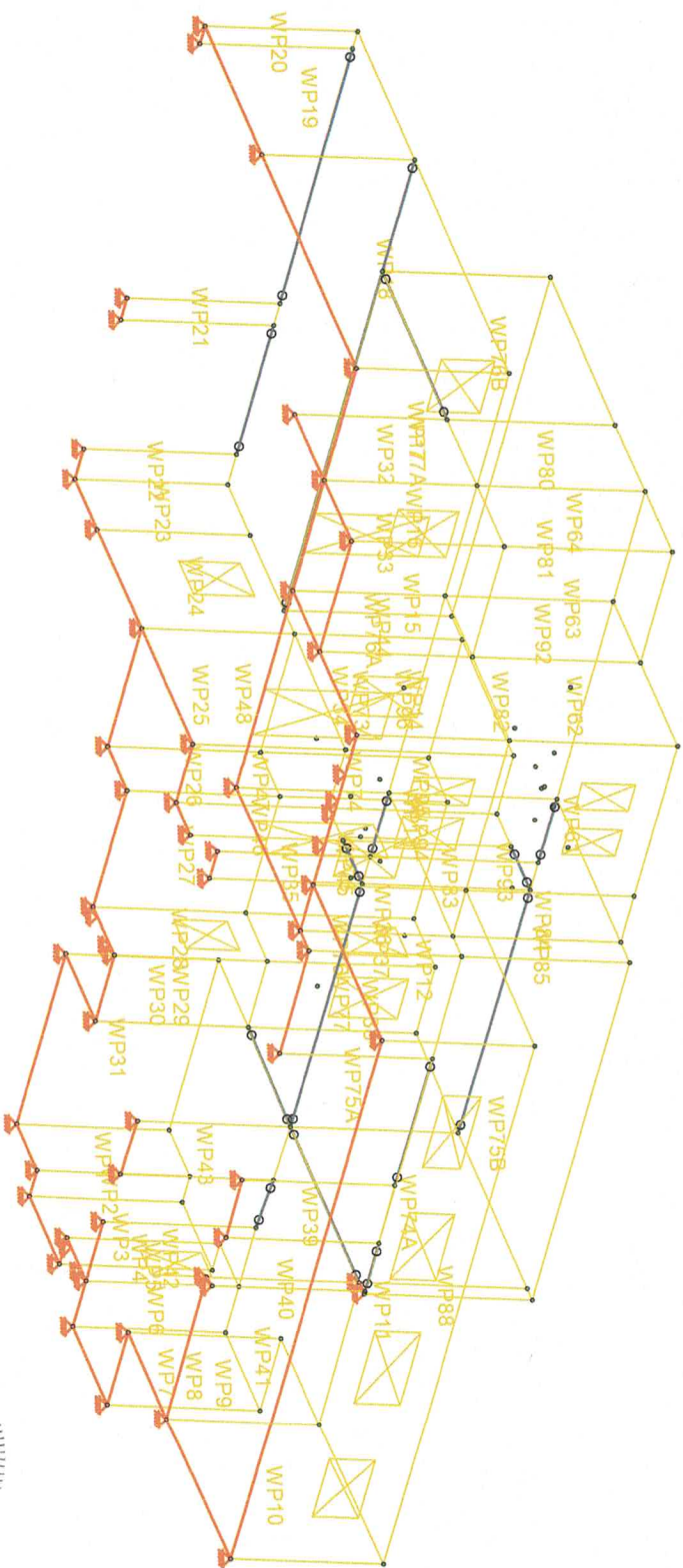




George Knipprath PE, Inc.	Patel Residence	SK-1
George Knipprath, PE		Oct 10, 2021
2110004		2110004-Patel Residence.rfl

Wind Generation Input

ASCE 7-10
115

Wind Code:

Wind Speed, V(mph):

Exposure Category:

B

Base Elevation(ft):

0

Wind Generation Detail Results

Exposure Constant Alpha: 7

Exposure Constant zg:

Gust Effect Factor, G: 0.85

Kzt: 1
h (ft): 21
Kh: 0.633
Windward Cp: 0.8
qh (ksf): 0.018
Gcpn (windward): +1.5
Gcpn (leeward): -1.0

Wind Generation Floor Geometry Results

Floor Level	Height (ft)	Kz	Width (X) (ft)	Length (Z) (ft)	Leeward Cp(X)	Leeward Cp(Z)
Floor Plan 2	21	0.633	41.419	51.24	0.5	0.453
Floor Plan 1	10	0.575	68.521	76	0.5	0.478

Wind Generation Floor Force Results

Floor Level	qz (ksf)	Leeward Pres. (ksf)	Leeward Pres. X (ksf)	Leeward Pres. Z (ksf)	Force X (k)	Force Z (k)
Floor Plan 2	0.018	0.012	0.008	0.007	5.67	4.416
Floor Plan 1	0.017	0.011	0.008	0.007	15.15	13.416



Wall Panel Data

Label	A Node	B Node	C Node	D Node	Material Type	Material Set	Thickness [in]	Design Rule	Panel/Spacing
1	WP1	F1 N1	F1 N2	N81	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
2	WP2	F1 N2	F1 N3	N82	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
3	WP3	F1 N3	F1 N4	N83	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
4	WP4	F1 N4	F1 N5	N84	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
5	WP5	F1 N5	F1 N6	N85	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
6	WP6	F1 N6	F1 N7	N86	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
7	WP7	F1 N7	F1 N8	N87	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
8	WP8	F1 N8	F1 N9	N88	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
9	WP9	F1 N9	F1 N10	N89	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
10	WP10	F1 N10	F1 N11	N90	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
11	WP11	F1 N11	F1 N12	N91	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
12	WP12	F1 N12	F1 N13	N92	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
13	WP13	F1 N13	F1 N14	N93	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
14	WP14	F1 N14	F1 N15	N94	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
15	WP15	F1 N15	F1 N16	N95	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
16	WP16	F1 N16	F1 N17	N96	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
17	WP17	F1 N17	F1 N18	N97	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
18	WP18	F1 N18	F1 N19	N98	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
19	WP19	F1 N19	F1 N20	N99	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
20	WP20	F1 N20	F1 N21	N100	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
21	WP21	F1 N21	F1 N22	N101	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
22	WP22	F1 N22	F1 N23	N102	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
23	WP23	F1 N23	F1 N24	N103	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
24	WP24	F1 N24	F1 N25	N104	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
25	WP25	F1 N25	F1 N26	N105	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
26	WP26	F1 N26	F1 N27	N106	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
27	WP27	F1 N27	F1 N28	N107	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
28	WP28	F1 N28	F1 N29	N108	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
29	WP29	F1 N29	F1 N30	N109	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
30	WP30	F1 N30	F1 N31	N110	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
31	WP31	F1 N31	F1 N32	N111	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
32	WP32	F1 N32	F1 N33	N112	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
33	WP33	F1 N33	F1 N34	N113	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
34	WP34	F1 N34	F1 N35	N114	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
35	WP35	F1 N35	F1 N36	N115	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
36	WP36	F1 N36	F1 N37	N116	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
37	WP37	F1 N37	F1 N38	N117	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
38	WP38	F1 N38	F1 N39	N118	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
39	WP39	F1 N39	F1 N40	N119	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
40	WP40	F1 N40	F1 N41	N120	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
41	WP41	F1 N41	F1 N42	N121	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
42	WP42	F1 N42	F1 N43	N122	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
43	WP43	F1 N43	F1 N44	N123	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
44	WP44	F1 N44	F1 N45	N124	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
45	WP45	F1 N45	F1 N46	N125	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
46	WP46	F1 N46	F1 N47	N126	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
47	WP47	F1 N47	F1 N48	N127	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
48	WP48	F1 N48	F1 N49	N128	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
49	WP49	F1 N49	F1 N50	N129	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
50	WP50	F1 N50	F1 N51	N130	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
51	WP51	F1 N51	F1 N52	N131	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
52	WP52	F1 N52	F1 N53	N132	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
53	WP53	F1 N53	F1 N54	N133	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
54	WP54	F1 N54	F1 N55	N134	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
55	WP55	F1 N55	F1 N56	N135	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
56	WP56	F1 N56	F1 N57	N136	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16
57	WP57	F1 N57	F1 N58	N137	Wood	DF	5.5 (stud)	Typical	S1 7/16 8d@6 16

Wall Panel Data (Continued)

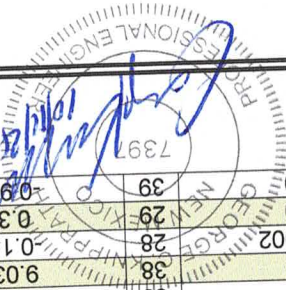
Label	A Node	B Node	C Node	D Node	Material Type	Material Set	Thickness [in]	Design Rule	Panel/Spacing
58	WP80	F2 N17	F2 N35	F1 N35	F1 N17	Wood	DF	5.5 (stud)	S1 7/16 8d@4 16
59	WP81	F2 N17	F2 N36	F1 N36	F1 N17	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
60	WP82	F2 N36	F2 N37	F1 N37	F1 N36	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
61	WP83	F2 N38	F2 N39	F1 N39	F1 N38	Wood	DF	5.5 (stud)	S1 (2) 7/16 8d@3 16
62	WP84	F2 N13	F2 N40	F1 N40	F1 N13	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
63	WP85	F2 N40	F2 N41	F1 N41	F1 N40	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
64	WP88	F2 N45	F2 N46	F1 N46	F1 N13	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
65	WP92	F2 N15	F2 N36	F1 N36	F1 N15	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
66	WP93	F2 N40	F2 N37	F1 N37	F1 N40	Wood	DF	5.5 (stud)	RS 19/32 10d@3 16
67	WP94	F2 N50	F2 N51	F1 N51	F1 N50	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
68	WP95	F2 N51	F2 N52	F1 N52	F1 N51	Wood	DF	5.5 (stud)	GB (2) 1/2 8d@8 16
69	WP96	F2 N52	F2 N27	F1 N27	F1 N52	Wood	DF	5.5 (stud)	S1 7/16 8d@6 16
70	WP74A	F2 N46	F2 N49	F1 N49	F1 N46	Wood	DF	5.5 (stud)	RS (2) 15/32 8d@4 16
71	WP75A	F2 N49	F2 N32	F1 N32	F1 N49	Wood	DF	5.5 (stud)	S1 7/16 8d@6 16
72	WP76A	F2 N27	F2 N34	F1 N34	F1 N27	Wood	DF	5.5 (stud)	S1 (2) 15/32 8d@2 16
73	WP77A	F2 N34	F2 N139	F1 N139	F1 N34	Wood	DF	5.5 (stud)	S1 (2) 15/32 8d@3 16
74	WP78B	F2 N35	F2 N139	F1 N139	F1 N35	Wood	DF	5.5 (stud)	S1 7/16 8d@6 16
75	WP75B	F2 N45	F2 N41	F1 N41	F1 N131	Wood	DF	5.5 (stud)	Typical

Envelope Wall Panel Forces

Wall Label	Elevation [ft]	Axial [k]	x Shear [k]	z Shear [k]	x-x Moment [k-ft]	z-z Moment [k-ft]	LC
1	WP1	max 1.899	5	0.049	5	-0.002	36
2		min 0.335	36	0.008	38	-0.012	3
3	WP2	max 0.688	5	0	38	0.014	5
4		min 0.135	38	-0.001	3	0.002	36
5	WP3	max 3.725	5	0.018	5	0.048	38
6		min 0.592	37	0.002	36	0.008	5
7	WP4	max 0.887	5	0.014	5	0.009	38
8		min 0.161	36	0.003	37	0.001	38
9	WP5	max 1.081	5	0	38	-0.008	39
10		min 0.201	39	-0.003	3	-0.046	5
11	WP6	max 0.873	5	-0.006	36	0.008	5
12		min 0.187	37	-0.03	3	0.001	39
13	WP7	max 4.262	5	-0.001	37	-0.001	39
14		min 0.669	37	-0.005	3	0.005	39
15	WP8	max 1.15	5	-0.011	3	-0.005	3
16		min 0.247	39	-0.011	5	0.011	29
17	WP9	max 3.353	5	0.025	5	0.011	29
18		min 0.568	37	0.004	37	-0.001	39
19	WP10	max 2.441	5	-0.006	39	0.063	5
20		min 0.526	37	-0.039	3	0.007	39
21	WP11	max 21.481	5	0.002	31	0.047	5
22		min 3.109	38	0	37	0.006	36
23	WP12	max 2.991	5	-0.003	36	-0.008	37
24		min 0.625	39	0.169	29	0.033	29
25	WP13	max 4.178	29	0.169	29	0.007	39
26		min 0.524	39	-0.029	39	0.007	39
27	WP14	max 5.977	29	0.333	30	0.005	39
28		min 1.158	39	-0.021	36	-0.011	33
29	WP15	max 2.484	28	0.192	29	0.084	30
30		min 0.529	38	-0.028	39	0.012	36
31	WP16	max 3.23	28	0.475	30	0.028	31
32		min 0.451	38	0.041	36	0.005	37
33	WP17	max 1.98	5	0.103	29	0.12	5
34		min 0.419	39	-0.022	39	0.013	36
35	WP18	max 8.47	5	0.162	5	0.002	39
36		min 0	0		0		0
37		max 5.763	5		5		5

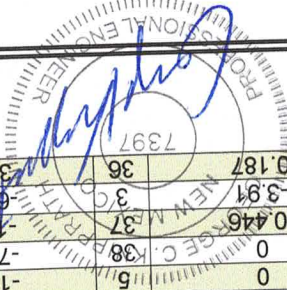
Envelope Wall Panel Forces (Continued)

Wail Label	Elevation [ft]	Axial [k]	LC	x Shear [k]	LC	z Shear [k]	LC	x-x Moment [k-ft]	LC	z-z Moment [k-ft]	LC
36	0	min 1.373	39	0.023	39	-0.016	29	0	3	0.678	37
37	0	max 4.415	5	0.038	5	0.184	5	0	5	6.158	5
38	0	min 0.78	36	0.005	39	0.026	36	0	37	0.942	37
39	0	max 3.699	5	0.283	5	0.093	37	0	3	-0.013	38
40	0	min 0.546	36	0.039	38	0.015	37	0	3	0.255	5
41	0	max 8.333	5	-0.035	36	0.006	5	0	38	0.037	36
42	0	min 1.162	36	-0.238	3	0.001	38	0	3	-0.079	39
43	0	max 3.096	5	-0.022	37	0.077	5	0	38	-0.079	39
44	0	min 0.454	36	-0.185	3	0.01	38	0	3	-0.61	3
45	0	max 1.13	5	0.072	28	0.106	5	0	2	-0.077	38
46	0	min 0.241	36	0.001	38	0.014	39	0	25	-0.561	3
47	0	max 15.011	5	0.272	28	0	37	-0.001	36	40.592	5
48	0	min 2.267	36	0.026	38	-0.011	31	0	3	5.9	36
49	0	max 6.777	30	-0.019	39	0.01	24	0	2	-0.615	38
50	0	min 1.118	36	-0.37	29	-0.018	34	0	28	-7.345	28
51	0	max 2.517	29	0.028	36	0.039	29	0	36	0.293	36
52	0	min 0.486	39	-0.19	30	0.003	39	0	30	-0.434	30
53	0	max 1.941	28	0.037	39	0.016	36	0	34	1.058	39
54	0	min 0.184	38	-0.14	29	-0.028	34	0	24	-2.39	29
55	0	max 1.206	31	0.014	36	-0.011	36	0	30	2.39	29
56	0	min 0.158	37	-0.069	30	-0.121	30	0	36	0.041	39
57	0	max 10.683	30	0.189	31	-0.013	36	0	30	9.919	36
58	0	min 1.533	36	0.016	37	-0.106	30	0	36	-1.801	36
59	0	max 8.951	5	-0.063	38	0.023	5	0	30	-15.145	30
60	0	min 1.23	36	-0.347	3	0	36	0	38	0.26	5
61	0	max 2.194	5	0.028	30	0.072	5	0	38	0.044	38
62	0	min 0.475	36	-0.001	36	0.011	38	0	30	48.008	5
63	0	max 33.697	5	0.137	30	-0.002	39	0	36	8.024	39
64	0	min 5.852	39	-0.001	36	-0.081	29	0	36	-0.021	38
65	0	max 3.22	30	0.003	39	-0.001	36	-0.001	30	-1.453	28
66	0	min 0.725	36	-0.044	29	-0.034	3	0	28	1.048	31
67	0	max 4.652	30	0.012	39	0.028	24	0.001	28	-0.699	37
68	0	min 1.03	36	-0.079	29	-0.017	38	0	38	0.482	5
69	0	max 5.327	31	0.082	5	0.005	36	0	30	0.024	37
70	0	min 1.153	36	0.004	37	-0.054	30	0	36	0.153	39
71	0	max 1.362	31	0.013	39	-0.001	37	0	29	-0.642	29
72	0	min 0.006	37	-0.041	29	-0.016	31	0	27	0.355	29
73	0	max 0.932	31	-0.001	36	-0.003	36	-0.002	28	-0.054	39
74	0	min 0.121	37	-0.031	30	-0.03	3	0	30	6.733	31
75	0	max 8.301	5	0.003	39	-0.011	36	0	30	0.818	37
76	0	min 1.464	39	-0.119	29	-0.142	30	0	36	-0.18	39
77	0	max 5.975	5	-0.004	39	0.001	36	0	30	-3.311	3
78	0	min 1.002	37	-0.088	3	-0.005	30	0	36	0.004	2
79	0	max 0.232	31	0.002	5	0.051	5	0	37	-0.007	27
80	0	min 0.038	37	0	36	0.006	37	0	3	0.001	37
81	0	max 5.649	5	-0.002	39	0.002	27	0	27	-0.174	3
82	0	min 0.878	37	-0.074	29	-0.004	2	0	5	-0.004	2
83	0	max 1.084	5	-0.006	38	0.027	5	0	39	-0.024	31
84	0	min 0.23	38	-0.03	3	0.005	38	0	36	19.115	28
85	0	max 12.429	28	0.549	28	0.001	30	0	30	3.262	38
86	0	min 2.185	38	0.094	38	0	36	0	30	0.151	37
87	0	max 5.707	30	0.1	30	0.004	34	0	29	-0.547	31
88	0	min 1.072	36	-0.007	36	-0.004	24	0	38	9.039	29
89	0	max 22.595	31	0.026	38	-0.014	39	-0.002	28	-0.153	39
90	0	min 4.191	37	-0.047	28	-0.158	29	0	29	0.38	38
91	0	max 8.099	28	0.074	30	-0.011	39	0	39	-0.958	28
92	0	min 1.354	38	-0.009	36	-0.109	29	0	39		



Envelope Wall Panel Forces (Continued)

Wall Label	Elevation [ft]	Axial [k]	LC	x Shear [k]	LC	z Shear [k]	LC	x-x Moment [k-ft]	LC	z-z Moment [k-ft]	LC
93	WP47	0	max	4.836	30	0.03	33	0.116	30	0	36
94		0	min	0.968	36	-0.015	39	0.015	36	-1.768	30
95	WP48	0	max	21.535	29	0.338	30	0.036	31	0	39
96		0	min	4.347	39	0.039	36	-0.009	37	-0.001	29
97	WP61	max	3.055	29	0.164	39	0.052	0.141	36	0.778	36
98		min	0.203	39	-3.868	29	-0.341	-1.722	30	-3.715	30
99	WP62	max	2.48	6	0.029	36	0.717	1.873	29	2.275	30
100		min	0	2	-1.947	30	-0.031	-0.096	39	-1.302	36
101	WP63	max	1.072	6	0.011	39	0.087	0.19	36	0.983	36
102		min	-0.1	2	-1.368	29	-0.709	-2.139	30	-1.302	26
103	WP64	max	1.695	28	0.086	36	0.678	1.987	29	4.429	30
104		min	0.137	38	-1.352	30	-0.005	-0.049	39	-0.112	36
105	WP73	max	4.109	30	0.62	36	-0.041	-0.132	36	-5.387	28
106		min	0.62	36	-0.008	39	0.018	0.045	39	0.481	36
107	WP74	max	1.374	29	0.912	30	0.018	0.045	39	-2.184	30
108		min	0.232	39	-0.018	36	-0.584	-1.427	29	1.161	39
109	WP75	max	0.919	6	1.755	29	0.382	1.769	30	-3.629	29
110		min	-0.605	2	0.029	39	-0.018	-0.155	36	3.55	29
111	WP76	max	0.355	6	0.008	29	-0.035	-0.02	39	0.11	39
112		min	-0.86	2	-0.003	39	-0.885	-1.411	29	15.163	30
113	WP77	max	8.563	30	0.68	30	1.243	2.076	30	1.422	36
114		min	1.162	36	0.073	36	-0.087	-0.182	36	18.631	30
115	WP80	max	18.171	29	2.184	28	0.577	1.448	29	2.965	36
116		min	3.22	39	0.055	38	0.007	-0.051	39	-0.215	39
117	WP81	max	2.306	30	0.397	29	0.897	2.264	30	-2.725	29
118		min	0.503	36	-0.024	39	-0.086	-0.154	36	1.017	27
119	WP82	max	2.644	30	0.805	29	0.872	2.646	30	-0.94	33
120		min	0.561	36	-0.037	39	0.031	-0.046	36	-0.104	39
121	WP83	max	2.227	6	0.281	29	0.05	0.548	30	-1.915	3
122		min	0	2	0.045	39	-0.005	-0.051	36	0.053	39
123	WP84	max	0.332	39	1.206	29	0.437	1.358	30	-2.754	29
124		min	-1.01	33	-0.012	39	-0.066	-0.157	36	0.411	29
125	WP85	max	0.202	6	0.187	29	0.047	0.085	39	-0.081	39
126		min	-0.385	2	-0.007	39	-0.988	-1.72	29	0.102	37
127	WP88	max	1.399	31	-0.005	37	0.019	0.021	29	-0.179	27
128		min	-0.057	37	-0.129	31	-0.119	-0.002	39	0.947	33
129	WP92	max	2.347	6	0.027	36	0.621	1.824	29	-0.144	39
130		min	-0.008	2	-0.436	30	-0.033	-0.094	39	10.331	29
131	WP93	max	9.094	6	0.071	36	0.452	1.712	29	-0.023	36
132		min	-1.364	2	-0.814	30	-0.064	-0.17	39	0.597	5
133	WP94	max	3.06	6	-0.13	36	0.058	0.597	29	0.173	36
134		min	-1.597	2	-1.051	30	-0.045	-0.082	39	0.114	30
135	WP95	max	3.092	30	-0.018	39	0.108	0.228	36	-1.948	30
136		min	0.587	36	-0.336	29	-0.284	-1.129	30	7.961	5
137	WP96	max	8.852	6	0.093	36	0.708	2.085	29	0.137	36
138		min	0.618	2	-0.404	30	0.042	0.017	39	-1.489	38
139	WP74A	max	4.52	6	1.026	36	0.141	0.688	29	-15.188	28
140		min	-4.287	2	-1.083	34	-0.009	-0.023	39	13.439	30
141	WP75A	max	2.605	6	-0.384	36	-0.063	0.027	37	-1.046	36
142		min	-2.12	2	-6.527	30	-0.634	-0.049	31	4.449	5
143	WP76A	max	9.373	5	0.785	5	1.297	1.493	29	0.498	36
144		min	1.391	36	0.085	37	0.107	0.081	39	-10.927	36
145	WP77A	max	-0.711	38	19.346	31	0.171	0	5	-79.706	3
146		min	-9.144	3	2.397	37	-0.026	-0.446	39	-1.113	39
147	WP76B	max	0.508	6	15.893	5	-0.184	-3.81	3	69.942	3
148		min	-8.959	3	2.064	39	-1.753	0.187	24	34.011	29
149	WP75B	max	2.059	6	0.292	39	0.124	0	36		



Envelope Wall Panel Forces (Continued)

150	Wail Label Elevation [ft]	min	10	
2	Axial [k]	LC	-0.973	
29	x Shear [k]	LC	-4.599	
34	z Shear [k]	LC	-0.148	
30	x-x Moment [k-ft]	LC	-1.134	
39	z-z Moment [k-ft]	LC	2.597	

AWC NDS-18: ASD Wall Panel Wood Code Checks (In-Plane)

1	WP1	S1 7/16 8d@6	R1	0.04	0.01	3	Not Req'd	NC	NC	NC
2	WP2	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
3	WP3	S1 7/16 8d@6	R1	0.01	0.003	3	Not Req'd	NC	NC	NC
4	WP4	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
5	WP5	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
6	WP6	S1 7/16 8d@6	R4	0	0	N/A		NC	NC	NC
7	WP6	S1 7/16 8d@6	R1	0.051	0.013	3	Not Req'd	NC	NC	NC
8	WP7	S1 7/16 8d@6	R1	0.021	0.005	3	Not Req'd	NC	NC	NC
9	WP8	S1 7/16 8d@6	R1	0.021	0.005	3	Not Req'd	NC	NC	NC
10	WP9	S1 7/16 8d@6	R1	0.017	0.004	3	Not Req'd	NC	NC	NC
11	WP10	S1 7/16 8d@6	R1	0.013	0.003	3	Not Req'd	NC	NC	NC
12	WP11	S1 7/16 8d@6	N/A	0.005	0.001	3	Not Req'd	NC	NC	NC
13	WP12	S1 7/16 8d@6	R1	0.125	0.032	30	Not Req'd	NC	NC	NC
14	WP13	S1 7/16 8d@6	R1	0.419	0.064	29	Not Req'd	NC	NC	NC
15		S1 7/16 8d@6	R4	0	0	N/A		NC	NC	NC
16		S1 7/16 8d@6	R7	0.355	0.054	29	Not Req'd	NC	NC	NC
17	WP14	S1 7/16 8d@6	R1	0.272	0.058	30	Not Req'd	NC	NC	NC
18	WP15	S1 7/16 8d@6	R1	0.227	0.058	29	Not Req'd	NC	NC	NC
19	WP16	S1 7/16 8d@6	R1	0.404	0.103	30	Not Req'd	NC	NC	NC
20	WP17	S1 7/16 8d@6	R1	0.25	0.064	29	Not Req'd	NC	NC	NC
21	WP18	S1 7/16 8d@6	R1	0.029	0.007	3	Not Req'd	NC	NC	NC
22	WP19	S1 7/16 8d@6	R1	0.048	0.012	3	Not Req'd	NC	NC	NC
23	WP20	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
24	WP21	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
25	WP22	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
26	WP23	S1 7/16 8d@6	R1	0.101	0.026	28	Not Req'd	NC	NC	NC
27	WP24	S1 7/16 8d@6	N/A	0.434	0.066	28	HTT4_10dx1.5_SPF-HF	NC	0.79	2.453
28	WP25	S1 7/16 8d@6	R1	0.252	0.064	29	Not Req'd	NC	NC	NC
29	WP26	S1 7/16 8d@6	R1	0.31	0.072	30	Not Req'd	NC	NC	NC
30	WP27	S1 7/16 8d@6	R1	0.212	0.054	29	Not Req'd	NC	NC	NC
31	WP28	S1 7/16 8d@6	R1	0	0	N/A		NC	NC	NC
32	WP29	S1 7/16 8d@6	R4	0	0	N/A		NC	NC	NC
33	WP29	S1 7/16 8d@6	R1	0.921	0.235	30	Not Req'd	NC	NC	NC
34	WP30	S1 7/16 8d@6	R1	0.806	0.205	30	Not Req'd	NC	NC	NC
35	WP31	S1 7/16 8d@6	R1	0.009	0.002	30	Not Req'd	NC	NC	NC
36	WP32	GB (2)/12 8d@8	R1	0.735	0.135	28	Not Req'd	NC	NC	NC
37	WP33	GB (2)/12 8d@8	N/A	0.728	0.079	29	Not Req'd	NC	NC	NC
38	WP34	GB (2)/12 8d@8	N/A	0.295	0.043	29	Not Req'd	NC	NC	NC
39	WP35	GB (2)/12 8d@8	R1	0	0	N/A		NC	NC	0.092
40	WP36	GB (2)/12 8d@8	R1	0.137	0.018	29	HTT4_10dx1.5_SPF-HF	NC	0.03	37
41	WP37	GB (2)/12 8d@8	R1	0	0	N/A		NC	NC	NC
42	WP38	GB (2)/12 8d@8	R1	0.382	0.07	29	Not Req'd	NC	NC	NC
43	WP39	GB (2)/12 8d@8	R1	0.11	0.02	3	Not Req'd	NC	NC	NC
44	WP40	GB (2)/12 8d@8	R1	0	0	N/A		NC	NC	NC
45	WP41	GB (2)/12 8d@8	R1	0.259	0.048	29	Not Req'd	NC	NC	NC
46	WP42	GB (2)/12 8d@8	R1	0.036	0.007	3	Not Req'd	NC	NC	NC
47	WP43	GB (2)/12 8d@8	R1	0.819	0.129	28	Not Req'd	NC	NC	NC
48	WP44	GB (2)/12 8d@8	R1	0.462	0.085	30	Not Req'd	NC	NC	NC
49	WP45	GB (2)/12 8d@8	N/A	0.283	0.036	30	Not Req'd	NC	NC	NC
50	WP46	GB (2)/12 8d@8	R1	0.403	0.05	28	Not Req'd	NC	NC	NC
51	WP47	GB (2)/12 8d@8	R1	0.418	0.068	29	Not Req'd	NC	NC	NC
52	WP48	GB (2)/12 8d@8	R1	0.246	0.045	30	Not Req'd	NC	NC	NC

Design Parameters

200p
 DEAD LOAD
 15 psc (cc) & 10 psc (cc)
 20 psc (cc)

Floor
 DEAD LOAD
 15 psc (cc) & 5 psc (cc)
 40 psc (cc)

Wind 115 MPH! Exp "B"

FRAMING

GIRDER #1

SPAN = 17'0"
 TRIBUTARY WIDTH
 1ST 10'6" & 20'0"
 2ND 6'0"
 WALL

$$DL = \frac{1}{2} (10.5 + 20.0) (15 + 15) + \frac{1}{2} (6.0) (15 + 15) = 591.2 \text{ pft}$$

$$SL = \frac{1}{2} (6.0) (20) = 60 \text{ pft}$$

$$LL = \frac{1}{2} (10.5 + 20) (40) = 610 \text{ pft}$$

USE 10 3/4 x 19 1/2 DF/DF 10F-V3 (02 EQUAL)

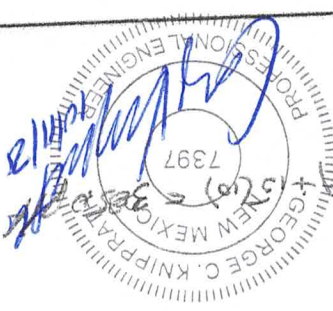
REACTIONS
 DL 5.41 k
 LL 5.19 k
 SL .51 k
 2

SPAN = 17'0"
 TRIBUTARY WIDTH
 1ST 14'0"
 2ND 6'0"
 WALL

$$DL = \frac{1}{2} (14.0) (15 + 15) + \frac{1}{2} (6.0) (15 + 15) = 180 \text{ pft}$$

$$SL = \frac{1}{2} (14.0) (20) = 140 \text{ pft}$$

$$LL = \frac{1}{2} (16.0) (40) = 180 \text{ pft}$$



REACTIONS
 DL 1.93 k
 LL .70 k
 SL .90 k
 2

USE Z-13/4 x 11 7/8 LVL ($f_b = 2800/1.9E$)

SPAN = 10'-0"
 TRIBUTARY WIDTH
 1st 14'-0"
 2nd 13'-0"
 WALL

$$DL = \frac{1}{2}(14.0)(15+10) + \frac{1}{2}(13.0)(15+5) + 15(10) = 455.0 \text{ pft}$$

$$SL = \frac{1}{2}(13.0)(20.0) = 130.0 \text{ pft}$$

$$LL = \frac{1}{2}(14.0)(40.0) = 280.0 \text{ pft}$$

USE Z-13/4 x 11 7/8 LVL ($f_b = 2800/1.9E$)

DL	2.28k	2
SL	1.65k	1
LL	1.40k	2

SPAN = 18'-0"

TRIBUTARY WIDTH
 2nd 13'-0" & 19'-0"

$$DL = \frac{1}{2}(13.0+19.0)(15+10) + \frac{1}{2}(13.0+19.0)(15+5) = 455.3 \text{ pft}$$

$$SL = \frac{1}{2}(13.0+19.0)(20) = 320.0 \text{ pft}$$

$$LL = \frac{1}{2}(13.0+19.0)(40) = 640.0 \text{ pft}$$

USE 6 3/4 x 18 GLV-LAM DF/DF 16F-V3

DL	4.46	1
SL	4.46	2
LL	4.46	2

SPAN = 15'-0"
 TRIBUTARY WIDTH
 1st 25'-0" & 8'-0"
 2nd 8'-0"
 WALL

$$DL = \frac{1}{2}(25+8)(15+10) + \frac{1}{2}(8)(15+5) + 10(15) = 642.5 \text{ pft}$$

$$LL = \frac{1}{2}(25+8)(40) = 660 \text{ pft}$$



USE 603x16 1/2 GALV. DE/DF 16F-V3
 5 L = 1/2(25.0+8.0)(20) = 350 pft

REACTIONS
 1
 2
 DL 5.0' 5.0k
 SL 24.8' 2.48k
 LL 49.5' 4.95k

SPAN = 21.0"
 TRIBURARY WIDTH
 1ST 15.0'
 2ND 25.0'
 WALL

DL = 1/2(13)(15+10) + 1/2(28.0)(15+5) + 10(15) = 392.5 pft
 SL = 1/2(28)(20) = 280.0 pft
 LL = 1/2(14)(40) = 248.0 pft

USE 2-13/4x11 7/8 LVL (fb = 2800/1.9E)

REACTIONS
 1
 2
 DL 3.78' 3.78k
 SL 1.75' 1.75k
 LL 1.75' 1.75k

SPAN = 8.0"
 TRIBURARY WIDTH
 1ST 18.0"
 2ND 13.0"

DL = 1/2(13)(15+10) + 1/2(13.0)(15+5) + 15(10) = 442.5 pft
 SL = 1/2(13)(20) = 130 pft
 LL = 1/2(13)(40) = 260 pft

USE 2-13/4x11 7/8 LVL (fb = 2600/1.9E)

REACTIONS
 1
 2
 DL 1.77' 1.77k
 SL .52' .52k
 LL 1.04' 1.04k

SPAN = 13.0"
 TRIBURARY WIDTH
 1ST = 5.6"
 2ND = 8.0"

DL = 1/2(5.5)(15+10) + 1/2(8.0)(15+5) + 15(10) = 298.8 pft
 SL = 1/2(8.0)(20) = 80.0 pft
 LL = 1/2(5.5)(40) = 110.0 pft



Reactions

DL	2.02
SL	.72
LL	.52

1,500 psf (Assumed)

USE 2-13/16 LVL ($F_y = 2800/1.9 F$)

DL = 5.4k LL = 5.19k SL = .51k

USE 3'0" x 3'0" x 12" THL w/ 4-#4 EACH WAY

FOOTINGS
 FOOTING #1
 (Beam #1)

FOOTING #2
 Beam #7

DL = 3.78 + 1.77 = 5.55k
 SL = 1.75 + .52 = 2.27k
 LL = 1.75 + 1.04 = 2.79k

USE 2'9" x 2'9" x 12" w/ 4-#4 EACH WAY

FOOTING #3
 GIRDERS 7&8

DL = 1.77 + 2.02 = 3.79k
 SL = .52 + .72 = 1.24k
 LL = 1.04 + .52 = 1.56k

USE 2'3" x 2'3" x 12" w/ 4-#4 EACH WAY

FOOTING #4
 GIRDER #5

DL = 4.46k
 SL = 2.88k
 LL = 5.76k

USE 3'0" x 3'0" x 12" THL w/ 4-#4 EACH WAY



Project Title: Patel Residence
Engineer: George Knipprath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Wood Beam

LIC #: KW-06014481, Build: 20.21.10.4

DESCRIPTION: Girder #1

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : DF/DF
Wood Grade : 16F-V3
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Fb + : 1,600.0 psi
Fb - : 1,250.0 psi
Fc - P||l : 1,500.0 psi
Fc - Perp : 560.0 psi
Fv : 265.0 psi
Ft : 975.0 psi
E : Modulus of Elasticity : 1,500,000 ksi
E : Modulus of Elasticity : 1,500,000 ksi
E : Modulus of Elasticity : 1,500,000 ksi
Density : 31.210pcf

Applied Loads

Beam self weight calculated and added to loads
Uniform Load : D = 0.5912, L = 0.610, S = 0.060, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio = 0.549 1
Section used for this span : 10.75x19.5
Fb: Actual : 793.23 psi
Fb: Allowable : 1,445.57 psi
Load Combination : +D+L
Location of maximum on span : 8.500 ft
Span # 1
Maximum Deflection
Max Downward Transient Deflection : 0.116 in Ratio = 1762 >= 360
Max Upward Transient Deflection : 0 in Ratio = 0
Max Downward Total Deflection : 0.236 in Ratio = 862 >= 180
Max Upward Total Deflection : 0 in Ratio = 0
Span: 1 : L Only
Span: 1 : +D+L
Span: n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Segment Length		Span #		Max Stress Ratios		C _d		C _{FV}		C _i		C _r		C _m		C _t		C _L		M		F _b		F _v		Shear Values	
D Only	Length = 17.0 ft	1	0.311	0.132	0.90	0.903	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	23.00	405.09	1301.02	4.38	31.37	238.50	0.00	0.00
+D+L	Length = 17.0 ft	1	0.549	0.232	1.00	0.903	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	45.03	793.23	1445.57	8.59	61.43	265.00	0.00	0.00
+D+S	Length = 17.0 ft	1	0.267	0.113	1.15	0.903	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	25.17	443.27	1662.41	4.80	34.38	304.75	0.00	0.00
+D+0.750L	Length = 17.0 ft	1	0.385	0.163	1.25	0.903	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	39.53	696.20	1806.97	7.54	58.92	331.25	0.00	0.00
+D+0.750L+0.750S	Length = 17.0 ft	1	0.436	0.184	1.15	0.903	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	41.15	724.83	1662.41	7.85	66.14	304.75	0.00	0.00
+D+0.60D	Length = 17.0 ft	1	0.105	0.044	1.60	0.903	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	13.80	243.05	2812.82	2.68	18.82	424.00	0.00	0.00



Project File: 2111004.ec6

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Project Title: Patel Residence
Engineer: George Knipprath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Wood Beam

LIC# : KVV-06014481, Build:20.21.10.4

DESCRIPTION: Girder #1

Overall Maximum Deflections

Load Combination			
Span	Max. "-" Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
1	0.2365	8.562	0.0000
Values in KIPS			
Support notation : Far left is #1			
Support 1 Support 2			
Overall Maximum	10.596	10.596	
Overall Minimum	0.510	0.510	
D Only	5.411	5.411	
+D+L	10.596	10.596	
+D+S	5.921	5.921	
+D+0.750L	9.300	9.300	
+D+0.750L+0.750S	9.683	9.683	
+0.60D	3.247	3.247	
L Only	5.185	5.185	
S Only	0.510	0.510	



Project File: 2111004.ec6
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Project Title: Patel Residence
Engineer: George KnippRath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Wood Beam

LIC#: KW-06014481, Build:20.21.10.4

DESCRIPTION: Girder #2

Overall Maximum Deflections

Load Combination		Span	Max. "-" Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
+D+0.750L+0.750S		1	0.1524	5.036	0.0000
Values in KIPS					0.000
Vertical Reactions		Support notation : Far left is #1			
Load Combination		Support 1 Support 2			
Overall MAXimum	3.125	3.125	0.700	0.700	
Overall MINimum	0.700	1.925	2.825	2.625	
D Only	1.925	2.825	2.625	2.600	
+D+L	2.825	2.625	2.600	3.125	
+D+S	2.625	2.600	3.125	1.155	
+D+0.750L	2.600	3.125	1.155	0.900	
+D+0.750L+0.750S	3.125	0.900	0.700		
+0.60D	1.155				
L Only	0.900				
S Only	0.700				



Wood Beam

LIC#: KW-06014481, Build: 20.21.10.4

DESCRIPTION: Girder #3

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : ILevel Truss Joist
Wood Grade : Microlam LVL 1.9 E
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + : 2,600.0 psi
Fb - : 2,600.0 psi
Fc - Pll : 2,510.0 psi
Fc - Perp : 750.0 psi
Fv : 285.0 psi
Ft : 1,555.0 psi
Density : 42.010 pcf
Embind - xx : 965.71 ksi
E : Modulus of Elasticity : 1,900.0 ksi

Applied Loads

Uniform Load : D = 0.4550, L = 0.280, S = 0.130, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio = 0.515 1
Section used for this span : 2-1.75x11.87
Fb: Actual : 1,340.28 psi
Fb: Allowable : 2,600.00 psi
Load Combination : +D+L
Location of maximum on span : 5.000ft
Span # where maximum occurs : Span # 1
Maximum Deflection : 0.068 in Ratio = 1757 >= 360
Span : 1 : L Only
Max Downward Transient Deflection : n/a
Max Upward Transient Deflection : 0 < 360
Max Downward Total Deflection : 645 >= 180
Span : 1 : +D+0.750L+0.750S
Max Upward Total Deflection : 0 < 180
n/a

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	M	V	Cd	CfV	Cf	Ct	Cm	Ct	CL	M	Fb	Fv	Shear Values
D Only	Length = 10.0 ft	1	0.355	0.257	0.90	1.00	1.00	1.00	1.00	1.00	1.00	5.69	829.70	2340.00	0.00
+D+L	Length = 10.0 ft	1	0.515	0.374	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.19	1,340.28	2600.00	0.00
+D+S	Length = 10.0 ft	1	0.357	0.259	1.15	1.00	1.00	1.00	1.00	1.00	1.00	7.31	1,066.75	2990.00	0.00
+D+0.750L	Length = 10.0 ft	1	0.373	0.270	1.25	1.00	1.00	1.00	1.00	1.00	1.00	8.31	1,212.63	3250.00	0.00
+D+0.750L+0.750S	Length = 10.0 ft	1	0.465	0.337	1.15	1.00	1.00	1.00	1.00	1.00	1.00	9.53	1,380.42	2990.00	0.00
Length = 10.0 ft		1													0.00
+D+0.60D	Length = 10.0 ft	1													0.00
Length = 10.0 ft															0.00
															456.00

Project Title: Patel Residence
Engineer: George Knipprath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Project File: 2111004.ec6
Project Descr: Two Story Single Family Residence

Project Title: Patel Residence
 Engineer: George Knipp Rath, PE
 Project ID: 2111004
 Project Descr: Two Story Single Family Residence

Overall Maximum Deflections				
Load Combination	Span	Max. "-" Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
+D+0.750L+0.750S	1	0.1860	Support notation : Far left is #1	Values in KIPS
Overall Maximum			Support 1	0.0000
Overall Minimum			Support 2	0.000
D Only				
+D+L				
+D+S				
+D+0.750L				
+D+0.750L+0.750S				
+0.60D				
L Only				
S Only				



Wood Beam

LIC#: KVV-06014481, Build: 20.21.10.4

DESCRIPTION: Girder #4

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

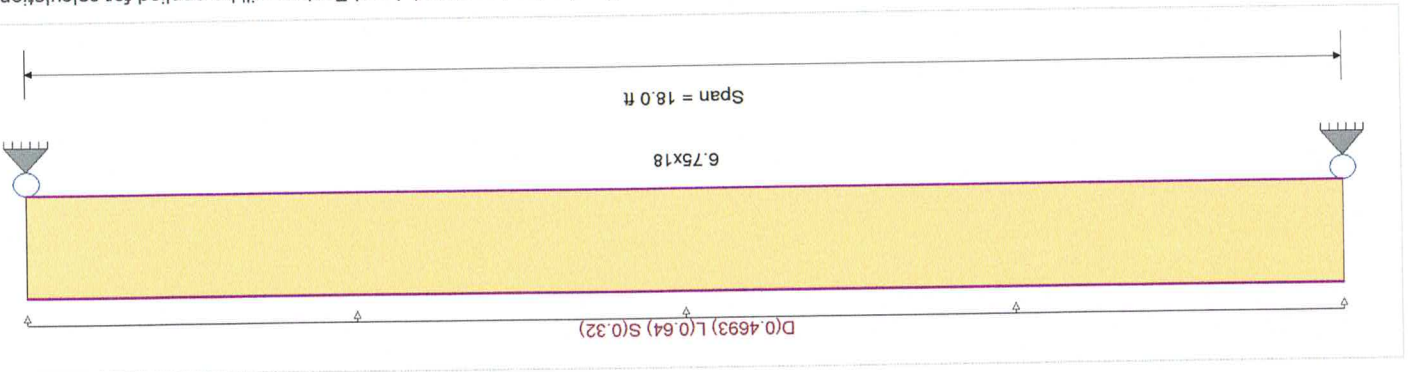
Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : DF/DF

Wood Grade : 16F-V3

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1600 psi	E : Modulus of Elasticity
Fb -	1250 psi	Ebend-xx
Fc - Pll	1500 psi	Ebend-xx
Fc - Perp	560 psi	Ebend-yy
Fv	265 psi	Ebend-yy
Ft	975 psi	Density
		Emibend-yy
		Emibend-xx
		1500ksi
		790ksi
		1500ksi
		790ksi
		1500ksi
		790ksi
		31.21 pcf



Applied Loads

Beam self weight calculated and added to loads
Uniform Load : D = 0.4693, L = 0.640, S = 0.320, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio

Section used for this span

Fb: Actual

Fb: Allowable

Load Combination

Location of maximum on span

Span # where maximum occurs

Maximum Deflection

Max Upward Transient Deflection

Max Downward Transient Deflection

Max Upward Total Deflection

Max Downward Total Deflection

0 in Ratio =

0.309 in Ratio =

0 in Ratio =

0.587 in Ratio =

0 in Ratio =

368 >= 180

0 < 180

n/a

Span: 1 : L Only

Span: 1 : +D+0.750L+0.750S

n/a

Section used for this span

Fv: Actual

Fv: Allowable

Location of maximum on span

Span # where maximum occurs

Maximum Shear Stress Ratio

Section used for this span

Fv: Actual

Fv: Allowable

Load Combination

Location of maximum on span

Span # where maximum occurs

Maximum Deflection

Max Upward Transient Deflection

Max Downward Transient Deflection

Max Upward Total Deflection

Max Downward Total Deflection

0 in Ratio =

0.309 in Ratio =

0 in Ratio =

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios				C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	M	F _b	V	f _v	F _v	
D Only	Length = 18.0 ft	1	0.484	0.194	0.90	0.949	1.00	1.00	1.00	1.00	1.00	1.00	1.00	20.07	660.84	1366.11	3.74	46.23	238.50
D+L	Length = 18.0 ft	1	0.998	0.400	1.00	0.949	1.00	1.00	1.00	1.00	1.00	1.00	1.00	45.99	1514.18	1517.90	8.58	105.92	265.00
D+S	Length = 18.0 ft	1	0.623	0.250	1.15	0.949	1.00	1.00	1.00	1.00	1.00	1.00	1.00	33.03	1087.51	1245.59	6.16	75.07	304.75
D+0.750L	Length = 18.0 ft	1	0.686	0.275	1.25	0.949	1.00	1.00	1.00	1.00	1.00	1.00	1.00	39.51	1300.84	1897.38	7.37	91.00	331.25
D+0.750L+0.750S	Length = 18.0 ft	1	0.929	0.372	1.15	0.949	1.00	1.00	1.00	1.00	1.00	1.00	1.00	49.23	1620.84	1745.59	9.18	113.38	304.75
+0.60D	Length = 18.0 ft	1	0.163	0.065	1.60	0.949	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.04	396.51	2428.65	2.25	27.74	424.00
Length = 18.0 ft																			

Project Title: Patel Residence
Engineer: George Knipprrath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Project File: 2111004.ec6

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Project Title: Patel Residence
Engineer: George Knippath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Project File: 2111004.ec6
Project File: 2111004.ec6

Wood Beam

LIC#: KW-06014481, Build: 20.21.10.4
DESCRIPTION: Girder #4

Overall Maximum Deflections

Load Combination				Max. " " Defl Location in Span				Load Combination				Max. " " Defl Location in Span			
+D+0.750L+0.750S				1				Load Combination				0.0000			
Values in KIPS				Support notation : Far left is #1				Support notation : Far left is #1				Values in KIPS			
Overall MAXimum				Support 1				Support 2				Support 1			
Overall MINimum				10.941				10.941				10.941			
D Only				4.461				4.461				4.461			
+D+L				10.221				10.221				10.221			
+D+S				7.341				7.341				7.341			
+D+0.750L				8.781				8.781				8.781			
+D+0.750L+0.750S				10.941				10.941				10.941			
+0.60D				2.676				2.676				2.676			
L Only				5.760				5.760				5.760			
S Only				2.880				2.880				2.880			



Project Title: Patel Residence
Engineer: George Knipprrath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Project File: 2111004.ecb
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Wood Beam
LIC#: KW-06014481, Build: 20.21.10.4
DESCRIPTION: Girder #5

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16
Wood Species : DF/DF
Wood Grade : 16F-V3
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
E : Modulus of Elasticity
Eband-xx : 1500ksi
Eband-yy : 1500ksi
Eband-xy : 790ksi
Density : 31.21pcf
Fb + : 1600 psi
Fb - : 1250 psi
Fc - Plll : 1500 psi
Fc - Perp : 560 psi
Fv : 265 psi
Ft : 975 psi

Applied Loads

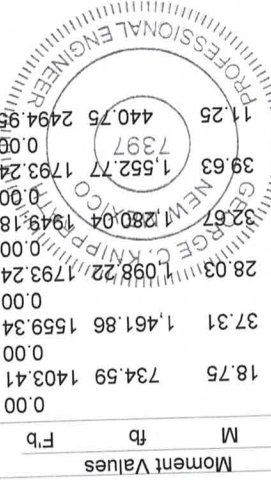
Beam self weight calculated and added to loads
Uniform Load : D = 0.6425, L = 0.660, S = 0.330, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio = 0.937 : 1
Section used for this span
Fb: Actual
Fb: Allowable
Load Combination
Location of maximum on span
Span # where maximum occurs
Maximum Deflection
Max Downward Transient Deflection
0 in Ratio =
Max Upward Transient Deflection
0 in Ratio =
Max Downward Total Deflection
0.426 in Ratio =
Max Upward Total Deflection
0 in Ratio =
Maximum Shear Stress Ratio = 0.413 : 1
Section used for this span
Fv: Actual
Fv: Allowable
Load Combination
Location of maximum on span
Span # where maximum occurs
Span # 1
Span # 1
Span # 1

Maximum Forces & Stresses for Load Combinations

Load Combination	Span #	M	V	Cd	C _{FV}	C _I	C _R	C _m	C _t	C _L	M	Fb	Fv	Shear Values
D Only	1	0.523	0.231	0.90	0.975	1.00	1.00	1.00	1.00	1.00	18.75	734.59	1403.41	0.00
D+L	1	0.937	0.413	1.00	0.975	1.00	1.00	1.00	1.00	1.00	37.31	1,461.86	1559.34	8.13
D+S	1	0.612	0.270	1.15	0.975	1.00	1.00	1.00	1.00	1.00	28.03	1,098.22	1793.24	6.11
D+0.750L	1	0.657	0.290	1.25	0.975	1.00	1.00	1.00	1.00	1.00	32.67	1,280.04	1949.18	7.12
D+0.750L+0.750S	1	0.866	0.382	1.15	0.975	1.00	1.00	1.00	1.00	1.00	39.63	1,552.77	1793.24	8.64
D+0.60D	1	0.177	0.078	1.60	0.975	1.00	1.00	1.00	1.00	1.00	11.25	440.75	2494.95	2.45

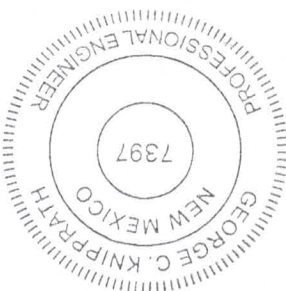


Project Title: Patel Residence
Engineer: George Knipp Rath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

DESCRIPTION: Girder #5

Overall Maximum Deflections

Load Combination			
Span	Max. "-" Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
1	0.4260	7.555	0.0000
Support notation : Far left is #1			
Values in KIPS			
0.000			
0.000			
Support 1 Support 2			
Load Combination			
Overall MAXimum			
Overall MINimum			
D Only			
+D+L			
+D+S			
+D+0.750L			
+D+0.750L+0.750S			
+0.60D			
L Only			
S Only			
2.475			
4.950			
3.000			
10.569			
8.712			
7.475			
9.950			
5.000			
2.475			
10.569			



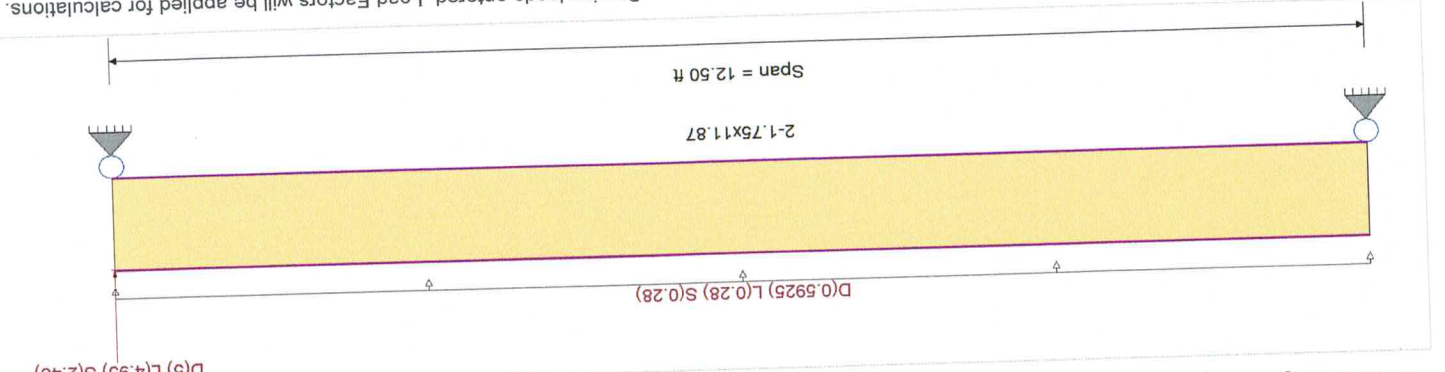
CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

MATERIAL PROPERTIES

Analysis Method : Allowable Stress Design	Wood Species : I Level Truss Joist	Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Load Combination : ASCE 7-16	Wood Grade : Microlam LVL 1.9 E	
Fb +	Ft	
Fb -	Fv	
Fc - Pll	Fc - Perp	
2,600.0 psi	2,510.0 psi	
2,600.0 psi	750.0 psi	
2,510.0 psi	285.0 psi	
1,900.0 ksi	1,555.0 psi	
Embind - xx	Density	
965.71 ksi	42.010 pcf	
E : Modulus of Elasticity		



Applied Loads

Beam self weight calculated and added to loads

Uniform Load : D = 0.5925, L = 0.280, S = 0.280, Tributary Width = 1.0 ft

Point Load : D = 5.0, L = 4.950, S = 2.480 k @ 12.50 ft, (From Beam #5)

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.976	1	2-1.75x11.87	Section used for this span	Fv: Actual	=	195.69 psi	=	327.75 psi	=	+D+0.750L+0.750S	=	Span # 1
Location of maximum on span	=	6.250 ft	=	+D+0.750L+0.750S	Load Combination	Fv: Allowable	=	11.542 ft	=	Span # 1				
Span # where maximum occurs	=	Span # 1												
Maximum Deflection		0.167 in	Ratio =	899 >= 360	Span: 1 : L Only									
Max Downward Transient Deflection		0 in	Ratio =	0 < 360										
Max Upward Transient Deflection		0.610 in	Ratio =	245 >= 180	Span: 1 : +D+0.750L+0.750S									
Max Downward Total Deflection		0 in	Ratio =	0 < 180										
Max Upward Total Deflection		0 in	Ratio =	n/a										

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	M	V	Cd	Cf/V	Cf	Ct	Cm	Ct	CL	M	Fb	V	Fv	Shear Values
D Only	Length = 12.50 ft	1	0.736	0.450	0.90	1.00	1.00	1.00	1.00	1.00	1.00	11.81	1,722.72	3.20	115.48	256.50
+D+L	Length = 12.50 ft	1	0.969	0.593	1.00	1.00	1.00	1.00	1.00	1.00	1.00	17.28	2,520.50	4.68	168.95	285.00
+D+S	Length = 12.50 ft	1	0.843	0.515	1.15	1.00	1.00	1.00	1.00	1.00	1.00	17.28	2,520.50	4.68	168.95	327.75
+D+0.750L	Length = 12.50 ft	1	0.714	0.437	1.25	1.00	1.00	1.00	1.00	1.00	1.00	15.91	2,321.05	4.31	155.58	356.25
+D+0.750L+0.750S	Length = 12.50 ft	1	0.976	0.597	1.15	1.00	1.00	1.00	1.00	1.00	1.00	20.01	2,919.39	5.42	195.69	327.75
+D+0.60D	Length = 12.50 ft	1	0.976	0.597	1.15	1.00	1.00	1.00	1.00	1.00	1.00	20.01	2,919.39	5.42	195.69	327.75
Length = 12.50 ft			0.248	0.152	1.60	1.00	1.00	1.00	1.00	1.00	1.00	7.09	1,033.63	1.92	69.29	456.00

Project Title: Patel Residence
 Engineer: George Knipprath, PE
 Project ID: 2111004
 Project Descr: Two Story Single Family Residence

Project File: 2111004.ec6
 Project File: 2111004.ec6

Wood Beam

LIC#: KW-06014481, Build: 20.21.10.4
 DESCRIPTION: Girder #6

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
+D+0.750L+0.750S	1	0.6101	6.296	0.0000
Support notation : Far left is #1				
Values in KIPS				

Vertical Reactions

Load Combination	Support 1	Support 2
Overall Maximum	6.404	16.976
Overall Minimum	1.750	4.230
D Only	3.779	8.779
+D+L	5.529	15.479
+D+S	5.529	13.009
+D+0.750L	5.091	13.804
+D+0.750L+0.750S	6.404	16.976
+0.60D	2.267	5.267
L Only	1.750	6.700
S Only	1.750	4.230



Wood Beam

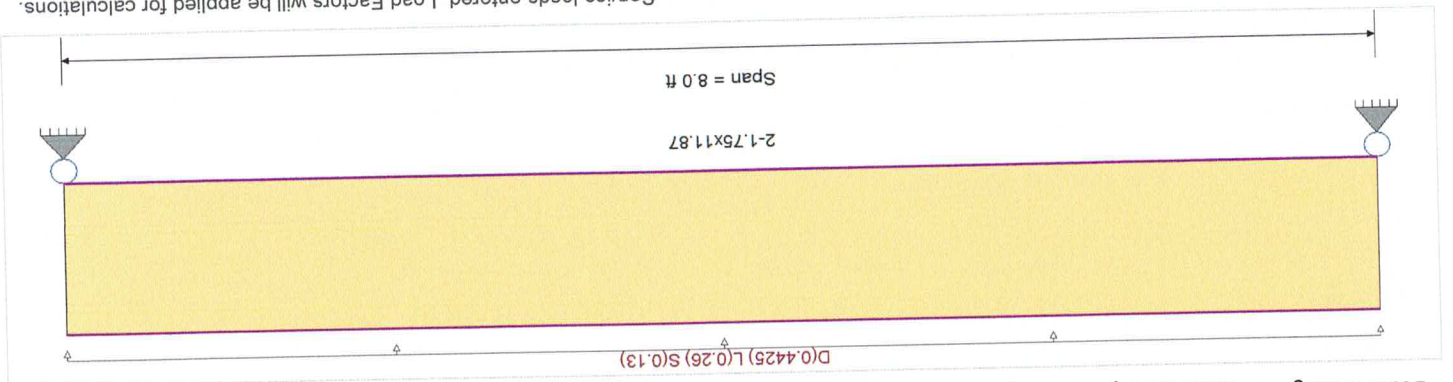
LIC#: KW-06014481, Build: 20.21.10.4
DESCRIPTION: Girder #7

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16
Wood Species : ILevel Truss Joist
Wood Grade : MicroLam LVL 1.9 E
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



Applied Loads

Uniform Load : D = 0.4425, L = 0.260, S = 0.130, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio = 0.315 1
Section used for this span
Fb: Actual = 819.85psi
Fb: Allowable = 2,600.00psi
Load Combination = +D+L
Location of maximum on span = 4.000ft
Span # where maximum occurs = Span # 1
Maximum Deflection = 0.026 in
Ratio = 0.073 in
Max Downward Transient Deflection = 0 in
Ratio = 0
Max Upward Transient Deflection = 0.073 in
Ratio = 1307 >= 180
Span: 1 : +D+0.750L+0.750S
Maximum Shear Stress Ratio = 0.270 : 1
Section used for this span
Fv: Actual = 76.99psi
Fv: Allowable = 285.00psi
Load Combination = +D+L
Location of maximum on span = 7.036ft
Span # where maximum occurs = Span # 1

Maximum Forces & Stresses for Load Combinations

Load Combination		Span #	Max Stress Ratios		C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	Moment Values		Shear Values					
Segment Length	M		V	F _b								F _v	M	V	F _b	F _v			
D Only	Length = 8.0 ft	1	0.221	0.189	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.54	516.42	2340.00	1.34	48.49	256.50	0.00	0.00
+D+L	Length = 8.0 ft	1	0.315	0.270	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.62	819.85	2600.00	0.00	0.00	285.00	0.00	0.00
+D+S	Length = 8.0 ft	1	0.223	0.191	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.58	668.13	2990.00	4.74	62.74	327.75	0.00	0.00
+D+0.750L	Length = 8.0 ft	1	0.229	0.196	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.10	743.99	3250.00	1.94	69.86	356.25	0.00	0.00
+D+0.750L+0.750S	Length = 8.0 ft	1	0.287	0.246	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.88	857.78	2990.00	2.23	80.55	327.75	0.00	0.00
+0.60D	Length = 8.0 ft	1	0.074	0.064	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.12	309.85	4160.00	0.81	29.10	456.00	0.00	0.00

Project Title: Patel Residence
 Engineer: George Knipp Rath, PE
 Project ID: 2111004
 Project Descr: Two Story Single Family Residence

Wood Beam
 LIC#: KW-06014481, Build: 20.21.10.4
 DESCRIPTION: Girder #7

Overall Maximum Deflections

Span	Max. "-" Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
1	0.0734	4.029	0.0000
Support notation : Far left is #1			
Values in KIPS			
Load Combination			
+D+0.750L+0.750S			
Overall MAXimum			
Overall MINimum			
D Only			
+D+L			
+D+S			
+D+0.750L			
+D+0.750L+0.750S			
+0.60D			
L Only			
S Only			
Support 1 Support 2			
2.940 0.520			
2.940 1.040			
2.550 1.062			
2.290 2.940			
2.810 2.550			
1.770 2.290			
1.770 2.810			
0.520 1.770			
0.520 2.940			



Project Title: Patel Residence
Engineer: George Knipp Rath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Wood Beam

LIC#: KVV-06014481, Build: 20.21.10.4
DESCRIPTION: Girder #8

Overall Maximum Deflections

Load Combination			
Span	Max. " " Defl Location in Span	Load Combination	Max. "+" Defl Location in Span
1	0.3158	6.547	0.0000
Support notation : Far left is #1			
Values in KIPS			
0.000			
Support 1 Support 2			
Load Combination			
Overall MAXimum			
Overall MINimum			
D Only			
+D+L			
+D+S			
+D+0.750L			
+D+0.750L+0.750S			
+0.60D			
L Only			
S Only			



Project File: 2111004.ec6
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Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : ASCE 7-16

General Information

Material Properties					
f _c : Concrete 28 day strength	=	3.0 ksi			
f _y : Rebar Yield	=	60.0 ksi			
E _c : Concrete Elastic Modulus	=	3,122.0 ksi			
Concrete Density	=	145.0 pcf			
φ Values Flexure	=	0.90			
φ Values Shear	=	0.750			
Analysis Settings					
Min Steel % Bending Reinf.	=	0.00180			
Min Allow % Temp Reinf.	=	1.0 : 1			
Min. Overturning Safety Factor	=	1.0 : 1			
Min. Sliding Safety Factor	=	1.0 : 1			
Add Ftg Wt for Soil Pressure	:	Yes			
Use f _{tg} wt for stability, moments & shears	:	Yes			
Add Pedestal Wt for Soil Pressure	:	No			
Use Pedestal wt for stability, mom & shear	:	No			
Soil Design Values					
Allowable Soil Bearing	=	1.50 ksf			
Soil Density	=	110.0 pcf			
Increase Bearing By Footing Weight	=	No			
Soil Passive Resistance (for Sliding)	=	250.0 pcf			
Soil/Concrete Friction Coeff.	=	0.30			
Increases based on footing Depth					
Footing base depth below soil surface	=	ft			
Allow press. increase per foot of depth	=	ksf			
when footing base is below	=	ft			
Increases based on footing plan dimension					
Allowable pressure increase per foot of depth	=	ksf			
when max. length or width is greater than	=	ft			

Dimensions

Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	12.0 in
Pedestal dimensions...		
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete...	=	3.0 in
at Bottom of footing	=	

Reinforcing

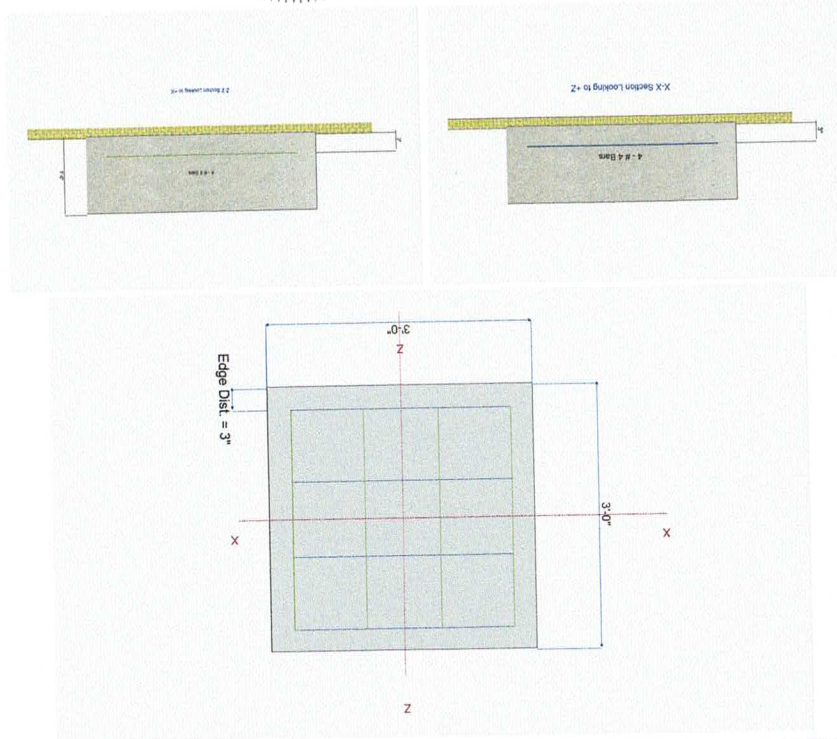
Bars parallel to X-X Axis	=	4.0
Number of Bars	=	4
Reinforcing Bar Size	=	# 4
Bars parallel to Z-Z Axis	=	4
Number of Bars	=	4
Reinforcing Bar Size	=	# 4
Bandwidth Distribution Check (ACI 15.4.4.2)	=	n/a
Direction Requiring Closer Separation	=	n/a
Bars required within zone	=	n/a
# Bars required on each side of zone	=	n/a

Applied Loads

P : Column Load
 OB : Overburden
 M-xx
 M-zz
 V-x
 V-z

D 5.40
 L 5.190
 S 0.510

ksf
 k-ft
 k-ft
 k-ft
 k



General Footing

LIC#: KW-06014481, Build: 20.21.10.4
DESCRIPTION: Footing #1

DESIGN SUMMARY

Item	Applied	Capacity	Governing Load Combination
------	---------	----------	----------------------------

Soil Bearing	1.322 ksf	1.50 ksf	+D+L about Z-Z axis
Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
Sliding - X-X	0.0 k	0.0 k	No Sliding
Sliding - Z-Z	0.0 k	0.0 k	No Sliding
Uplift	0.0 k	0.0 k	No Uplift

PASS	0.8813	0.1793	Z Flexure (+X)	1.880 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.1793	0.1793	Z Flexure (-X)	1.880 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.1793	1.880 k-ft/ft	X Flexure (+Z)	10.486 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.1793	1.880 k-ft/ft	X Flexure (-Z)	10.486 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.1412	11.604 psi	1-way Shear (+X)	82.158 psi	+1.20D+1.60L+0.50S
PASS	0.1412	11.604 psi	1-way Shear (-X)	82.158 psi	+1.20D+1.60L+0.50S
PASS	0.1412	11.604 psi	1-way Shear (+Z)	82.158 psi	+1.20D+1.60L+0.50S
PASS	0.1412	11.604 psi	1-way Shear (-Z)	82.158 psi	+1.20D+1.60L+0.50S
PASS	0.2648	43.516 psi	2-way Punching	164.317 psi	+1.20D+1.60L+0.50S

Detailed Results

Soil Bearing		Rotation Axis & Load Combination...		Gross Allowable		Actual Soil Bearing Stress @ Location		Actual / Allow	
Xecc	Zecc	(in)	Bottom, -Z	Top, +Z	Left, -X	Right, +X			Ratio

X-X, D Only	1.50	n/a	0.0	0.7450	0.7450	n/a	n/a	0.497	0.881
X-X, D+D+L	1.50	n/a	0.0	1.322	1.322	n/a	n/a	0.535	0.785
X-X, D+S	1.50	n/a	0.0	0.8017	0.8017	n/a	n/a	0.813	0.813
X-X, D+D+0.750L	1.50	n/a	0.0	1.178	1.178	n/a	n/a	0.298	0.298
X-X, D+D+0.750L+0.750S	1.50	n/a	0.0	1.220	1.220	n/a	n/a	0.497	0.881
X-X, D+0.60D	1.50	n/a	0.0	0.4470	0.4470	n/a	0.7450	0.298	0.497
Z-Z, D Only	1.50	n/a	0.0	n/a	n/a	n/a	0.7450	0.497	0.881
Z-Z, D+L	1.50	n/a	0.0	n/a	n/a	n/a	1.322	0.881	0.881
Z-Z, D+S	1.50	n/a	0.0	n/a	n/a	n/a	0.8017	0.535	0.785
Z-Z, D+D+0.750L	1.50	n/a	0.0	n/a	n/a	n/a	1.178	0.813	0.813
Z-Z, D+D+0.750L+0.750S	1.50	n/a	0.0	n/a	n/a	n/a	1.220	0.298	0.298
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.4470	n/a	0.497	0.881

Overturning Stability

Rotation Axis & Load Combination...		Overturning Moment		Resisting Moment		Stability Ratio		Status	

Footing Has NO Overturning

All units k

Sliding Stability

Force Application Axis		Sliding Force		Resisting Force		Stability Ratio		Status	

Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combination		Mu		Side		Tension Surface		As Req'd		Gvrm. As		Actual As		Phi*Mu		Status	

X-X, +1.40D	0.9450	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+1.60L	1.848	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+1.60L+0.50S	1.880	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+1.60L+0.50S	1.880	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L	1.459	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L	1.459	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L	0.810	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L	0.810	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L+1.60S	1.561	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L+1.60S	1.561	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK
X-X, +1.20D+L+1.60S	0.9120	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK	OK

Project Title: Patel Residence
Engineer: George KnippRath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

General Footing

DESCRIPTION: Footing #1

LIC#: KIW-06014481, Build: 20.21.10.4

Project File: 2111004.ecb
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Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in ²	Gvnr. As in ²	Actual As in ²	Phi*Mu k-ft	Status
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X-X, +1.20D+1.60S	0.9120	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
X-X, +1.20D+0.50S	1.491	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
X-X, +0.90D	0.6075	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
X-X, +1.20D+L+0.20S	1.472	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
X-X, +1.20D+L+0.50S	0.6075	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60S	1.472	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60L	1.848	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60L	1.880	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60L+0.50S	1.880	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60L+0.50S	1.880	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L	1.459	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L	1.459	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+0.50S	1.491	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+0.50S	1.491	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60S	0.9120	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+1.60S	0.9120	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+1.60S	1.561	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+1.60S	1.561	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+0.50S	1.491	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+0.50S	1.491	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +0.90D	0.6075	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +0.90D	0.6075	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+0.20S	1.472	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
Z-Z, +1.20D+L+0.20S	1.472	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
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+1.40D	5.83 psi	5.83 psi	11.41 psi	11.41 psi	11.41 psi	5.83 psi	82.16 psi	OK
+1.20D+1.60L	11.41 psi	11.41 psi	11.60 psi	11.60 psi	11.60 psi	11.41 psi	82.16 psi	OK
+1.20D+1.60L+0.50S	11.60 psi	11.60 psi	11.60 psi	11.60 psi	11.60 psi	11.60 psi	82.16 psi	OK
+1.20D+L	9.01 psi	9.01 psi	9.01 psi	9.01 psi	9.01 psi	9.01 psi	82.16 psi	OK
+1.20D+L	5.00 psi	5.00 psi	5.00 psi	5.00 psi	5.00 psi	5.00 psi	82.16 psi	OK
+1.20D+L+1.60S	5.63 psi	5.63 psi	5.63 psi	5.63 psi	5.63 psi	5.63 psi	82.16 psi	OK
+1.20D+L+1.60S	5.63 psi	5.63 psi	5.63 psi	5.63 psi	5.63 psi	5.63 psi	82.16 psi	OK
+1.20D+L+0.50S	9.20 psi	9.20 psi	9.20 psi	9.20 psi	9.20 psi	9.20 psi	82.16 psi	OK
+1.20D+L+0.50S	3.75 psi	3.75 psi	3.75 psi	3.75 psi	3.75 psi	3.75 psi	82.16 psi	OK
+1.20D+L+0.20S	9.08 psi	9.08 psi	9.08 psi	9.08 psi	9.08 psi	9.08 psi	82.16 psi	OK

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
---------------------	----	--------	-------------	--------

+1.40D	21.88 psi	164.32 psi	0.1331	OK
+1.20D+1.60L	42.78 psi	164.32 psi	0.2603	OK
+1.20D+1.60L+0.50S	43.52 psi	164.32 psi	0.2648	OK
+1.20D+L	33.77 psi	164.32 psi	0.2055	OK
+1.20D+L	18.75 psi	164.32 psi	0.1141	OK
+1.20D+L+1.60S	36.13 psi	164.32 psi	0.2199	OK
+1.20D+L+1.60S	21.11 psi	164.32 psi	0.1285	OK
+1.20D+L+0.50S	34.51 psi	164.32 psi	0.21	OK
+0.90D	14.06 psi	164.32 psi	0.08558	OK
+1.20D+L+0.20S	34.06 psi	164.32 psi	0.2073	OK



General Footing

LIC#: KW-06014481, Build: 20.21.10.4
 DESCRIPTION: Footing #2

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : ASCE 7-16

General Information

Material Properties					
fc : Concrete 28 day strength	=	3.0 ksi			
fy : Rebar Yield	=	60.0 ksi			
Ec : Concrete Elastic Modulus	=	3,122.0 ksi			
φ Values Flexure	=	0.90			
φ Values Shear	=	0.750			
Analysis Settings					
Min Steel % Bending Reinf.	=	0.00180			
Min Allow % Temp Reinf.	=	1.0 : 1			
Min. Overturning Safety Factor	=	1.0 : 1			
Min. Sliding Safety Factor	=	Yes			
Add Ftg Wt for Soil Pressure	:	Yes			
Use Ftg Wt for stability, moments & shears	:	No			
Add Pedestal Wt for Soil Pressure	:	No			
Use Pedestal Wt for stability, mom & shear	:	No			
Soil Design Values					
Allowable Soil Bearing	=	1.50 ksf			
Soil Density	=	110.0 pcf			
Increase Bearing By Footing Weight	=	No			
Soil Passive Resistance (for Sliding)	=	250.0 pcf			
Soil/Concrete Friction Coeff.	=	0.30			
Increases based on footing Depth					
Footing base depth below soil surface	=	ft			
Allow press. increase per foot of depth	=	ksf			
when footing base is below	=	ft			
Increases based on footing plan dimension					
Allowable pressure increase per foot of depth	=	ksf			
when max. length or width is greater than	=	ft			

Dimensions

Width parallel to X-X Axis	=	2.750 ft
Length parallel to Z-Z Axis	=	2.750 ft
Footing Thickness	=	12.0 in
Pedestal dimensions...		
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	3.0 in
Rebar Centerline to Edge of Concrete...	=	
at Bottom of footing	=	

Reinforcing

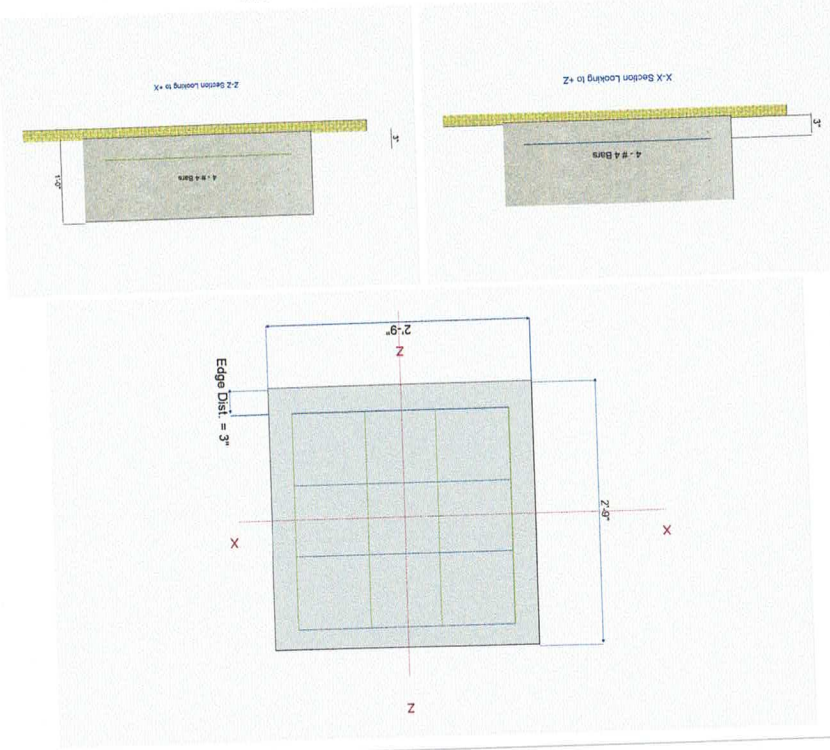
Bars parallel to X-X Axis	=	4.0
Number of Bars	=	4
Reinforcing Bar Size	=	# 4
Bars parallel to Z-Z Axis	=	4.0
Number of Bars	=	4
Reinforcing Bar Size	=	# 4
Direction Requiring Closer Separation	=	n/a
Width Distribution Check (ACI 15.4.4.2)	=	n/a
Bars required within zone	=	n/a
# Bars required on each side of zone	=	n/a

Applied Loads

P : Column Load
 OB : Overburden
 M-xx
 M-zz
 V-x
 V-z

D 5.550
 Lr 2.790
 L 2.270
 S

W
 E
 H
 K
 k-kt
 k-kt
 K



General Footing

DESCRIPTION: Footing #2

DESIGN SUMMARY

Design OK

Governing Load Combination

+D+0.750L+0.750S about Z-Z axis

0.0 k-ft

0.0 k-ft

0.0 k-ft

0.0 k

No Sliding

No Sliding

No Sliding

No Sliding

No Sliding

No Sliding

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No Sliding

No Sliding

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No Sliding

No Sliding

No Sliding

Project File: 2111004.ec6

Patel Residence
George Knipp Rath, PE
Two Story Single Family Residence

Project Title:
Engineer:
Project ID:
Project Descr:

GEORGE KNIPP RATH PE

(c) ENERGCALC INC 1983-2021

LIC#: KW-06014481, Build: 20.21.10.4

Item	Applied	Capacity	Governing Load Combination
Soil Bearing	1.381 ksf	1.50 ksf	+D+0.750L+0.750S about Z-Z axis
Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
Sliding - X-X	0.0 k	0.0 k	No Sliding
Sliding - Z-Z	0.0 k	0.0 k	No Sliding
Uplift	0.0 k	0.0 k	No Uplift
Z Flexure (+X)	1.635 k-ft/ft	11.408 k-ft/ft	+1.20D+L+1.60S
Z Flexure (-X)	1.635 k-ft/ft	11.408 k-ft/ft	+1.20D+L+1.60S
X Flexure (+Z)	1.635 k-ft/ft	11.408 k-ft/ft	+1.20D+L+1.60S
X Flexure (-Z)	1.635 k-ft/ft	11.408 k-ft/ft	+1.20D+L+1.60S
1-way Shear (+X)	10.131 psi	82.158 psi	+1.20D+L+1.60S
1-way Shear (-X)	10.131 psi	82.158 psi	+1.20D+L+1.60S
1-way Shear (+Z)	10.131 psi	82.158 psi	+1.20D+L+1.60S
1-way Shear (-Z)	10.131 psi	82.158 psi	+1.20D+L+1.60S
2-way Punching	37.211 psi	164.317 psi	+1.20D+L+1.60S
PASS	0.9207	1.50 ksf	+D+0.750L+0.750S about Z-Z axis
PASS	n/a	0.0 k-ft	Overturning - X-X
PASS	n/a	0.0 k-ft	Overturning - Z-Z
PASS	n/a	0.0 k	Sliding - X-X
PASS	n/a	0.0 k	Sliding - Z-Z
PASS	n/a	0.0 k	Uplift
PASS	0.1433	1.635 k-ft/ft	Z Flexure (+X)
PASS	0.1433	1.635 k-ft/ft	Z Flexure (-X)
PASS	0.1433	1.635 k-ft/ft	X Flexure (+Z)
PASS	0.1433	1.635 k-ft/ft	X Flexure (-Z)
PASS	0.1233	10.131 psi	1-way Shear (+X)
PASS	0.1233	10.131 psi	1-way Shear (-X)
PASS	0.1233	10.131 psi	1-way Shear (+Z)
PASS	0.1233	10.131 psi	1-way Shear (-Z)
PASS	0.2265	37.211 psi	2-way Punching

Overturning Stability

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc	Actual Soil Bearing Stress @ Location	Left, -X	Right, +X	Actual / Allow
X-X, D Only	1.50	n/a	0.0	1.248	n/a	n/a	0.586
X-X, D+L	1.50	n/a	0.0	1.179	n/a	n/a	0.786
X-X, D+S	1.50	n/a	0.0	1.156	n/a	n/a	0.771
X-X, D+D+S	1.50	n/a	0.0	1.156	n/a	n/a	0.921
X-X, D+D+0.750L	1.50	n/a	0.0	1.381	n/a	n/a	0.921
X-X, D+D+0.750L+0.750S	1.50	n/a	0.0	1.381	n/a	n/a	0.352
X-X, +D+0.60D	1.50	n/a	0.0	0.8789	n/a	n/a	0.586
Z-Z, D Only	1.50	n/a	0.0	1.248	n/a	n/a	0.832
Z-Z, D+L	1.50	n/a	0.0	1.179	n/a	n/a	0.786
Z-Z, D+S	1.50	n/a	0.0	1.156	n/a	n/a	0.771
Z-Z, D+D+S	1.50	n/a	0.0	1.156	n/a	n/a	0.921
Z-Z, D+D+0.750L	1.50	n/a	0.0	1.381	n/a	n/a	0.921
Z-Z, D+D+0.750L+0.750S	1.50	n/a	0.0	1.381	n/a	n/a	0.352
Z-Z, +D+0.60D	1.50	n/a	0.0	0.8789	n/a	n/a	0.586

Sliding Stability

Force Application Axis	Sliding Force	Resisting Force	Stability Ratio	Status
Load Combination...				
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in ²	Gvm. As in ²	Actual As in ²	Phi*Min k-ft	Status
X-X, +1.40D	0.9713	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+1.60L	1.391	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+1.60L+0.50S	1.532	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+1.60L+0.50S	1.532	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L	1.181	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L	1.181	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L	0.8325	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L	0.8325	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L+1.60S	1.635	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L+1.60S	1.635	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK
X-X, +1.20D+L+1.60S	1.287	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK

General Footing

DESCRIPTION: Footing #2

LIC#: KW-06014481, Build: 20.21.10.4

Project File: 2111004.ecb

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Project Title: Patel Residence
Engineer: George Knipprrath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

Footing Flexure		Flexure Axis & Load Combination						Status	
Mu	K-ft	Side	Tension Surface	As Req'd	Gvrm. As	Actual As	Phi*Mu	Phi*Mu	K-ft

X-X, +1.20D+1.60S	1.287	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
X-X, +1.20D+L+0.50S	1.323	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
X-X, +0.90D	1.323	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
X-X, +0.90D	0.6244	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
X-X, +1.20D+L+0.20S	1.238	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
X-X, +1.20D+L+0.50S	1.238	+Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
X-X, +0.90D	1.238	-Z	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+1.60L	0.9713	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.40D	0.9713	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.40D	1.391	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+1.60L	1.391	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+1.60L	1.532	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+1.60L+0.50S	1.532	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L	1.181	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L	0.8325	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D	1.635	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L+1.60S	1.635	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L+1.60S	1.287	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+1.60S	1.287	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L+0.50S	1.323	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L+0.20S	1.238	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +0.90D	0.6244	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +0.90D	1.238	+X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408
Z-Z, +1.20D+L+0.20S	1.238	-X	Bottom	0.2592	AsMin	0.2909	11.408	OK	11.408

One Way Shear

Load Combination...		Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	6.02 psi	6.02 psi	6.02 psi	6.02 psi	6.02 psi	6.02 psi	6.02 psi	82.16 psi	OK
+1.20D+1.60L	8.62 psi	8.62 psi	8.62 psi	8.62 psi	8.62 psi	8.62 psi	8.62 psi	82.16 psi	OK
+1.20D+1.60L+0.50S	9.49 psi	9.49 psi	9.49 psi	9.49 psi	9.49 psi	9.49 psi	9.49 psi	82.16 psi	OK
+1.20D+L	7.32 psi	7.32 psi	7.32 psi	7.32 psi	7.32 psi	7.32 psi	7.32 psi	82.16 psi	OK
+1.20D	5.16 psi	5.16 psi	5.16 psi	5.16 psi	5.16 psi	5.16 psi	5.16 psi	82.16 psi	OK
+1.20D+L+1.60S	10.13 psi	10.13 psi	10.13 psi	10.13 psi	10.13 psi	10.13 psi	10.13 psi	82.16 psi	OK
+1.20D+L+1.60S	7.97 psi	7.97 psi	7.97 psi	7.97 psi	7.97 psi	7.97 psi	7.97 psi	82.16 psi	OK
+1.20D+L+0.50S	8.20 psi	8.20 psi	8.20 psi	8.20 psi	8.20 psi	8.20 psi	8.20 psi	82.16 psi	OK
+0.90D	3.87 psi	3.87 psi	3.87 psi	3.87 psi	3.87 psi	3.87 psi	3.87 psi	82.16 psi	OK
+1.20D+L+0.20S	7.67 psi	7.67 psi	7.67 psi	7.67 psi	7.67 psi	7.67 psi	7.67 psi	82.16 psi	OK

Two-Way "Punching" Shear

Two-Way "Punching" Shear		Vu	Phi*Vn	Vu / Phi*Vn	Status
Load Combination...					
+1.40D	22.10 psi	164.32 psi	0.1345	OK	
+1.20D+1.60L	31.64 psi	164.32 psi	0.1926	OK	
+1.20D+1.60L+0.50S	34.87 psi	164.32 psi	0.2122	OK	
+1.20D+L	26.88 psi	164.32 psi	0.1636	OK	
+1.20D	18.94 psi	164.32 psi	0.1153	OK	
+1.20D+L+1.60S	37.21 psi	164.32 psi	0.2265	OK	
+1.20D+L+1.60S	29.28 psi	164.32 psi	0.1782	OK	
+1.20D+L+0.50S	30.11 psi	164.32 psi	0.1832	OK	
+0.90D	14.21 psi	164.32 psi	0.08647	OK	
+1.20D+L+0.20S	28.17 psi	164.32 psi	0.1714	OK	



Project Title: Patel Residence
Engineer: George Knipprath, PE
Project ID: 2111004
Project Descr: Two Story Single Family Residence

General Footing

LIC#: KW-06014481, Build: 20.21.10.4

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties					
f _c : Concrete 28 day strength	60.0 ksi	=	3.0 ksi		
f _y : Rebar Yield	60.0 ksi	=	60.0 ksi		
E _c : Concrete Elastic Modulus	3,122.0 ksi	=	145.0 pcf		
Concrete Density	0.90	=	0.750		
φ Values Flexure		=			
φ Values Shear		=			
Analysis Settings					
Min Steel % Bending Reinf.		=	0.00180		
Min Allow % Temp Reinf.		=	1.0		
Min. Overturning Safety Factor		=	1.0		
Min. Sliding Safety Factor		=	1.0		
Add Ftg Wt for Soil Pressure		=	Yes		
Use ftg wt for stability, moments & shears		=	Yes		
Add Pedestal Wt for Soil Pressure		=	No		
Use Pedestal wt for stability, mom & shear		=	No		
Increases based on footing Depth					
Allowable Soil Bearing	1.50 ksf	=			
Soil Density	No	=			
Increase Bearing By Footing Weight	110.0 pcf	=			
Soil Passive Resistance (for Sliding)	250.0 pcf	=			
Soil/Concrete Friction Coeff.	0.30	=			
Increases based on footing plan dimension					
Allowable pressure increase per foot of depth	ksf	=			
when max. length or width is greater than	ft	=			

Dimensions

Width parallel to X-X Axis	2.250 ft	=	2.250 ft		
Length parallel to Z-Z Axis	12.0 in	=	3.0 in		
Pedestal dimensions...		=			
px : parallel to X-X Axis		=			
pz : parallel to Z-Z Axis		=			
Height		=			
Rebar Centerline to Edge of Concrete...		=			
at Bottom of footing		=			

Reinforcing

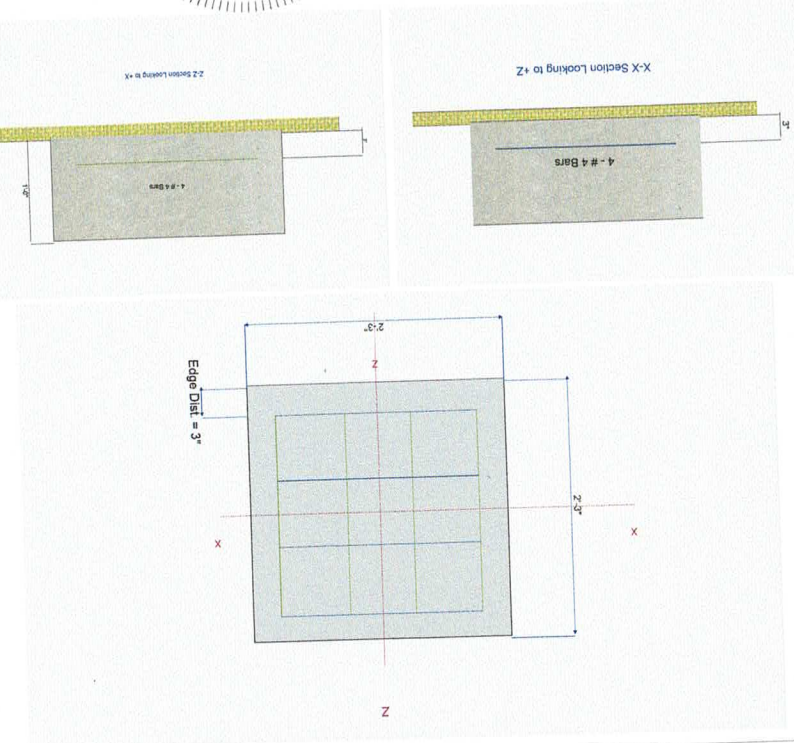
Bars parallel to X-X Axis	4.0	#	4		
Number of Bars		=			
Reinforcing Bar Size		=			
Bars parallel to Z-Z Axis	4	#	4		
Number of Bars		=			
Reinforcing Bar Size		=			
Direction Requiring Closer Separation		=			
Width Distribution Check (ACI 15.4.4.2)		=			
Bars required within zone	n/a				
# Bars required on each side of zone	n/a				

Applied Loads

P : Column Load
OB : Overburden
M-xx
M-zz
V-x
V-z

D 3.790
L 1.560
S 1.240

ksf
k-ft
k-ft
k



Project File: 2111004.ecb
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Footing Flexure											
Flexure Axis & Load Combination											
Mu	Side	Tension Surface	As Req'd	Gvrm. As	Actual As	Ph*Mn	Status				
k-ft			in ²	in ²	in ²	k-ft					
0.6633	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.6633	-Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.8805	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.8805	-Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.9580	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.9580	-Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.7635	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.7635	-Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.5685	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.5685	-Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
1.012	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
1.012	-Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
0.8165	+Z	Bottom	0.2592	AsMln	0.3556	13.842	OK				
X-X, +1.40D							OK				
X-X, +1.20D+1.60L							OK				
X-X, +1.20D+1.60L+0.50S							OK				
X-X, +1.20D+1.60L+0.50S							OK				
X-X, +1.20D+L							OK				
X-X, +1.20D+L							OK				
X-X, +1.20D+L							OK				
X-X, +1.20D+L							OK				
X-X, +1.20D+L							OK				
X-X, +1.20D+L+1.60S							OK				
X-X, +1.20D+L+1.60S							OK				
X-X, +1.20D+1.60S							OK				

DESCRIPTION: Footing #3

Project Title: Patel Residence
Engineer: George Knipprath, PE
Project ID: 21111004
Project Descr: Two Story Single Family Residence

Project File: 21111004.ec6
(c) ENERCALC INC 1983-2021

GEORGE KNIPPRATH PE

LIC#: KW-06014481, Build:20.21.10.4

Footings Flexure									
Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in ²	Gvnr. As in ²	Actual As in ²	Phi*Mu k-ft	Status	
One Way Shear	X-X, +1.20D+1.60S	-Z	Bottom	0.2592	AsMin	0.3556	13.842	OK	
	X-X, +1.20D+L+0.50S	-Z	Bottom	0.8410	AsMin	0.3556	13.842	OK	
	X-X, +1.20D+L+0.20S	-Z	Bottom	0.7945	AsMin	0.3556	13.842	OK	
	X-X, +0.90D	-Z	Bottom	0.4264	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L+0.50S	-X	Bottom	0.8410	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK	
	Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK	
	Z-Z, +1.40D	-X	Bottom	0.6633	AsMin	0.3556	13.842	OK	
Z-Z, +1.40D	-X	Bottom	0.6633	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L+0.20S	-Z	Bottom	0.7945	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L+0.50S	-Z	Bottom	0.8410	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L+0.50S	-Z	Bottom	0.8410	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L	-Z	Bottom	0.4264	AsMin	0.3556	13.842	OK		
X-X, +0.90D	-Z	Bottom	0.4264	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L+0.20S	-Z	Bottom	0.7945	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L	-Z	Bottom	0.7945	AsMin	0.3556	13.842	OK		
X-X, +1.20D+L+0.50S	-Z	Bottom	0.9580	AsMin	0.3556	13.842	OK		
X-X, +1.20D+1.60L	-Z	Bottom	0.8805	AsMin	0.3556	13.842	OK		
X-X, +1.20D+1.60L	-Z	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S	-X	Bottom	0.9580	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60L	-X	Bottom	0.8805	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60S	-X	Bottom	1.012	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+1.60L	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+1.60S	-X	Bottom	0.8165	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.5685	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7635	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L	-X	Bottom	0.7945	AsMin	0.3556	13.842	OK		
Z-Z, +1.20D+L+0.50S									



DESIGN SUMMARY

LIC#: KW-06014481, Build:20.21.10.4

DESCRIPTION: Footing #4

Project Title:	Patel Residence
Engineer:	George Knipprath, PE
Project ID:	2111004
Project Descr:	Two Story Single Family Residence

Project File: 2111004.ec6
(c) ENERCALC INC 1983-2021

GEORGE KNIPPRATH PE

(c) ENERCALC INC 1983-2021

DESIGN SUMMARY			
Min. Ratio	Item	Applied	Capacity
PASS	0.9073	Soil Bearing	1.50 ksf
PASS	n/a	Overturning - X-X	0.0 k-ft
PASS	n/a	Overturning - Z-Z	0.0 k-ft
PASS	n/a	Sliding - X-X	0.0 k
PASS	n/a	Sliding - Z-Z	0.0 k
PASS	n/a	Uplift	0.0 k
PASS	0.1908	Z Flexure (+X)	2.001 k-ft/ft
PASS	0.1908	Z Flexure (-X)	2.001 k-ft/ft
PASS	0.1908	X Flexure (+Z)	2.001 k-ft/ft
PASS	0.1908	X Flexure (-Z)	2.001 k-ft/ft
PASS	0.1503	1-way Shear (+X)	12.352 psi
PASS	0.1503	1-way Shear (-X)	12.352 psi
PASS	0.1503	1-way Shear (+Z)	12.352 psi
PASS	0.1503	1-way Shear (-Z)	12.352 psi
PASS	0.2819	2-way Punching	46.319 psi
PASS			164.317 psi
			+D+0.750L+0.750S about Z-Z axis
			No Overturning
			No Overturning
			No Sliding
			No Sliding
			No Uplift
			+D+0.750L+0.750S about Z-Z axis

Detailed Results

Soil Bearing		Rotation Axis & Load Combination...		Gross Allowable		Xecc	Zecc	Actual Soil Bearing Stress @ Location		Left, -X Right, +X		Actual / Allow
							(in)	Bottom, -Z	Top, +Z			Ratio
X-X, D Only	1.50	n/a	0.0	0.6406	1.281	0.0	0.0	0.6406	0.6406	n/a	n/a	0.427
X-X, +D+L	1.50	n/a	0.0	0.9606	1.281	0.0	0.0	0.9606	0.9606	n/a	n/a	0.854
X-X, +D+S	1.50	n/a	0.0	1.121	1.281	0.0	0.0	1.121	0.9606	n/a	n/a	0.640
X-X, +D+0.750L	1.50	n/a	0.0	1.361	1.281	0.0	0.0	1.361	0.9606	n/a	n/a	0.747
X-X, +D+0.750L+0.750S	1.50	n/a	0.0	0.3843	1.361	0.0	0.0	0.3843	1.361	n/a	n/a	0.907
X-X, +0.60D	1.50	n/a	0.0	0.6406	1.281	0.0	0.0	0.6406	0.3843	n/a	n/a	0.256
Z-Z, D Only	1.50	0.0	0.0	n/a	1.281	0.0	0.0	n/a	0.6406	0.6406	0.6406	0.427
Z-Z, +D+L	1.50	0.0	0.0	n/a	1.281	0.0	0.0	n/a	0.9606	0.9606	0.9606	0.854
Z-Z, +D+S	1.50	0.0	0.0	n/a	1.281	0.0	0.0	n/a	0.9606	0.9606	0.9606	0.640
Z-Z, +D+0.750L	1.50	0.0	0.0	n/a	1.281	0.0	0.0	n/a	0.9606	0.9606	0.9606	0.747
Z-Z, +D+0.750L+0.750S	1.50	0.0	0.0	n/a	1.361	0.0	0.0	n/a	0.9606	0.9606	0.9606	0.907
Z-Z, +0.60D	1.50	0.0	0.0	n/a	1.281	0.0	0.0	n/a	0.6406	0.6406	0.6406	0.256

Overtaking Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				All units k

Sliding Stability

Force Application Axis	Sliding Force	Resisting Force	Stability Ratio	Status
Force Application Axis Load Combination...				
Footing Has NO Sliding				
Footing Flexure				
Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd In2
				Gvrm. As In2
				Actual As In2
				Phi*Min
				Status

Footnote Flexure

Flexure Axis & Load Combination		Mu k-ft	Side	Surface	in ²	in ²	K-11
X-X, +1.40D	X-X, +1.40D	0.7805	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+1.60L	X-X, +1.20D+1.60L	1.821	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+1.60L	X-X, +1.20D+1.60L	1.821	-Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+1.60L+0.50S	X-X, +1.20D+1.60L+0.50S	2.001	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+1.60L+0.50S	X-X, +1.20D+1.60L+0.50S	2.001	-Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+L	X-X, +1.20D+L	1.389	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+L	X-X, +1.20D+L	1.389	-Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D	X-X, +1.20D	0.6690	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D	X-X, +1.20D	0.6690	-Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+L+1.60S	X-X, +1.20D+L+1.60S	1.965	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+L+1.60S	X-X, +1.20D+L+1.60S	1.965	-Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+1.60S	X-X, +1.20D+1.60S	1.245	+Z	Bottom	0.2592	0.2667	10.486
X-X, +1.20D+1.60S	X-X, +1.20D+1.60S	1.245	-Z	Bottom	0.2592	0.2667	10.486

OK OK OK OK OK OK OK OK OK OK OK

General Footing

LIC#: KVV-06014481, Build: 20.21.10.4
 DESCRIPTION: Footing #4

Footing Flexure

Flexure Axis & Load Combination

Mu k-ft	Side	Tension Surface	As Req'd in ²	Gvrm. As in ²	Actual As in ²	Phi*Mu k-ft	Status
1.245	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.569	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.569	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.5018	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.5018	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.461	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.461	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.7805	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.7805	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.821	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.821	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
2.001	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
2.001	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.389	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.389	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.6690	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.6690	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.965	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.965	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.245	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.245	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.569	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.569	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.5018	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
0.5018	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.461	+X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.461	-X	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.461	+Z	Bottom	0.2592	AsMin	0.2667	10.486	OK
1.461	-Z	Bottom	0.2592	AsMin	0.2667	10.486	OK

One Way Shear

Load Combination...

Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
4.82 psi	4.82 psi	4.82 psi	4.82 psi	4.82 psi	82.16 psi	0.06	OK
11.24 psi	11.24 psi	11.24 psi	11.24 psi	11.24 psi	82.16 psi	0.14	OK
12.35 psi	12.35 psi	12.35 psi	12.35 psi	12.35 psi	82.16 psi	0.15	OK
8.57 psi	8.57 psi	8.57 psi	8.57 psi	8.57 psi	82.16 psi	0.10	OK
4.13 psi	4.13 psi	4.13 psi	4.13 psi	4.13 psi	82.16 psi	0.05	OK
4.13 psi	4.13 psi	4.13 psi	4.13 psi	4.13 psi	82.16 psi	0.15	OK
12.13 psi	12.13 psi	12.13 psi	12.13 psi	12.13 psi	82.16 psi	0.09	OK
7.69 psi	7.69 psi	7.69 psi	7.69 psi	7.69 psi	82.16 psi	0.12	OK
9.69 psi	9.69 psi	9.69 psi	9.69 psi	9.69 psi	82.16 psi	0.04	OK
3.10 psi	3.10 psi	3.10 psi	3.10 psi	3.10 psi	82.16 psi	0.11	OK
9.02 psi	9.02 psi	9.02 psi	9.02 psi	9.02 psi	82.16 psi	0.11	OK

Two-Way "Punching" Shear

Load Combination...

Vu	Phi*Vn	Vu / Phi*Vn	Status
18.07 psi	164.32 psi	0.11	OK
42.15 psi	164.32 psi	0.2565	OK
46.32 psi	164.32 psi	0.2819	OK
32.15 psi	164.32 psi	0.1957	OK
15.49 psi	164.32 psi	0.09425	OK
45.49 psi	164.32 psi	0.2768	OK
28.82 psi	164.32 psi	0.1754	OK
36.32 psi	164.32 psi	0.221	OK
11.62 psi	164.32 psi	0.07068	OK
33.82 psi	164.32 psi	0.2058	OK



Restrained Retaining Wall
LIC#: KW-06014481, Build: 20.21.10.4
DESCRIPTION: Basement Wall

Code Reference:
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Project Title:
Engineer:
Project ID:
Project Descr:
Project File: 2111004.ecb
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GEORGE KNIPPRATH PE

Criteria

Soil Data

Retained Height	=	10 ft
Wall height above soil	=	ft
Total Wall Height	=	ft
Top Support Height	=	10 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	6 in

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method	=	32.0 psf/ft
At-Rest Heel Pressure	=	0.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density	=	110 pcf
Footings Soil Frictior	=	0.4 psf
Soil height to ignore for passive pressure	=	12 in

Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning	=	psf
Surcharge Over Toe	=	psf
Used for Sliding & Overturning	=	psf

Axial Load Applied to Stem

Axial Dead Load	=	145.0 lbs
Axial Live Load	=	lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Design Summary

Total Bearing Load	=	4,766.67 lbs
...resultant ecc.	=	0.0 in
Soil Pressure @ Toe	=	1,191.67 psf OK
Soil Pressure @ Heel	=	1,191.67 psf OK
Allowable	=	psf

ACI Factored @ Toe	=	1,430.0 psf
ACI Factored @ Heel	=	1,430.0 psf
Footing Shear @ Toe	=	0.6932 psi OK
Footing Shear @ Heel	=	-2.111 psi OK
Allowable	=	82.158 psi

Reaction at Top	=	318.970 lbs
Reaction at Bottom	=	1,857.78 lbs
Sliding Calcs	=	1,857.78 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors
Dead Load 1.2
Live Load 1.6
Earth, H 1.6
Wind, W 1
Seismic, E 1

Concrete Stem Construction

Thickness	=	8.00 in
Wall Weight	=	100.0 psf
Stem is FIXED to top of footing	=	

Design Height Above Ftg

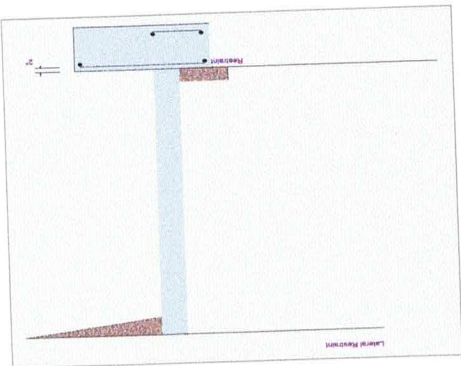
Rebar Size	=	10 ft
Rebar Spacing	=	16.00 in
Rebar Placed at	=	Edge
Rebar Depth 'd'	=	4.50 in

Moment...Actual	=	0.0 ft-#
Moment...Allowable	=	3,011.18 ft-#
Shear Force @ this height	=	511.99 lbs

Shear...Actual	=	9.481 psi
Shear...Allowable	=	75.0 psi

Mmax Between Top & Base	1,526.47 ft-#	3,011.18 ft-#	3,413.40 ft-#
@ Base of Wall	5.582 ft	# 5	16.00 in
	0.00 ft	# 5	Edge
	As < Min %		4.50 in

37.926 psi	2,048.01 lbs
75.0 psi	



Restained Retaining Wall
DESCRIPTION: Basement Wall

LIC #: KW-06014481, Build: 20.21.10.4

Project File: 2111004.ec6
(c) ENERCALC INC 1983-2021

Project Title:
Engineer:
Project ID:
Project Descr:

GEORGE KNIPPRATH PE

Footing Design Results

	Toe	Heel
Factored Pressure	= 1,430.0	1,430.0 psf
Mu' : Upward	= 715.0	ft-#
Mu' : Downward	= 183.0	ft-#
Mu: Design	= 532	517 ft-#
Actual 1-Way Shear	= 0.6932	psi
Allow 1-Way Shear	=	psi

Other Acceptable Sizes & Spacings:

Toe: # 4 @ 18.00 in	-or-	#4 @ 5.55 in, #5 @ 8.61 in, #6 @ 12.22 in, #7 @ 16.61
Heel: # 5 @ 8.61 in	-or-	#4 @ 5.55 in, #5 @ 8.61 in, #6 @ 12.22 in, #7 @ 16.61
Key: # 0 @ 0.00 in	-or-	No key defined
Min footing T&S reinf Area	1.73	in ²
Min footing T&S reinf Area per foot	0.43	in ² /ft
If one layer of horizontal bars:		
#4 @ 5.56 in		#4 @ 11.11 in
#5 @ 8.61 in		#5 @ 17.22 in
#6 @ 12.22 in		#6 @ 24.44 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

>>> Sliding Forces are restrained by the adjacent slab

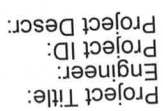
Forces acting on footing for soil pressure
Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied from Stem	=	0.0 lbs	0.0 ft	=	-2,133.38 ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft	=	0.0 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft	=	0.0 ft-#
Axial Dead Load on Stem	=	145.0 lbs	1.333 ft	=	193.333 ft-#
Soil Over Toe	=	55.0 lbs	0.50 ft	=	27.50 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft	=	0.0 ft-#
Stem Weight	=	1,000.0 lbs	1.333 ft	=	1,333.33 ft-#
Soil Over Heel	=	2,566.67 lbs	2.833 ft	=	7,272.22 ft-#
Footing Weight	=	1,000.0 lbs	2.0 ft	=	2,000.0 ft-#
Total Vertical Force	=	4,766.67 lbs		=	8,693.01 ft-#

Moment at Footing Base is not Stabilized by Vertical Loads
Resulting Moment = 0.0 ft-#
Soil Pressure = 0.0 ft-#

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.





LIC#: KW-06014481, Build: 20.21.10.4

DESCRIPTION: Basement Wall

GEORGE KNIPPRATH PE

Project File: 21111004.ec6
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