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May 18, 2023

Project No. 644-23006
23-04-037

Ms. Caroline Legrand, President
The Ridge Wellness, Inc.
6487 Cavalleri Road, Apt. #429
Malibu, California 90265

Project: The Ridge Wellness Center
APN 568-070-021
56475 Apple Canyon Road
Lake Hemet Area
Riverside County, California
County Geologic Report No. 210001

Subject: Geotechnical Review & Supplemental Analyses

Ref: *Revised Planning Level Geotechnical Assessment: The Ridge, Approximately 36-acre Parcel, Assessor Parcel Number 568-070-021, Lake Hemet Area, Riverside County, California* prepared by Petra Geosciences dated October 15, 2022; Job No. 20-227, Revision 1

*Report of Active Faulting, The Ridge Wellness Center, Approximately 36-acre Parcel, Assessor Parcel Number 568-070-021, Lake Hemet Area*, Riverside County, California; report by Petra Geosciences, Inc., J.N. 20-227, dated October 12, 2020

*Response to Comment by Riverside County Geologist, County Geologic Report 210001, Report of Active Faulting, The Ridge Wellness Center, Approximately 36-acre Parcel, Assessor Parcel Number 568-070-021, Lake Hemet Area*, Riverside County, California by Petra Geosciences, Inc. dated October 12, 2020, J.N. 20-227.

In accordance with your request, we have reviewed the above referenced Geotechnical Investigation report prepared by Petra Geosciences (Petra) with specific focus on the liquefaction/lateral spread potential and the related recommendations provided for use in the preliminary design and construction of the Ridge Wellness Center located at 56475 Apple Canyon Road in the Lake Hemet area of Riverside County, California. The review was requested to further evaluate the potential impacts of liquefaction and lateral spreading as they relate to facility design and construction. It is our understanding that the proposed wellness center structures will be of relatively lightweight wood-frame or steel-frame construction and will be supported by conventional shallow spread footings and concrete slabs on grade or possibly by post-tensioned foundation/slab systems.

The referenced report includes a detailed evaluation of liquefaction potential along with recommendations to mitigate liquefaction related differential settlement and lateral spread. As part of our review, we have performed engineering calculations using the subsurface data and laboratory test data included in the Petra report to perform an independent evaluation of the potential for liquefaction related differential settlements and lateral spread impacting the proposed development.

The Petra report included substantial subsurface data that in our opinion accurately characterizes the soil and groundwater conditions at the site. The Petra field exploration program included numerous exploratory bores and CPT soundings that are useful in the assessment of liquefaction and lateral spread potential.

The Petra report includes liquefaction related seismic settlement estimates that appear conservative but may also be reasonable and manageable from a foundation design and construction perspective. Our independent seismic settlement analyses performed using Petra's field blow count data suggests that the actual potential liquefaction related differential settlements are closer to one-half of the Petra estimates. Our supplemental seismic settlement analyses are based entirely on the exploratory bores and specifically the corrected standard penetration sampler (SPT) blow counts in general accordance with Special Publication 117.

Our seismic settlement estimates are based upon corrected SPT field blow counts included within the Petra report. The field blow counts obtained from the bore logs included within the Petra report are summarized within Table 1 of this memo. The correction values intended to normalize the SPT sampling methods with respect to sample depth and sampling methods are summarized within Table 2 of this memo. The normalized field blow counts that have been corrected with consideration to sampling methods and sample depths are included within Table 3. Our seismic settlement estimates based on the corrected field blow counts and both the commonly accepted NCEER/NSF method as well as the shear strain method are summarized within Table 4. Based upon our interpretation of the SPT data included within the Petra report, we expect potential seismic settlement to be significantly lower than predicted by Petra. In our opinion, the total liquefaction related seismic settlement should be less than 2 inches. We expect that the differential seismic settlement at the site should be approximately 1 inch acting over a horizontal distance of approximately 50 feet.

The primary explanation for the reduced seismic settlement estimates determined using corrected blow-counts is that it appears that Petra based their seismic settlement estimates primarily on cone penetration test (CPT) data and possibly uncorrected field blow counts. In addition, in our analysis, we disregarded the potential seismic settlements within the loose sandy soil above the groundwater level based on our assumption that the surface soil will be re-compacted during remedial grading operations. Based upon our independent analysis, it is our opinion that the potential differential seismic settlements may be adequately mitigated with remedial grading and appropriate structural design.

The more significant issue and the primary reason we were requested to review and analyze the Petra report, is the potential for lateral spreading if liquefaction was to occur at the site. The Petra report presents detailed analyses of lateral spread potential performed using a proprietary software program based upon commonly accepted lateral spread evaluation methods. Unfortunately, the analyses appear to ignore some of the primary screening factors utilized in determining lateral spread potential. The most widely accepted method of evaluating lateral spread potential developed and published by Youd (2004) includes a flow chart that indicates that the potential for significant lateral spread is negligible in sandy soil with corrected blow counts of greater than 15.

Based upon the corrected field blow counts summarized with Table 3, it is evident that all of the field blow counts below the current and historic groundwater levels exceed 15. In our opinion, this commonly accepted threshold remains applicable to this specific project site and should not be ignored. A copy of the flow chart included within the Youd (2004) method is attached.

In addition, another basic screening factor in evaluating lateral spread potential is the relatively level nature of the site and the lack of any significant "open face" slopes within the project vicinity that would allow for significant lateral spreading to occur. The gently sloping nature of the site topography is not substantial enough to allow for lateral movement as there is no reasonable outlet for the soil to migrate. Nearly all documented cases of lateral spreading have occurred in coastal areas or near significant open slopes such as rivers or exposed drainage courses.

**Based upon our project review and independent analyses, it is our opinion that the potential for lateral spreading to occur at the site is "negligible". In our opinion, mitigation measures to address lateral spreading are not necessary. The ground improvement program recommended by Petra should not be necessary. In our opinion, the potential seismic settlements may be adequately mitigated with remedial grading and appropriate foundation design.**

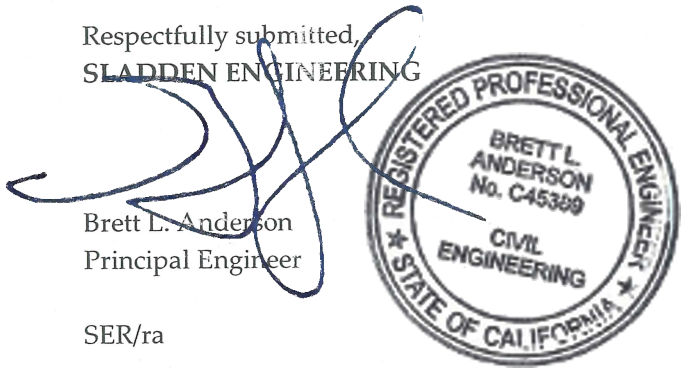
The project site is located within a State of California delineated fault zone. An active faulting investigation was conducted for the project site and the results of that investigation are presented in the referenced Petra Geosciences reports. The investigation was conducted through geophysical methods (seismic reflection) and restricted use zones for habitable structures were established. In accordance with current guidelines, habitable structures may not be constructed within the established restricted use zone.

In our opinion, the proposed buildings may be supported upon conventional shallow spread footings provided that the potential differential seismic settlement of approximately 1 inch over a lateral distance of approximately 50 feet is considered in design. The use of a unitized foundation system including grade-beams/slab stiffening elements or a post tensioned slab system should be expected to adequately mitigate potential seismic settlements. The allowable bearing pressures and lateral values included within the Petra report remain appropriate for use in design.

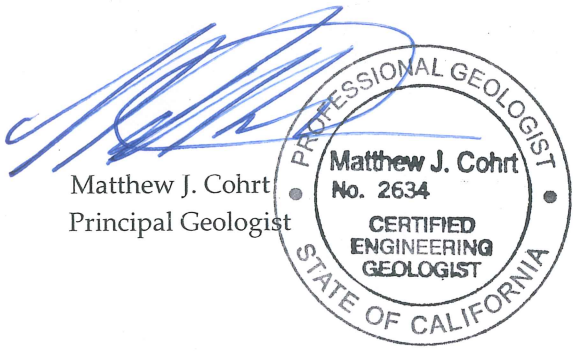
In our opinion, remedial grading will be the most effective seismic settlement mitigation method. To provide firm and uniform foundation bearing conditions and to mitigate potential liquefaction related seismic settlements, the primary foundation bearing soil should be over-excavated and recompacted. Over-excavation should extend to a minimum depth of 5 feet below existing grade or 5 feet below the bottom of the proposed building footing elevations, whichever is deeper. Once adequate removals have been verified, the exposed native soil should be moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction. We recommend that geo-grid reinforcement be placed within the excavation bottom to provide additional seismic settlement mitigation. The previously removed material may then be placed in thin lifts at near optimum moisture content and compacted to at least 90 percent relative compaction compacted engineered fill. Removals should extend at least 10 feet laterally beyond the building limits.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this letter or the referenced report, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING




Brett L. Anderson
Principal Engineer




Matthew J. Cohrt
Principal Geologist

SER/ra

Copies: pdf/ Addressee

| Boring | B-1 | B-2 | B-3 | B-4 | B-5 | B-6 | B-7 | MW-1 |
|---|---|---|---|---|---|---|---|---|
| Depth-ft. | | | SPT'S | | | | | |
| 2 | | 28 | | 14 | | | | |
| 3 | | | 26 | | 14 | 16 | 22 | |
| 5 | 18 | 29 | | 28 | 16 | 20 | 28 | 16 |
| 6 | | | 19 | | | | | |
| 7 | 30 | | | 25 | | | | |
| 8 | | 29 | 28 | | 42 | 26 | 32 | |
| 10 | 33 | 26 | | 30 | 68 | 28 | 45 | 32 |
| | | | 19 | | | | | |
| 15 | 25 | 24 | 22 | 61 | 35 | 39 | | 11 |
| 20 | 18 | 62 | 31 | 40 | 38 | 24 | | 21 |
| 25 | 50 | | 39 | | | 39 | | 20 |
| 30 | 20 | | 40 | | | | | 32 |
| 35 | 42 | | 22 | | | | | 50 |

# Tabulation of Field Blowcounts

Table 1

| Gamma' assumed pcf | Cn | Ce 80/60 | Cb 7.5" | Cr | 3" to Terz. | Cs | Product |
|---|---|---|---|---|---|---|---|
| | | Corrections To SPT Values | | | | | |
| 110 | 1.68 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.92 |
| 110 | 1.62 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.88 |
| 110 | 1.5 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.82 |
| 110 | 1.45 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.79 |
| 47.6 | 1.62 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.88 |
| 47.6 | 1.59 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.87 |
| 47.6 | 1.54 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.84 |
| 47.6 | 1.83 | 0.95 | 1.15 | | 0.667 | 1 | 0 |
| 47.6 | 1.42 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.88 |
| 47.6 | 1.33 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.92 |
| 47.6 | 1.24 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.86 |
| 47.6 | 1.16 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.81 |
| 47.6 | 1.1 | 0.95 | 1.15 | 0.75 | 0.667 | 1 | 0.8 |

# SPT Correction Values

Table 2

| Boring Depth -ft. | B-1 | B-2 | B-3 | B-4 | B-5 | B-6 | B-7 | MW-1 |
|---|---|---|---|---|---|---|---|---|
| | | | $N_{1,60}$ Values | | | | | |
| 2 | | 26 | | 13 | | 13 | 15 | 15 |
| 3 | | | 23 | | 12 | 14 | | |
| 5 | 15 | 24 | | 23 | 13 | | | |
| 6 | | | 15 | | | | 33 | 33 |
| 7 | 27 | | | 22 | | 37 | 60 | 60 |
| 8 | | 25 | 24 | | 36 | 59 | | |
| 10 | 28 | 22 | | 25 | 57 | | 29 | 29 |
| 15 | 22 | 21 | 19 | 54 | 31 | 34 | | |
| 20 | 17 | 57 | 28 | 37 | 35 | | | |
| 25 | 43 | | 33 | | | | | |
| 30 | 16 | | 32 | | | | | |
| 35 | 34 | | 18 | | | | | |
| | 37 | N/I | 40 | N/I | N/I | 31 | N/I | 36 |
| | | | Recorded Depths to Bedrock, feet | | | | | |

# Corrected Blowcounts

Table 3

| FIELD CONDITIONS | | | | SETTLEMENT ESTIMATES BY VARIOUS METHODS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | NCEER/NSF METHOD | | SHEAR STRAIN METHOD | | |
| Bore No. | Depth | Depth to Water* | Depth to Bedrock* | Petra [1] | Engr [2] | Eng-Judgm't | Low mod'us | !st Layer |
| | feet | feet | feet | inches | inches | inches | inches | inches |
| BH-1 | 40' 5" | 12.5 | 40' 5" | 0.11 | 0.15 | 0.37 | 1.37 | 0.62 |
| BH-3 | 50' | 8' 8" | 40' | 0.21 | 0.3 | 0.35 | 1.06 | 0.64 |
| BH-4 | 21.5' | 10' 4" | _ _ _ | 0 | 0 | 0 | 0.34 | 0.58 |
| BH-5 | 21.5' | 10' 9" | _ _ _ | 0.1 | 0.13 | 0.21 | 0.66 | 1.04 |

* Petra's notation

[1] Petra's interpretation of field penetraction numbers

[2] Engr's interpretation of field penetration numbers

Table 4

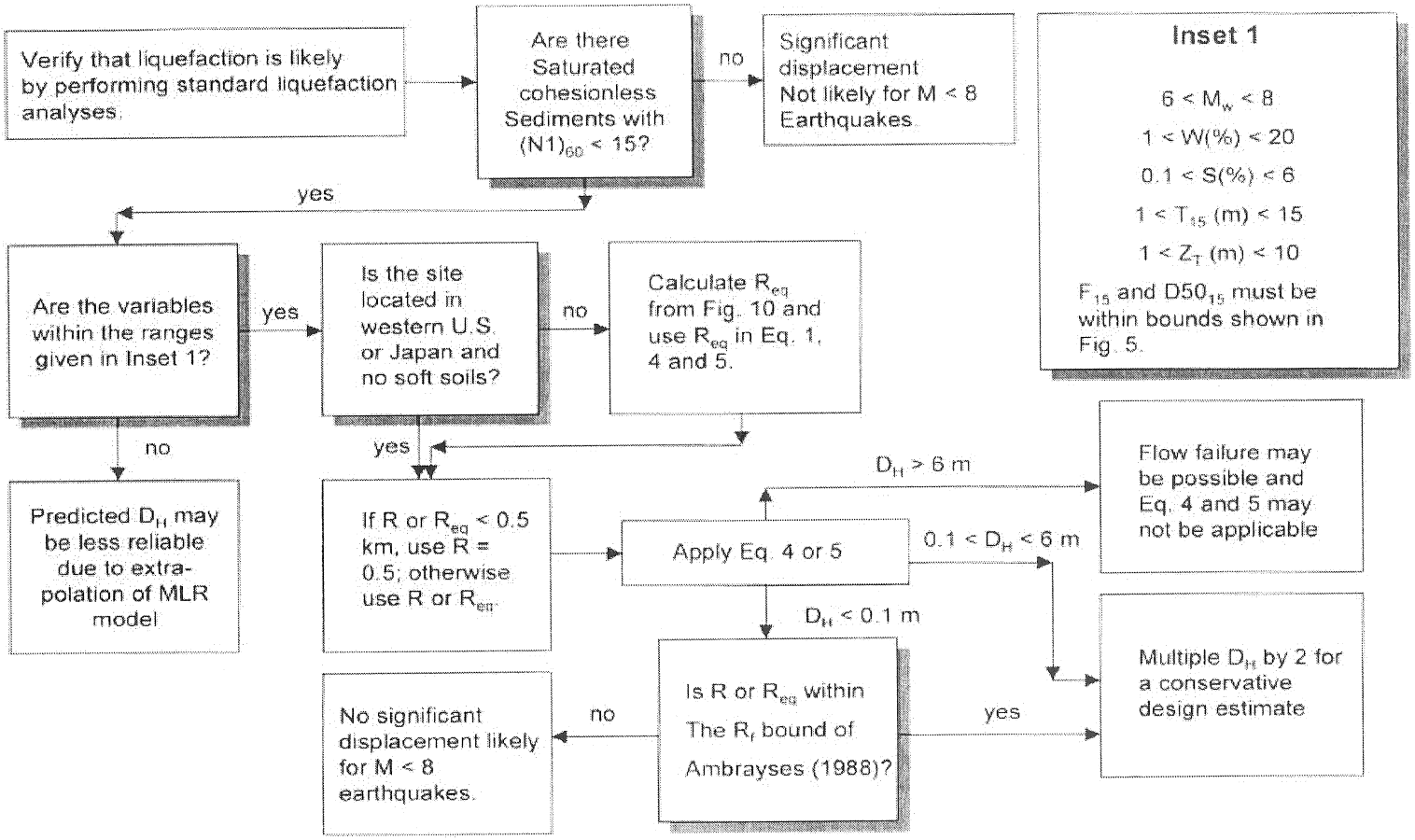



**Fig. 9.** Flow chart [for application of Eq. (6)]

Youd, T.L., Hansen, C.M., Bartlett, S.F., 2002, Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement, Journal of Geotechnical and Geoenvironmental Engineering, December 2002, Vol. 128, No. 12.