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Structural Calculations

[redacted] ADU

[redacted]

Project No.: [redacted]

April 19th, 2023

[redacted]

[redacted]

[redacted]

January 11, 2023
Project: [redacted] ***ADU***
Location: [redacted]
PLEASANTON, CA [redacted]
Client: N/A

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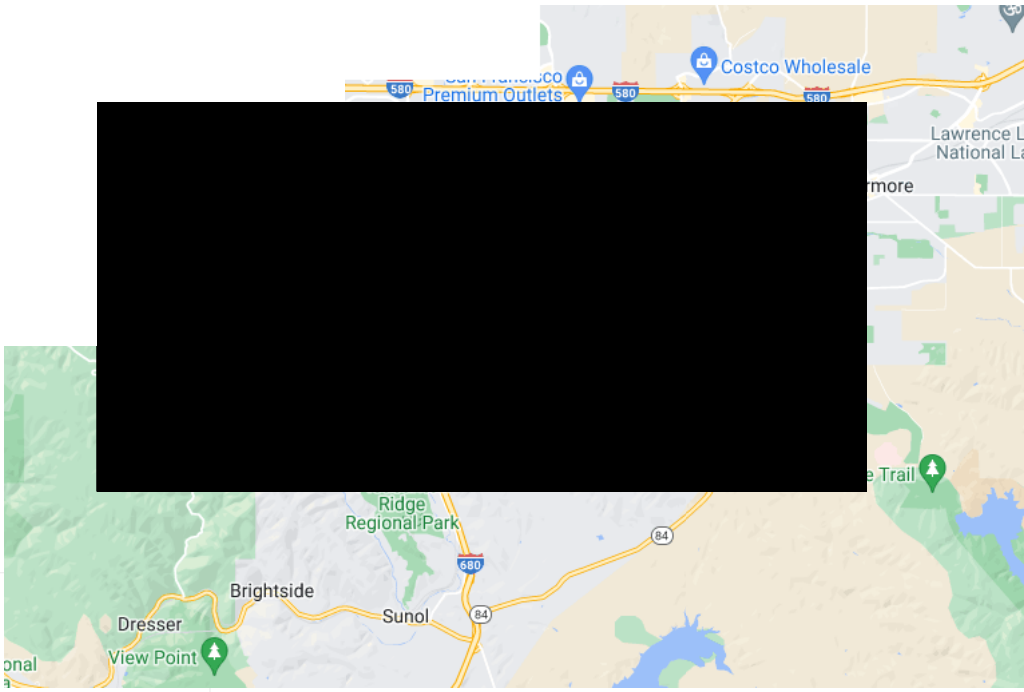
[redacted]

Hazards by Location

Search Information

Address:	[redacted]
Coordinates:	37.66058010069452, -121.87250319998883
Elevation:	362 ft
Timestamp:	2023-01-05T18:14:12.061Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default



Basic Parameters

Name	Value	Description
S_S	1.871	MCE_R ground motion (period=0.2s)
S_1	0.688	MCE_R ground motion (period=1.0s)
S_{MS}	2.245	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.497	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.932	Coefficient of risk (0.2s)
CR_1	0.918	Coefficient of risk (1.0s)
PGA	0.779	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.935	Site modified peak ground acceleration
T_L	8	Long-period transition period (s)
SsRT	2.228	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.39	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.871	Factored deterministic acceleration value (0.2s)
S1RT	0.817	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.89	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.688	Factored deterministic acceleration value (1.0s)
PGAd	0.779	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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BUILDING INFORMATION

A. General:

Number of stories	2
Building risk category	II
Design Code	2019 CBC
Load standard	ASCE 7-16
Design Load Combination	ASD

B. Lateral Loads Data:

WIND STANDARD	ASCE 7-16(Directional Procedure)	
Exposure	C	
Wind Speed V	110	
Enclosure	Enclosed Building	
Velocity pressure q_z	$0.00256K_zK_{zt}K_dK_eV^2$	(26.10-1)
Velocity pressure exposure coefficient K_z	from	(Table 26.10-1)
Directionality Factor K_d	0.85	(Table 26.6-1)
Topographic factor defined K_{zt}	1	(26.8.2)
Gust Effect Factor G	0.85	(26.11)
Pressures for MWFRS p	$qGC_p - q_i(GC_{pi})$	(27.3-1)
External pressure coefficient Cp	from	(Fig. 27.3-1)
Internal pressure coefficient (GC_{pi})	0.18	(Table 26.13-1)}
SEISMIC STANDARD	ASCE 7-16(Equivalent Lateral Force Procedure)	
Seismic Design Category	D	(Table 11.6-1)
Importance factor I_e	1	(Table 1.5-2)
Soil Site Class	D-Default	(Table 20-3-1)
Response Spectral Acc. (0.2 sec) S_s	1.871	
Response Spectral Acc. (1.0 sec) S_1	0.688	
T_L (sec)	8	
Fa	1.2	(Table 11.4-1)
Fv	1.7	(Table 11.4-2)
Max. Considered earthquake acc. S_{MS}	2.2452	(11.4-1)
Max. Considered earthquake acc. S_{M1}	1.1696	(11.4-2)
Design spectral acc. At short period S_{DS}	1.497	(11.4-3)
Design spectral acc. at 1s period S_{D1}	0.78	(11.4-4)
Response modification coefficient R	6.5	(Table 12.2-1)
System overstrength coefficient Ω	2.5	(Table 12.2-1)
Approximate fundamental period parameters	Ct = 0.02 x = 0.75	(Table 12.8-2)
Building Height (ft)	22	
Building period $T=T_a$ (sec)	0.2	(12.8-7)
Base Shear Adjustment Factor	1	
Minimum Cs	0.07	(12.8.5 & 12.8-6)
Maximum Cs	0.59	(12.8-3 & 12.8-4)
Seismic response coefficient Cs	0.23	(12.8-2)
Adjusted Cs	0.23	
For allowable stress design V = 0.7CsW	0.1612W	

[redacted]	Company	: [redacted]	Designed	: [redacted]	
	Project	: [redacted] ADU	Checked	: [redacted]	
	Job No.	: [redacted]	Date	: 01/11/2023	
	Plan	: N/A	Client	: N/A	

DESIGN LOADS

Floor Loads (Load_Floor)

Framing	3.5	psf
Sheathing (3/4" Plywood)	2.5	psf
Ceiling	2.5	psf
Lt. Wt. Conc./Flooring Tile	0	psf
Misc.	6.5	psf
Total Dead Load	**15**	**psf**
Live Load	**40**	**psf**
Total Load	**55**	**psf**

Interior Wall (Wall_In)

Insulation	1	psf
Drywall	5	psf
Studs	1	psf
Misc.	3	psf
Total Dead Load	**10**	**psf**

Roof Loads (Load_Roof)

Framing	2.5	psf
Sheathing (1/2" CDX)	1.5	psf
Ceiling	2.5	psf
Clay Tile	4	psf
Misc.	1	psf
Insulation	1.5	psf
Total Dead Load	**13**	**psf**
Live Load	**20**	**psf**
Snow Load	**10**	**psf**
Total Load	**43**	**psf**

Exterior Wall (Wall_Ex)

7/8" Stucco	10	psf
Insulation	1	psf
Drywall	2.5	psf
Studs	1	psf
Misc.	2.5	psf
Total Dead Load	**17**	**psf**

Ceiling Joist (Load_Ceiling)

Ceiling Joist	6	psf
Total Dead Load	**6**	**psf**
Live Load	**10**	**psf**
Total Load	**16**	**psf**

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Company	:	[redacted]	Designed	:	[redacted]
Project	:	[redacted]	Checked	:	[redacted]
[redacted]	:	[redacted]	Date	:	01/11/2023
Plan	:	N/A	Client	:	N/A

LOAD COMBINATIONS

(Load Standard: ASCE 7-16)

id	Load case	Dead	Sds*Dead	Live	Roof Live	Snow	Wind	Seismic	Direction	Load Duration Factor CD
1	D	1								0.9
2	D + L	1		1						1
3	D + Lr	1			1					1.25
4	D + S	1				1				1.15
5	D + 0.75L + 0.75Lr	1		0.75	0.75					1.25
6	D + 0.75L + 0.75S	1		0.75		0.75				1.15
7	D + 0.6W (N)	1					0.6		N_S	1.6
8	D + 0.6W (S)	1					0.6		S_N	1.6
9	D + 0.6W (E)	1					0.6		E_W	1.6
10	D + 0.6W (W)	1					0.6		W_E	1.6
11	D + 0.75(0.6W) (N) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		N_S	1.6
12	D + 0.75(0.6W) (S) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		S_N	1.6
13	D + 0.75(0.6W) (E) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		E_W	1.6
14	D + 0.75(0.6W) (W) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		W_E	1.6
15	D + 0.75(0.6W) (N) + 0.75L + 0.75S	1		0.75		0.75	0.45		N_S	1.6
16	D + 0.75(0.6W) (S) + 0.75L + 0.75S	1		0.75		0.75	0.45		S_N	1.6
17	D + 0.75(0.6W) (E) + 0.75L + 0.75S	1		0.75		0.75	0.45		E_W	1.6
18	D + 0.75(0.6W) (W) + 0.75L + 0.75S	1		0.75		0.75	0.45		W_E	1.6
19	0.6D + 0.6W (N)	0.6					0.6		N_S	1.6
20	0.6D + 0.6W (S)	0.6					0.6		S_N	1.6
21	0.6D + 0.6W (E)	0.6					0.6		E_W	1.6
22	0.6D + 0.6W (W)	0.6					0.6		W_E	1.6
23	(1.0 + 0.14Sds)D + 0.7ΩE (N)	1	0.14					0.7	N_S	1.6
24	(1.0 + 0.14Sds)D + 0.7ΩE (S)	1	0.14					0.7	S_N	1.6
25	(1.0 + 0.14Sds)D + 0.7ΩE (E)	1	0.14					0.7	E_W	1.6
26	(1.0 + 0.14Sds)D + 0.7ΩE (W)	1	0.14					0.7	W_E	1.6
27	(1.0 + 0.105Sds)D + 0.525ΩE (N) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	N_S	1.6
28	(1.0 + 0.105Sds)D + 0.525ΩE (S) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	S_N	1.6
29	(1.0 + 0.105Sds)D + 0.525ΩE (E) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	E_W	1.6
30	(1.0 + 0.105Sds)D + 0.525ΩE (W) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	W_E	1.6
31	(0.6 - 0.14Sds)D + 0.7ΩE (N)	0.6	-0.14					0.7	N_S	1.6
32	(0.6 - 0.14Sds)D + 0.7ΩE (S)	0.6	-0.14					0.7	S_N	1.6
33	(0.6 - 0.14Sds)D + 0.7ΩE (E)	0.6	-0.14					0.7	E_W	1.6
34	(0.6 - 0.14Sds)D + 0.7ΩE (W)	0.6	-0.14					0.7	W_E	1.6