DATE:
January 26, 2022

PROJECT NUMBER:
SL06089-3

CLIENT:
Adam and Billie Jean Nielson
1730 Northwood Road
Nipomo, California 93444

PROJECT NAME:
256 Candice Court
APN: 075-391-044
Arroyo Grande Area, San Luis Obispo County, California

SOILS ENGINEERING REPORT UPDATE LETTER

Dear Mr. and Ms. Nielson:

This letter has been prepared as an update to the project Soils Engineering Report for the proposed single-family residence to be located at 256 Candice Court, APN: 075-391-044, Arroyo Grande Area, San Luis Obispo County, California. It is our understanding that the referenced Soils Engineering Report originally prepared by GeoSolutions, Inc. (GeoSolutions, Inc., 2017) was submitted to the building department for permitting of this project.

GeoSolutions, Inc. has reviewed the sub-surface data and recommendations presented during preparation of the referenced reports with respect to the 2019 California Building Code (CBC 2019) and the project plans for the proposed project.

GeoSolutions, Inc. has determined the recommendations provided in the most recent referenced Soils Engineering Report (GeoSolutions, Inc., 2017) can be considered applicable to development of the Site and valid to the current date and the 2019 California Building Code.

SEISMIC DESIGN CONSIDERATIONS

Estimating the design ground motions at the Site depends on many factors including the distance from the Site to known active faults; the expected magnitude and rate of recurrence of seismic events produced on such faults; the source-to-site ground motion attenuation characteristics; and the Site soil profile characteristics. According to section 1613 of the 2019 CBC (CBSC, 2019), all structures and portions of structures should be designed to resist the effects of seismic loadings caused by earthquake ground motions in accordance with the ASCE 7: Minimum Design Loads for Buildings and Other Structures, hereafter referred to as ASCE 7-16 (ASCE, 2016). The Site soil profile classification (Site Class) can be determined by the average soil properties in the upper 100 feet of the Site profile and the criteria provided in Table 20.3-1 of ASCE 7-16.

Spectral response accelerations and peak ground accelerations, provided in this report were obtained using the computer-based Seismic Design Maps tool available from the Structural Engineers Association of California (SEAOC, 2019). This program utilizes the methods developed in ASCE 7-16 in conjunction with user-inputted Site location to calculate seismic design parameters and response spectra (both for period and displacement) for soil profile Site Classes A through E.

Site coordinates of 35.105 degrees north latitude and -120.568 degrees east longitude were used in the web-based probabilistic seismic hazard analysis (SEAOC, 2019). Based on the results from the in-situ tests performed during the field investigation, the Site was defined as **Site Class D**, “Stiff Soil” profile per ASCE7-16, Chapter 20. Relevant seismic design parameters obtained from the program area summarized in Table 1: Seismic Design Parameters. Refer to attached pages (Design Map Summary, SEAOC, 2019) for more information regarding the seismic hazard analysis performed for the project and detailed results.

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Table 1: Seismic Design Parameters

Site Class	**D "Stiff Soil"**
Seismic Design Category	**D**
Short-Period Design Spectral Response Acceleration, S_{DS}	**0.762g**
Site Specific MCE Peak Ground Acceleration, PGA_M	**0.529g**

LIQUEFACTION HAZARD ASSESSMENT

Liquefaction occurs when saturated cohesionless soils lose shear strength due to earthquake shaking. Ground motion from an earthquake may induce cyclic reversals of shear stresses of large amplitude. Lateral and vertical movement of the soil mass combined with the loss of bearing strength can result from this phenomenon. Liquefaction potential of soil deposits during earthquake activity depends on soil type, void ratio, groundwater conditions, the duration of shaking, and confining pressures on the potentially liquefiable soil unit. Fine, poorly graded loose sand, shallow groundwater, high intensity earthquakes, and long duration of ground shaking are the principal factors leading to liquefaction.

Based on the consistency and relative density of the in-situ soils the potential for seismic liquefaction of soils at the Site is low. Assuming that the recommendations of the Soils Engineering Report are implemented, the potential for seismically induced settlement and differential settlement at the Site is considered to be low.

CLOSURE

This report is issued with the understanding that it is the responsibility of the owner or his/her representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project, and incorporated into the project plans and specifications. The owner or his/her representative is responsible to ensure that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

As of the present date, the findings of this letter are valid for the property studied. With the passage of time, changes in the conditions of a property can occur whether they are due to natural processes or to the works of man on this or adjacent properties. Therefore, this letter should not be relied upon after a period of 3 years without our review nor should it be used or is it applicable for any properties other than those studied. However, many events such as floods, earthquakes, grading of the adjacent properties and building and municipal code changes could render sections of this report invalid in less than 3 years.

If you have any questions or require additional assistance, please feel free to contact the undersigned at (805) 614-6333.

Sincerely,
GeoSolutions, Inc.

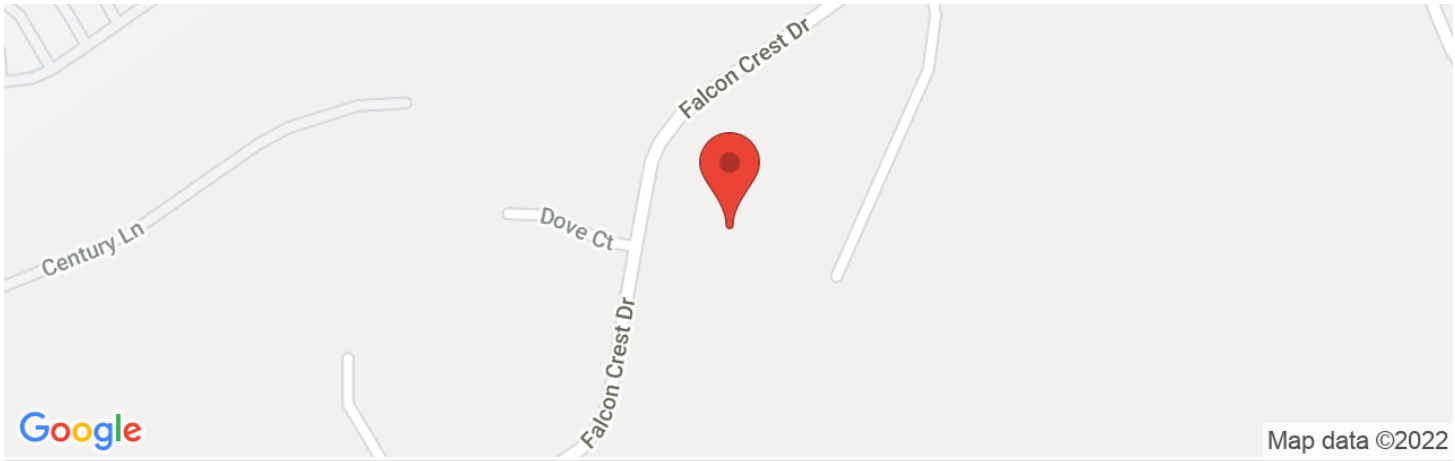
Patrick B. McNeill, PE
Principal

Attachment: Design Map Summary (SEAOC, 2019)

References: Soils Engineering Report Update, 256 Candice Court, APN: 075-391-044, Arroyo Grande Area, San Luis Obispo County, California, by GeoSolutions, Inc., Project SL06089-2, dated March 3, 2017.

256 Candice Ct, Arroyo Grande, CA 93420, USA

Latitude, Longitude: 35.104769, -120.568054



Date	1/26/2022, 11:34:25 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.063	MCE_R ground motion. (for 0.2 second period)
S_1	0.388	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.143	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.762	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.075	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.467	MCE_G peak ground acceleration
F_{PGA}	1.133	Site amplification factor at PGA
PGA_M	0.529	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.063	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.175	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.693	Factored deterministic acceleration value. (0.2 second)
S1RT	0.388	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.428	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.894	Factored deterministic acceleration value. (1.0 second)
PGAd	1.092	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.905	Mapped value of the risk coefficient at short periods
C_{R1}	0.907	Mapped value of the risk coefficient at a period of 1 s

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