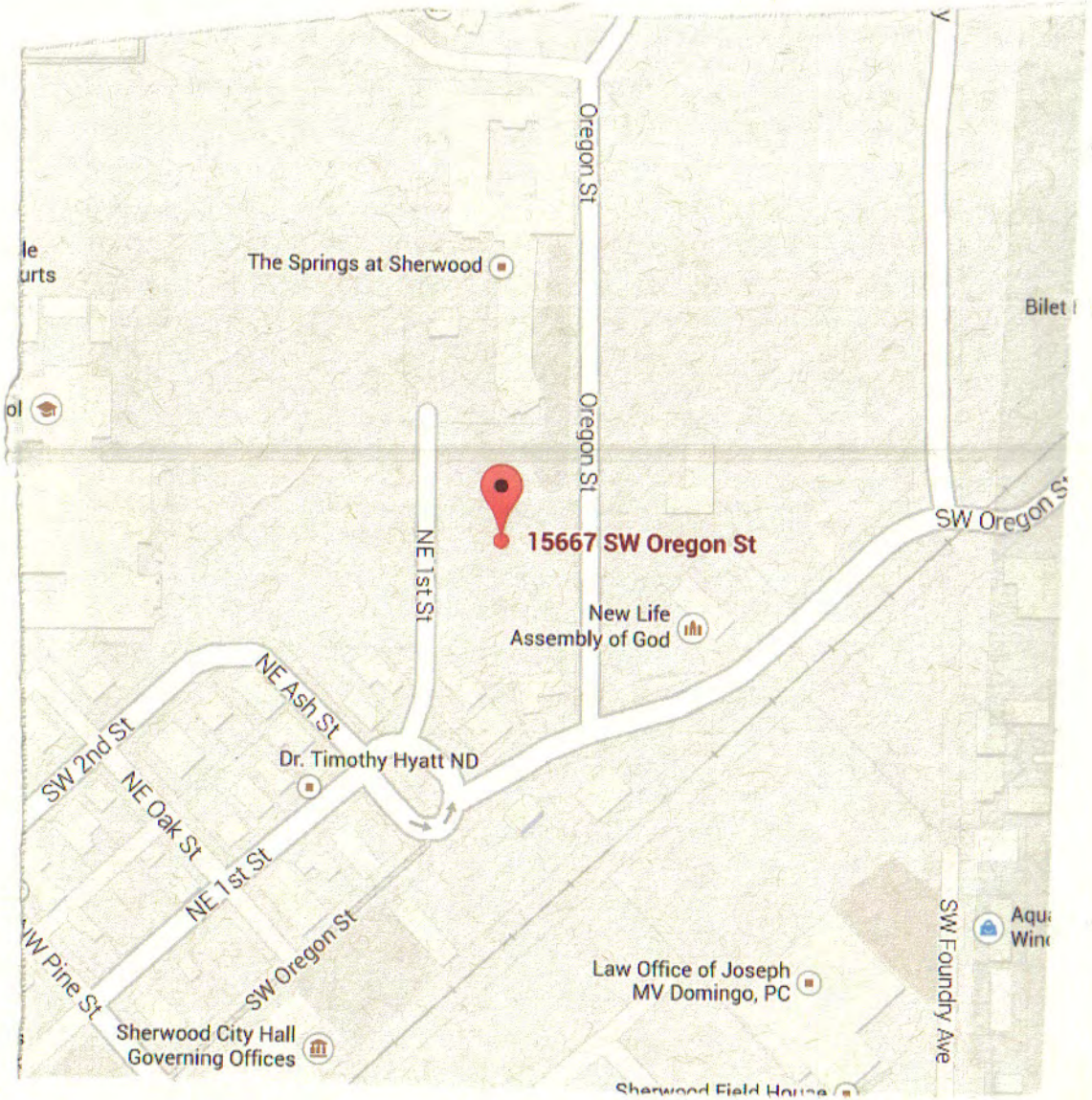
A geotechnical engineer from our office visually classified the soils encountered according to the Unified Soil Classification System (USCS) as follows:

TP-1	Depth (ft.)	USCS	Description
	0 – 0.7	ML-OL	Dark Brown – Black, Clayey Silt, Soft (Topsoil)
	0.7 - 4.5	ML-SM	Brown Clayey Silt, Medium Stiff Slight seepage at 4 feet.

TP-2	Depth (ft.)	USCS	Description
	0 – 0.8	ML-OL	Dark Brown – Black, Clayey Silt, Soft (Topsoil)
	0.8 - 4.75	ML-SM	Brown Clayey Silt, Medium Stiff Slight seepage at 4 feet.

TB-1	Depth (ft.)	USCS	Description
	0 – 6.2	ML-SM	Brown Clayey Silt, Medium Stiff

TB-2	Depth (ft.)	USCS	Description
	0 – 5.75	ML-SM	Brown Clayey Silt, Medium Stiff

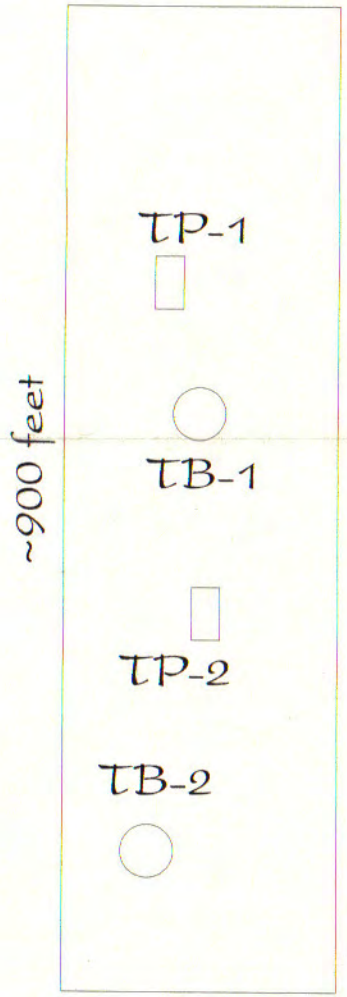


Vicinity Plan, Figure 1

15677 Oregon St

Sherwood, Oregon

LaVielle Geotechnical P.C.



North

Indicates Approximate
Location of Test Pits and Borings

Site Plan, Figure 2

Addition to 15677 Oregon St
Portland, Oregon

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