



**GeoTek, Inc.**  
1548 North Maple Street, Corona, California 92878  
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

July 23, 2021  
Project No. 1889-CR

**Pacific Communities Builder, Inc.**

1000 Dove Street, Suite 300  
Newport Beach, California 92660

Attention: Mr. Tony Arnest

Subject: Updated Seismic Design Parameters & Seismic Settlement Evaluation  
Tentative Tract No. 37907  
Pacific Legacy Encore  
Northwest Corner of West Metz Road and North A Street  
Perris, Riverside County, California

References: See Page 4

Dear Mr. Arnest,

As requested, GeoTek, Inc. (GeoTek) has prepared this letter to present updated seismic design parameters for the subject site. We have also completed an updated seismic settlement analysis based on the 2019 CBC. The prior GeoTek report (GeoTek, 2018) presented seismic design parameters based on the 2016 California Building Code (CBC). The seismic design parameters and seismic settlement analysis presented in this letter are based on the 2019 CBC. We also understand that the site is now identified as Tentative Tract No. 37907.

Updated Seismic Design Parameters

The site is located at approximately latitude: 33.7952°N and longitude: -117.2360°W. Site spectral accelerations ( $S_a$  and  $S_1$ ), for 0.2 and 1.0 second periods for a Class “D” site, was determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for  $S_{M1}$  and  $S_{D1}$  reported as “null-See Section 11.4.8” (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value  $S_1$  exceeds 0.2. The value  $S_1$  for the subject site exceeds 0.2.

For a site Class D, an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where  $S_1$  exceeds 0.2 provided the value of the seismic response coefficient,  $C_s$ , is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of  $T \leq 1.5T_L$  and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for  $T_L \geq T > 1.5T_L$  or Eq. 12.8-4 for  $T > T_L$ .

The results, based on the 2015 NEHRP and the 2019 CBC, are presented in the following table and we have assumed that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

<b>SITE SEISMIC PARAMETERS</b>	
Mapped 0.2 sec Period Spectral Acceleration, $S_s$	1.46g
Mapped 1.0 sec Period Spectral Acceleration, $S_1$	0.54g
Site Coefficient for Site Class "D", $F_a$	1.0
Site Coefficient for Site Class "D", $F_v$	1.76
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$	1.46g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$	0.951g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{DS}$	0.973g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$	0.634g
Peak Ground Acceleration ( $PGA_M$ )	0.55g
Seismic Design Category	D

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

#### Updated Seismic Settlement Analysis

An updated seismic settlement analysis was also performed since the ground acceleration ( $PGA_M$ ) per the 2019 CBC is higher than the ground acceleration used in the prior GeoTek report (GeoTek, 2018) which was based on the 2016 CBC. For this updated analysis, we utilized the same soil profile as the prior analysis (Boring B-1) and the same assumed high groundwater depth of 80 feet. Due to the depth to groundwater, the site soils are not susceptible to liquefaction.

A new ground acceleration value of 0.55g and a mean earthquake event ( $M_w$ ) of 6.88 were used. The ground acceleration and earthquake magnitude values were obtained from the USGS websites. The computer software program LiquefyPro was utilized along with the site-specific



input values mentioned above. Based on the results of this analysis, we estimate that the site soils may be subject to a total seismic settlement of about ¼ inch in response to the design level earthquake event. Differential seismic settlement is anticipated to be about ½ of the total seismic settlement over a span of 40 feet.

The estimated seismic settlement magnitudes are considered to be within tolerable limits and is not a design constraint for this project. The computer output file from the liquefaction analysis is attached. All other recommendations provided within the referenced report (GeoTek, 2018) remain applicable to the site and are considered updated to the 2019 CBC.

We appreciate the opportunity to be of service on this project. Please contact the undersigned if you have any questions.

Respectfully submitted,  
**GeoTek, Inc.**



Edward H. LaMont  
CEG 1892, Exp. 07/31/22  
Principal Geologist



Robert R. Russell, PE, GE  
GE 2042, Ex. 12/31/22  
Sr. Project Engineer



Attachment: Seismic Settlement Analysis

Distribution: (I) Addressee via email

G:\Projects\1851 to 1900\1889CR Pacific Communities Builder Tract No. 31225 Perris\1889-CR Updated Seismic Design Parameters.doc

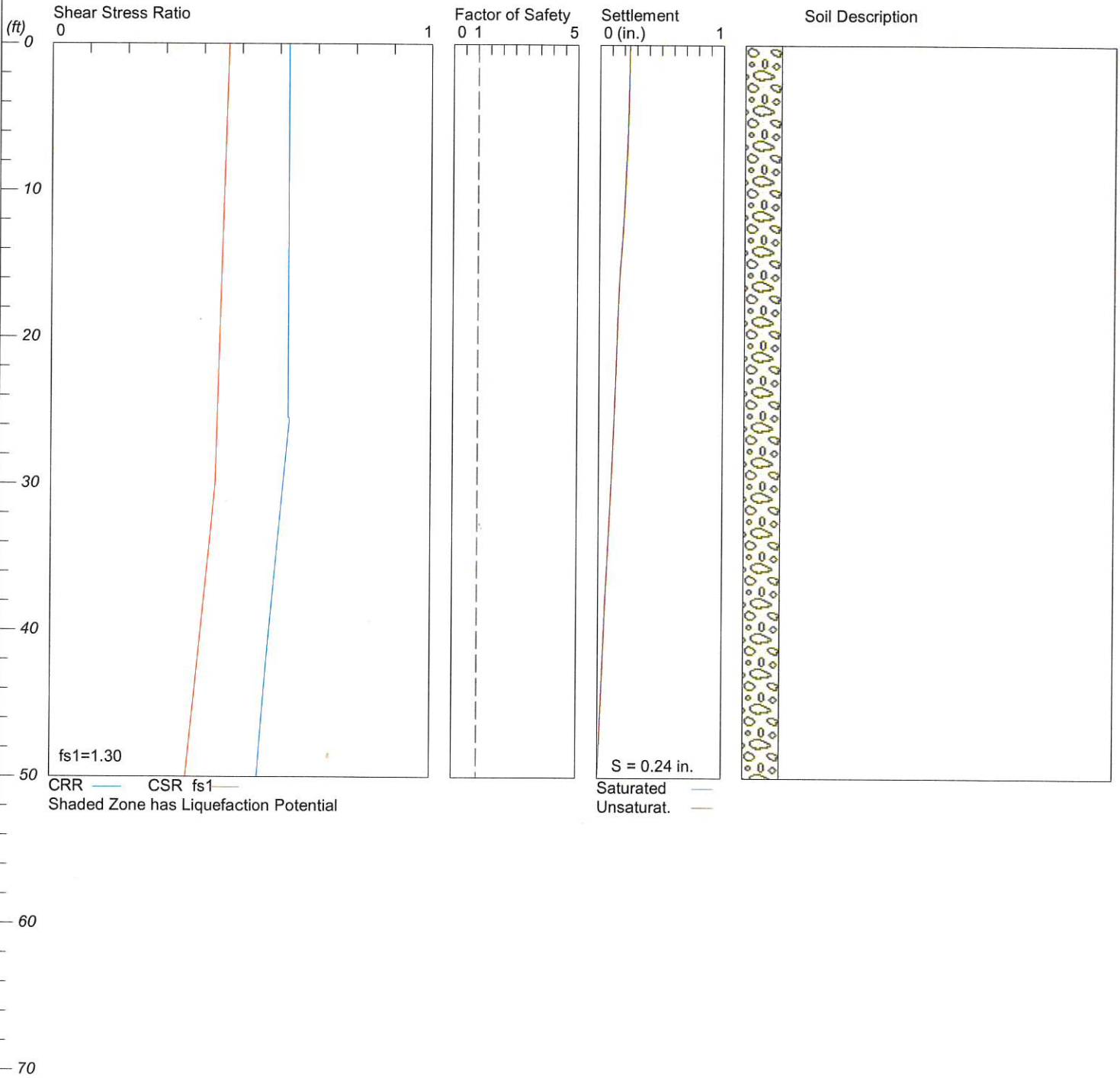
## **REFERENCE**

GeoTek, Inc., 2018, "Geotechnical and Infiltration Evaluation, Proposed Tentative Tract No. 31225, Pacific Legacy Encore, Northwest Corner of West Metz Road and North A Street, Perris, Riverside County, California", dated July 26

# LIQUEFACTION ANALYSIS

Hole No.=B-1 Water Depth=80 ft

Magnitude=6.88  
Acceleration=0.55g



LiquefyPro CivilTech Software USA www.civiltech.com



\*\*\*\*\*  
\*\*\*\*\*

LIQUEFACTION ANALYSIS SUMMARY

Copyright by CivilTech Software  
www.civiltech.com

\*\*\*\*\*  
\*\*\*\*\*

Font: Courier New, Regular, Size 8 is recommended for this report.  
Licensed to , 7/23/2021 11:13:36 AM

Input File Name: UNTITLED  
Title:  
Subtitle:

Surface Elev.=  
Hole No.=B-1  
Depth of Hole= 50.00 ft  
Water Table during Earthquake= 80.00 ft  
Water Table during In-Situ Testing= 80.00 ft  
Max. Acceleration= 0.55 g  
Earthquake Magnitude= 6.88

Input Data:

Surface Elev.=  
Hole No.=B-1  
Depth of Hole=50.00 ft  
Water Table during Earthquake= 80.00 ft  
Water Table during In-Situ Testing= 80.00 ft  
Max. Acceleration=0.55 g  
Earthquake Magnitude=6.88  
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
  2. Settlement Analysis Method: Ishihara / Yoshimine
  3. Fines Correction for Liquefaction: Stark/Olson et al.\*
  4. Fine Correction for Settlement: Post Liquefaction
  5. Settlement Calculation in: All zones\*
  6. Hammer Energy Ratio, Ce = 1.25
  7. Borehole Diameter, Cb= 1.15
  8. Sampling Method, Cs= 1.2
  9. User request factor of safety (apply to CSR) , User= 1.3  
Plot one CSR curve (fs1=User)
  10. Use Curve Smoothing: Yes\*
- \* Recommended Options

In-Situ Test Data:  
Depth SPT gamma Fines

ft		pcf	%
0.00	20.00	130.00	46.20
5.00	18.00	135.00	46.20
10.00	24.00	130.00	21.40
15.00	25.00	130.00	21.10
20.00	100.00	120.00	10.00
25.00	100.00	120.00	10.00
30.00	300.00	130.00	10.00
35.00	300.00	130.00	10.00
40.00	300.00	130.00	10.00
45.00	300.00	130.00	10.00
50.00	300.00	130.00	10.00

Output Results:

Settlement of Saturated Sands=0.00 in.

Settlement of Unsaturated Sands=0.24 in.

Total Settlement of Saturated and Unsaturated Sands=0.24 in.

Differential Settlement=0.119 to 0.157 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.62	0.46	5.00	0.00	0.24	0.24
1.00	0.62	0.46	5.00	0.00	0.24	0.24
2.00	0.62	0.46	5.00	0.00	0.24	0.24
3.00	0.62	0.46	5.00	0.00	0.23	0.23
4.00	0.62	0.46	5.00	0.00	0.23	0.23
5.00	0.62	0.46	5.00	0.00	0.23	0.23
6.00	0.62	0.46	5.00	0.00	0.23	0.23
7.00	0.62	0.46	5.00	0.00	0.22	0.22
8.00	0.62	0.46	5.00	0.00	0.22	0.22
9.00	0.62	0.45	5.00	0.00	0.21	0.21
10.00	0.62	0.45	5.00	0.00	0.21	0.21
11.00	0.62	0.45	5.00	0.00	0.20	0.20
12.00	0.62	0.45	5.00	0.00	0.20	0.20
13.00	0.62	0.45	5.00	0.00	0.19	0.19
14.00	0.62	0.45	5.00	0.00	0.18	0.18
15.00	0.62	0.45	5.00	0.00	0.17	0.17
16.00	0.62	0.45	5.00	0.00	0.16	0.16
17.00	0.62	0.45	5.00	0.00	0.16	0.16
18.00	0.62	0.45	5.00	0.00	0.15	0.15
19.00	0.62	0.44	5.00	0.00	0.15	0.15
20.00	0.62	0.44	5.00	0.00	0.15	0.15
21.00	0.62	0.44	5.00	0.00	0.14	0.14
22.00	0.62	0.44	5.00	0.00	0.14	0.14
23.00	0.62	0.44	5.00	0.00	0.13	0.13
24.00	0.62	0.44	5.00	0.00	0.13	0.13
25.00	0.62	0.44	5.00	0.00	0.13	0.13

26.00	0.63	0.44	5.00	0.00	0.12	0.12
27.00	0.62	0.44	5.00	0.00	0.12	0.12
28.00	0.62	0.43	5.00	0.00	0.11	0.11
29.00	0.61	0.43	5.00	0.00	0.11	0.11
30.00	0.61	0.43	5.00	0.00	0.10	0.10
31.00	0.61	0.43	5.00	0.00	0.10	0.10
32.00	0.60	0.42	5.00	0.00	0.09	0.09
33.00	0.60	0.42	5.00	0.00	0.08	0.08
34.00	0.60	0.42	5.00	0.00	0.08	0.08
35.00	0.59	0.41	5.00	0.00	0.07	0.07
36.00	0.59	0.41	5.00	0.00	0.07	0.07
37.00	0.59	0.41	5.00	0.00	0.06	0.06
38.00	0.58	0.40	5.00	0.00	0.05	0.05
39.00	0.58	0.40	5.00	0.00	0.05	0.05
40.00	0.58	0.39	5.00	0.00	0.05	0.05
41.00	0.57	0.39	5.00	0.00	0.04	0.04
42.00	0.57	0.39	5.00	0.00	0.04	0.04
43.00	0.57	0.38	5.00	0.00	0.03	0.03
44.00	0.56	0.38	5.00	0.00	0.03	0.03
45.00	0.56	0.38	5.00	0.00	0.02	0.02
46.00	0.56	0.37	5.00	0.00	0.02	0.02
47.00	0.55	0.37	5.00	0.00	0.01	0.01
48.00	0.55	0.36	5.00	0.00	0.01	0.01
49.00	0.55	0.36	5.00	0.00	0.00	0.00
50.00	0.55	0.36	5.00	0.00	0.00	0.00

---

\* F.S.<1, Liquefaction Potential Zone  
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

1 atm (atmosphere) = 1 tsf (ton/ft<sup>2</sup>)  
CRRm                   Cyclic resistance ratio from soils  
CSRsf                   Cyclic stress ratio induced by a given earthquake (with user  
request factor of safety)  
F.S.                    Factor of Safety against liquefaction, F.S.=CRRm/CSRsf  
S\_sat                   Settlement from saturated sands  
S\_dry                   Settlement from Unsaturated Sands  
S\_all                   Total Settlement from Saturated and Unsaturated Sands  
NoLiq                   No-Liquefy Soils