

Structural Load Calculations for MI Treehouse, LLC

Job: 18-025

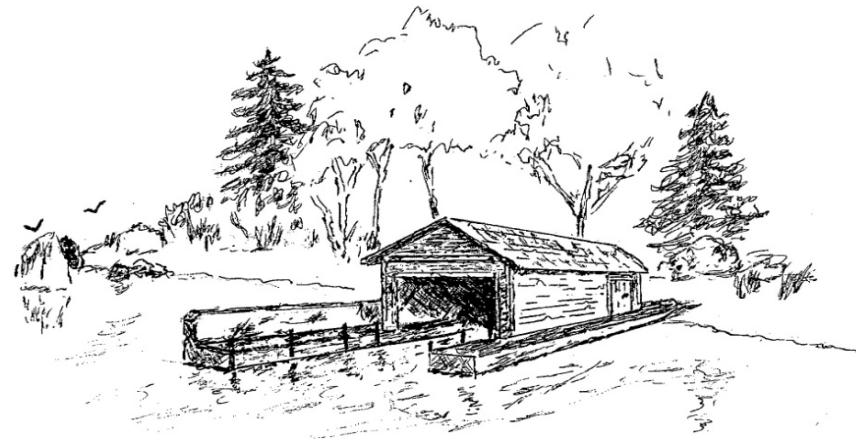
Site 5637 East Mercer Way

Address : Mercer Island, WA 98084

Date: March 30, 2020



Stoney Point Engineering



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Sheet: 2 Design Criteria

3 - 26 Vertical Load Calculations

27 - 29 Vertical Load Keyplans

30 - 35 Lateral Load Calculations

36 - 45 Lateral Load Keyplans

46 Diaphragm Calculations

47 - 49 Shoring Calculations

50 Retaining Wall Calculations

Structural Design (2015 IBC)

Gravity Design Loads (IBC 1606, 1607, 1608)																														
Description	I.D.	Dead Loads (D)																	Live Load (L)	Snow Load (S) (ASCE 7-10 Chap. 7)										
		Pitch	Material ₁	Spc. (in.)	D ₁ (psf)	Material ₂	Spc. (in.)	D ₂ (psf)	Material ₃	Spc. (in.)	D ₃ (psf)	Material ₄	Spc. (in.)	D ₄ (psf)	Material ₅	Spc. (in.)	D ₅ (psf)	D (psf)			L/L _r (psf)	Drift Surcharges								
																		Flat		Slope		Used	W _b	h _r	X _d	W _d	Drift	Slide	Un-bal	Slope
1	Roof Load	R	6 : 12	2x12	24.00	1.6	1/2" Plywood		1.5	Comp		2.0	5/8" Sheetrock		2.8	Insulation	12.00	1.2	9.0	10.1	15.0	25.0								25
2	Floor	F		TJI 9.5-230	16.00	2.0	3/4" Plywood		2.3	Hardwood		3.4	5/8" Sheetrock		2.8					10.4	10.4	15.0	40.0							
3	Wall	W		2x6	16.00	1.2	1/2" Plywood		1.5	1/2" Sheetrock		2.2	Insulation	5.50	0.6					5.4	5.4	10.0	0.0							
4	Deck	D		2x12	16.00	2.4	5/4 Spaced Cdr.		2.0											4.4	4.4	15.0	60.0							
5																														
6																														
7																														
8																														
9																														
10																														

Lumber Strengths (psi)		F _b	F _t	F _v	F _{c⊥}	F _c	E
Joist/Rafters							
	Hem-Fir #2	850	525	150	405	1300	1.30
Beams and Headers							
	4" Nominal Doug-Fir #2	900	575	180	625	1350	1.60
	6" Nominal Doug-Fir #1	1350	675	170	625	925	1.60
Posts							
	4" Nominal Doug-Fir #1	1000	675	180	625	1500	1.70
	6" Nominal Doug-Fir #1	1200	950	170	625	1000	1.60
	Studs Hem-Fir Stud	675	400	150	405	800	1.20
Laminated Strand Lumber (LSL)							
	1.3 E	1700		400	680	1400	1.30
	1.55 E	2325		310	400	2050	1.55
Microllam (LVL)							
	1.9 E	2600	1555	285	750	2510	1.90
Parallel Strand Lumber (PSL)							
	2.0 E	2900	2025	290	750	2900	2.00
	P.T. 2.0 E	2175		191	465	2059	1.78
Glu-Laminated Timbers							
	24F-V4	2400	1100	240	650	1650	1.80
APA Rated Sheathing							
		Span Rating		Max Span with Design Loads (in)			
	Roof 5/8" Ply	20/40		24.0			
	Wall 15/32" Ply	24/0		16.0			
	Floor (T&G) 3/4 Ply	48/24		24.0			

Wind Loads (IBC 1609.1.1)	
ASCE (7-10) Chap 27 Directional Procedure	
3 Second Gust = 110 mph	
Exposure Category = C	Sect. 26.7.3
Mean Roof Height = 36.0 ft	
K _d = 0.85 ft	Table 26.6-1
K _{zt} = 1.00	Eq 26.8.1
K _h = 1.02	Table 27.3-1
q _h = 26.9 lb/ft ²	Eq 27.3-1
G = 0.85	Sec. 26.9
p = q _h (GC _p - GC _p i)	Eq 27.4-1

Deflection Limits (IBC Table 1604.3)			
	L	S or W	D + L
Roof			
Plaster	360	360	240
Nonplaster	240	240	180
None	180	180	120
Floor	360		240
Walls		240	

Seismic Loads (IBC 1613.1)	
ASCE (7-10) Sec. 12.14 Simplified Alternative for Simple Bearing Wall Systems	
Spectral Response Acceleration, S _S = 144.40	
Site Class = D	Table 20.3-1
Site Coefficient, F _a = 1.00	Table 11.4-1
Height Coefficient, F = 1.20	Sec. 12.14.8.1
Maximum Spectral Response Acceleration, S _{MS} = 144.4	Equation 11.4-1
5%Damped Design Spectral Response Acceleration, S _{DS} = 96.3	Equation 11.4-3
Seismic Design Category = D	Table 11.6-1
Default Response Modification Coefficient, R = 6.50	Table 12.14-1

Post Calculations

Post					Bearing			Loading								Adjustment Factors								Stresses (psi)				Loads (lbs.)					
#	Location	I.D.	Length (ft.)		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.			
			y-y	x-x		Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c		F _{c⊥}	E	F _c					F _{c⊥}	All.	Act.	All.		Act.	Live	Dead	
1	Roof	6x6	10.00	10.00	SPF					F	F	6.00	-3.30	6.00	7.40	7.40								1.04		0.56	442	141	754	141	13,371	2,133	800
										2																					838	503	
2	Roof	HUC610			DF2					3		18.60	9.30																		2,350	838	503
3	Roof	6x6	5.00	5.00	DF2					R	R	6.00	-3.30	6.00	9.30	9.30									0.91	625	89	1,231	89	18,906	1,676	1,005	
4	Roof	2-2x6		16.00	PLY					R	R	6.00		6.00	7.40	7.40									0.34	340	54	268	54	4,427	555	333	
5	Roof	2x6		16.00	PLY					R	R	3.70		3.70	2.00	2.00									0.34	340	25	268	25	2,214	93	56	
										W	W	3.70		3.70	3.00	3.00															0	56	
6	Roof	3-2x8		15.00	PLY					R	R	3.70		3.70	2.00	2.00									0.46	340	53	623	53	11,093	93	56	
										W	W	3.70		3.70	3.00	3.00															0	56	
										7																					887	628	
7	Roof	HUC410			DF2					R	R	6.40		6.40	2.00	2.00															2,350	160	96
										W	W	6.40		6.40	3.00	3.00																0	96
										8		6.40	3.20																		727	436	
8	Roof	4x6	5.00	5.00	DF2					R	R	12.50		12.50	9.30	9.30									0.74	625	121	1,108	121	12,031	1,453	872	
9	Roof	2-2x6		15.00	PLY					10		18.60	9.30												0.38	340	68	300	68	4,951	698	419	
10	Roof	6x6	5.00	5.00	DF2					R	R	12.00		12.00	9.30	9.30									0.91	625	74	1,231	74	18,906	1,395	837	
11	Roof	2x6		8.00	PLY					R	R	8.20		8.20	9.10	9.10									0.81	340	182	645	182	2,805	933	560	
12	Roof	2x6		10.00	PLY					R	R	2.70		2.70	4.00	4.00									0.67	340	30	537	30	2,805	135	81	
										W	W	2.70		2.70	2.00	2.00															0	27	
13	Roof	2-2x6		14.00	PLY					R	R	18.90		15.10	12.80	12.80									0.42	340	292	337	292	5,558	2,902	1,741	
										R	R	18.90	15.10	18.90	11.30	11.30															108	65	
14	Roof	2-2x6		8.00	PLY					R	R	18.60		18.60	6.00	6.00									0.81	340	165	645	165	5,610	1,395	837	
										15		18.60	9.30																	308	185		
15	Roof	6x6	5.00	5.00	DF2					R	R	5.30		5.30	9.30	9.30									0.91	625	33	1,231	33	18,906	616	370	
16	Roof	3-2x4		8.00	PLY					R	R	15.00		15.00	13.90	13.90									0.50	340	265	399	265	5,355	2,606	1,564	
17	Roof	3.5x5.5 LSL		15.00	SPF					R	R	18.90		3.80	11.30	11.30								1.06	0.40	451	441	566	441	8,672	966	579	
										R	R	18.90	3.80	18.90	12.80	12.80															1,930	1,158	
										R	R	17.00		14.60	11.30	11.30															2,353	1,412	
										R	R	17.00	14.60	17.00	12.80	12.80															54	33	
18	Roof	3.5x5.5 LSL		15.00	PLY					R	R	17.00		14.60	11.30	11.30								1.06	0.40	360	356	566	356	6,938	2,353	1,412	
										R	R	17.00	14.60	17.00	12.80	12.80															54	33	
										R	R	11.70		11.70	12.80	12.80															1,872	1,123	
19	Roof	2x6		15.00	PLY					R	R	6.00		6.00	6.20	6.20									0.38	340	91	300	91	2,476	465	279	
20	Roof	2x6		15.00	PLY					R	R	2.70		2.70	7.40	7.40									0.38	340	48	300	48	2,476	250	150	
21	Roof	2x6		15.00	PLY					R	R	5.90		5.90	7.40	7.40									0.38	340	145	300	145	2,476	546	327	
										22		3.20	1.60																		199	119	
22	Roof	2x6		15.00	PLY					R	R	6.00		6.00	5.30	5.30									0.38	340	78	300	78	2,476	398	239	
23	Roof	2x6		15.00	PLY					R	R	2.20		2.20	9.00	9.00									0.38	340	48	300	48	2,476	248	149	
24	Roof	2x6		15.00	PLY					R	R	4.40		4.40	9.00	9.00									0.38	340	97	300	97	2,476	495	297	
25	Roof	6x6	15.00	15.00	SPF					R	R	6.00	-2.00	6.00	6.20	6.20									0.29	425	62	389	62	11,758	827	496	

Post Calculations

Post				Bearing		Loading						Adjustment Factors							Stresses (psi)				Loads (lbs.)								
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
										26																				353	212
26	Roof	HUC610			DF2					27	10.60	5.30																2,350	353	212	
27	Roof	6x6	5.00	5.00	DF2					R	R	6.00	-2.00	6.00	5.30	5.30								0.91	625	38	1,231	38	18,906	707	424
28	Roof	2x6		10.00	PLY					R	R	6.40		6.40	4.00	4.00								0.67	340	70	537	70	2,805	320	192
										W	W	6.40		6.40	2.00	2.00													0	64	
29	Roof	2-2x6		15.00	PLY					R	R	11.70		11.70	12.80	12.80								0.38	340	182	300	182	4,951	1,872	1,123
30	Deck	HUC410			GLB					D	D	15.80		15.80	1.90	4.30													2,085	1,280	320
31	Second Floor	6x6		9.00	PLY					D	D	8.00	-4.00		1.33	1.33								0.64	340	96	862	96	10,285	399	100
										30		8.00	-4.00																1,920	480	
32	Second Floor	2-2x6		9.00	PLY					W	W	8.20		8.20	8.00	8.00								0.74	340	187	593	187	5,610	0	328
										F	F	8.20		8.20	1.33	1.33														218	82
										D	D	8.20		8.20	2.70	4.00														771	193
										11																			933	560	
33	Second Floor	2-2x6		9.00	PLY					W	W	8.20		8.20	8.00	8.00								0.74	340	195	593	195	5,610	0	328
										F	F	8.20		8.20	1.33	1.33														218	82
										D	D	8.20		8.20	4.00	2.70														877	219
										11																			933	560	
34	Second Floor	2x6		9.00	PLY					W	W	2.70		2.70	8.00	8.00								0.74	340	112	593	112	2,805	0	108
										F	F	2.70		2.70	7.60	7.60														410	154
										12																			135	108	
35	Second Floor	2x6		9.00	PLY					F	F	15.20		15.20	1.33	1.33								0.74	340	68	593	68	2,805	404	152
36	Second Floor	2-2x6		9.00	PLY					13														0.74	340	292	593	292	5,610	3,010	1,806
37	Second Floor	2x6		9.00	PLY					W	W	2.70		2.70	8.00	8.00								0.74	340	130	593	130	2,805	0	108
										F	F	2.70		2.70	9.60	9.60														518	194
										12																			135	108	
38	Second Floor	2-2x6		9.00	PLY					1														0.74	340	259	593	259	5,610	2,971	1,303
39	Second Floor	2x6		9.00	PLY					R	R	3.20		3.20	10.00	10.00								0.74	340	98	593	98	2,805	400	240
										W	W	3.20		3.20	3.00	3.00														0	48
										F	F	3.20		3.20	1.33	1.33														85	32
40	Second Floor	2-2x6		9.00	PLY					R	R	6.40		6.40	10.00	10.00								0.74	340	98	593	98	5,610	800	480
										W	W	6.40		6.40	3.00	3.00														0	96
										F	F	6.40		6.40	1.33	1.33														170	64
41	Deck	2-2x6		9.00	PLY					D	D	15.80		15.80	4.30	1.90								0.74	340	180	593	180	5,610	1,659	415
										4																				555	333
42	Roof	2-2x8		16.80	PLY					5														0.49	340	17	391	17	7,395	93	111
										43																				0	148
43	Roof	HUC48			DF2					W	W	3.70		3.70	8.00	8.00													1,680	0	148
44	Roof	2-2x8		19.10	PLY					6														0.40	340	98	318	98	6,920	979	739
										43																				0	148
										45																				0	256

Post Calculations

Post			Bearing		Loading							Adjustment Factors							Stresses (psi)				Loads (lbs.)										
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.			
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead		
45	Roof	HUC48			DF2					W	W	6.40		6.40	8.00	8.00														1,680	0	256	
46	Second Floor	6x8		9.00	PLY					R	R	16.20		12.00	7.70	7.70								0.81	340	261	1,094	261	13,558	1,454	873		
										R	R	16.20	12.00	16.20	2.00	2.00														27	16		
										W	W	16.20		16.20	8.00	8.00														0	648		
										F	F	16.20		16.20	7.30	7.30														2,365	887		
										9		16.20	6.40																	422	253		
										16		16.20	8.90																		1,174	705	
										14		16.20	12.00																		442	265	
										4																					555	333	
46D1	Second Floor	6x8		9.00	PLY			0.75		R	R	16.20		12.00	7.70	7.70								0.81	340	241	1,094	241	13,558	1,091	873		
								0.75		R	R	16.20	12.00	16.20	2.00	2.00															20	16	
								0.75		W	W	16.20		16.20	8.00	8.00															0	648	
								0.75		F	F	16.20		16.20	7.30	7.30															1,774	887	
								0.75		9		16.20	6.40																		316	253	
								0.75		16		16.20	8.90																		881	705	
								0.75		3U		16.20	8.90																		783	0	
								0.75		14		16.20	12.00																		331	265	
								0.75		4																					416	333	
46D2	Second Floor	6x8		9.00	PLY			0.00	0.60	R	R	16.20		12.00	7.70	7.70								0.81	340	86	1,094	86	13,558	0	524		
								0.00	0.60	R	R	16.20	12.00	16.20	2.00	2.00															0	10	
								0.00	0.60	W	W	16.20		16.20	8.00	8.00															0	389	
								0.00	0.60	F	F	16.20		16.20	7.30	7.30															0	532	
								0.00	0.60	9		16.20	6.40																		0	152	
								0.00	0.60	16		16.20	8.90																		0	423	
										3U		16.20	8.90																		1,044	0	
								0.00	0.60	14		16.20	12.00																		0	159	
								0.00	0.60	4																					0	200	
46U1	Second Floor	6x8		9.00	PLY			0.75		R	R	16.20		12.00	7.70	7.70								0.81	340	201	1,094	201	13,558	1,091	873		
								0.75		R	R	16.20	12.00	16.20	2.00	2.00															20	16	
								0.75		W	W	16.20		16.20	8.00	8.00															0	648	
								0.75		F	F	16.20		16.20	7.30	7.30																1,774	887
								0.75		9		16.20	6.40																			316	253
								0.75		16		16.20	8.90																			881	705
								0.75		3U-		16.20	8.90																		-783	0	
								0.75		14		16.20	12.00																			331	265
								0.75		4																						416	333
46U2	Second Floor	6x8		9.00	PLY			0.00	0.60	R	R	16.20		12.00	7.70	7.70								0.81	340	34	1,094	34	13,558	0	524		
								0.00	0.60	R	R	16.20	12.00	16.20	2.00	2.00															0	10	
								0.00	0.60	W	W	16.20		16.20	8.00	8.00															0	389	
								0.00	0.60	F	F	16.20		16.20	7.30	7.30															0	532	

Post Calculations

Post				Bearing		Loading						Adjustment Factors						Stresses (psi)				Loads (lbs.)									
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
								0.00	0.60	9		16.20	6.40																	0	152
								0.00	0.60	16		16.20	8.90																	0	423
										3U-		16.20	8.90																	-1,044	0
								0.00	0.60	14		16.20	12.00																0	159	
								0.00	0.60	4																			0	200	
47	Second Floor	3-2x4		9.00	PLY					14														0.41	340	173	331	173	5,217	1,703	1,022
48	Second Floor	HUS48			DF2					F	F	15.20		15.20	1.33	1.33													1,580	404	152
49	Second Floor	HUS48			DF2					F	F	18.20		18.20	1.33	1.33													1,580	484	182
50	Second Floor	2-2x4		9.00	PLY					F	F	4.90		4.90	16.60	16.60								0.41	340	330	331	330	3,478	1,627	610
										48																				404	152
										49																				484	182
51	Second Floor	HUS48			DF2					F	F	14.70		14.70	1.33	1.33													1,580	391	147
52	Second Floor	2-2x4		9.00	PLY					F	F	4.90		4.90	16.60	16.60								0.41	340	318	331	318	3,478	1,627	610
										48																				404	152
										51																				391	147
53	Second Floor	4x6		9.00	SPF					17												1.06	0.65	451	441	969	441	8,672	5,303	3,182	
54	Second Floor	2x4		9.00	PLY					F	F	3.20		3.20	2.00	2.00								0.41	340	34	331	34	1,739	128	48
55	Second Floor	2x4+6x8		9.00	PLY					R	R	16.20		4.20	2.00	2.00								0.92	340	303	734	303	16,363	183	110
										R	R	16.20	4.20	16.20	7.70	7.70														856	513
										W	W	16.20		16.20	8.00	8.00														0	648
										F	F	16.20		16.20	7.30	7.30														2,365	887
										14		16.20	4.20																	1,262	757
										16		16.20	7.30																	1,432	859
										9		16.20	9.80																	276	165
										W	W	6.80		6.80	10.00	10.00														0	340
										F	F	6.80		6.80	16.30	16.30														2,217	831
										49		6.80	2.00																	342	128
										56		6.80	2.00																	289	108
55D1	Second Floor	6x8		9.00	PLY			0.75		R	R	16.20		4.20	2.00	2.00							0.81	340	312	1,094	312	13,558	137	110	
								0.75		R	R	16.20	4.20	16.20	7.70	7.70														642	513
								0.75		W	W	16.20		16.20	8.00	8.00														0	648
								0.75		F	F	16.20		16.20	7.30	7.30														1,774	887
								0.75		14		16.20	4.20																	946	757
								0.75		16		16.20	7.30																	1,074	859
								0.75		3U		16.20	7.30																	955	0
								0.75		9		16.20	9.80																	207	165
								0.75		W	W	6.80		6.80	10.00	10.00														0	340
								0.75		F	F	6.80		6.80	16.30	16.30														1,663	831
								0.75		49		6.80	2.00																	256	128
								0.75		56		6.80	2.00																	217	108

Post Calculations

Post				Bearing		Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)								
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _P	Bearing		Buckling		All.	Trib.			
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead		
								0.75		3U-		6.80	3.80																			-767	0
55D2	Second Floor	6x8		9.00	PLY			0.00	0.60	R	R	16.20		4.20	2.00	2.00								0.81	340	54	1,094	54	13,558	0	66		
								0.00	0.60	R	R	16.20	4.20	16.20	7.70	7.70															0	308	
								0.00	0.60	W	W	16.20		16.20	8.00	8.00															0	389	
								0.00	0.60	F	F	16.20		16.20	7.30	7.30															0	532	
								0.00	0.60	14		16.20	4.20																		0	454	
								0.00	0.60	16		16.20	7.30																		0	515	
										3U		16.20	7.30																		1,273	0	
								0.00	0.60	9		16.20	9.80																		0	99	
								0.00	0.60	W	W	6.80		6.80	10.00	10.00															0	204	
								0.00	0.60	F	F	6.80		6.80	16.30	16.30															0	499	
								0.00	0.60	49		6.80	2.00																		0	77	
								0.00	0.60	56		6.80	2.00																		0	65	
										3U-		6.80																			-2,318	0	
55U1	Second Floor	6x8		9.00	PLY			0.75		R	R	16.20		4.20	2.00	2.00								0.81	340	303	1,094	303	13,558	137	110		
								0.75		R	R	16.20	4.20	16.20	7.70	7.70															642	513	
								0.75		W	W	16.20		16.20	8.00	8.00															0	648	
								0.75		F	F	16.20		16.20	7.30	7.30															1,774	887	
								0.75		14		16.20	4.20																		946	757	
								0.75		16		16.20	7.30																		1,074	859	
								0.75		3U-		16.20	7.30																		-955	0	
								0.75		9		16.20	9.80																		207	165	
								0.75		W	W	6.80		6.80	10.00	10.00															0	340	
								0.75		F	F	6.80		6.80	16.30	16.30															1,663	831	
								0.75		49		6.80	2.00																		256	128	
								0.75		56		6.80	2.00																		217	108	
								0.75		3U		6.80	3.80																		767	0	
55U2	Second Floor	6x8		9.00	PLY			0.00	0.60	R	R	16.20		4.20	2.00	2.00								0.81	340	107	1,094	107	13,558	0	66		
								0.00	0.60	R	R	16.20	4.20	16.20	7.70	7.70																0	308
								0.00	0.60	W	W	16.20		16.20	8.00	8.00																0	389
								0.00	0.60	F	F	16.20		16.20	7.30	7.30																0	532
								0.00	0.60	14		16.20	4.20																			0	454
								0.00	0.60	16		16.20	7.30																		0	515	
										3U-		16.20	7.30																			-1,273	0
								0.00	0.60	9		16.20	9.80																		0	99	
								0.00	0.60	W	W	6.80		6.80	10.00	10.00																0	204
								0.00	0.60	F	F	6.80		6.80	16.30	16.30																0	499
								0.00	0.60	49		6.80	2.00																			0	77
								0.00	0.60	56		6.80	2.00																			0	65
										3U		6.80																				2,318	0

Post Calculations

Post					Bearing			Loading								Adjustment Factors								Stresses (psi)				Loads (lbs.)			
#	Location	I.D.	Length (ft.)		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
								0.00	0.60	56		6.80	4.80																0	27	
										3U-		6.80	3.00																-1,295	0	
								0.00	0.60	F	F	3.50		2.50	1.80	1.80													0	26	
								0.00	0.60	F	F	3.50		3.50	7.30	7.30													0	115	
								0.00	0.60	61		3.50	2.50																0	16	
61	Second Floor	HU11			DF2					F	F	3.60		3.60	3.40	3.40												2,550	245	92	
62	Second Floor	4x4	9.00	9.00	PLY					F	F	3.50	1.00	3.50	1.80	1.80								0.32	340	27	432	27	4,165	64	24
										61		3.50	1.00																175	66	
63	Second Floor	4x4	9.00	9.00	PLY					F	F	3.50	1.00	3.50	1.80	1.80								0.32	340	91	432	91	4,165	64	24
										F	F	3.50		3.50	7.30	7.30													511	192	
										61		3.50	1.00																175	66	
										F	F	1.90		1.90	1.33	1.33													51	19	
64	Second Floor	4x4	9.00	9.00	PLY					F	F	5.50		5.50	1.33	1.33								0.32	340	17	432	17	4,165	146	55
65	Second Floor	2-2x4		9.00	PLY					F	F	3.60		3.60	1.33	1.33								0.41	340	13	331	13	3,478	96	36
66	Second Floor	4x4	9.00	9.00	PLY					67														0.32	340	45	432	45	4,165	304	114
										68																			94	35	
67	Second Floor	HUC28-2			DF2					F	F	3.60		3.60	3.40	3.40													1,490	245	92
										69		3.60	2.50																59	22	
68	Second Floor	HUC28-2			DF2					F	F	3.60		3.60	1.30	1.30													1,490	94	35
69	Second Floor	LUS28-2			DF2					F	F	3.60		3.60	2.70	2.70													1,315	194	73
70	Second Floor	4x4	9.00	9.00	PLY					F	F	3.60		3.60	3.40	3.40								0.32	340	43	432	43	4,165	245	92
										69		3.60	1.10																135	51	
71	Second Floor	4x4	9.00	9.00	PLY					72														0.32	340	47	432	47	4,165	415	156
72	Second Floor	HUC28-2			DF2					F	F	3.60		3.60	3.40	3.40													1,490	245	92
										73		3.60	1.10																170	64	
73	Second Floor	LUS28-2			DF2					F	F	3.60		3.60	3.40	3.40													1,315	245	92
74	Second Floor	2-2x6		9.00	PLY					19														0.74	340	45	593	45	5,610	465	279
75	Second Floor	2-2x6		9.00	PLY					W	W	2.70		2.70	8.00	8.00								0.74	340	31	593	31	5,610	0	108
										20																			250	150	
76	Second Floor	2-2x6		9.00	PLY					W	W	5.90		5.90	8.00	8.00								0.74	340	87	593	87	5,610	0	236
										21																			745	447	
77	Second Floor	2-2x6		9.00	PLY					F	F	3.60		3.60	1.30	1.30								0.74	340	53	593	53	5,610	94	35
										19																			465	279	
78	Second Floor	2-2x6		9.00	PLY					W	W	2.20		2.20	8.00	8.00								0.74	340	35	593	35	5,610	0	88
										69		2.20	1.50																62	23	
										23																			248	149	
79	Second Floor	2-2x6		9.00	PLY					W	W	4.40		4.40	8.00	8.00								0.74	340	74	593	74	5,610	0	176
										69		2.20	0.70																133	50	
										80		2.20	1.90																44	16	
										24																			495	297	

Post Calculations

Post					Bearing			Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)				
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f		F _v , F _c	F _c	F _{c⊥}					E	F _c	F _{c⊥}	All.		Act.	All.
80	Second Floor	HUC28-2			DF2					F	F	3.60		3.60	3.40	3.40													1,490	245	92
										73		3.60	2.50																75	28	
81	Second Floor	2-2x6		9.00	PLY					W	W	4.40		4.40	8.00	8.00							0.74	340	82	593	82	5,610	0	176	
										80		2.20	0.30																276	104	
										24																			495	297	
82	Second Floor	2-2x6		9.00	PLY					W	W	2.20		2.20	8.00	8.00							0.74	340	30	593	30	5,610	0	88	
										23																			248	149	
83	Second Floor	2x6		9.00	PLY					R	R	3.20		3.20	4.00	4.00							0.74	340	121	593	121	2,805	160	96	
										W	W	3.20		3.20	6.00	6.00													0	96	
										F	F	3.20		3.20	7.30	7.30													467	175	
84	Second Floor	2-2x6		9.00	PLY					R	R	6.40		6.40	4.00	4.00							0.74	340	127	593	127	5,610	320	192	
										W	W	6.40		6.40	9.00	9.00													0	288	
										F	F	6.40		6.40	7.30	7.30													934	350	
85	Second Floor	2-2x6		9.00	PLY					16													0.74	340	253	593	253	5,610	2,606	1,564	
86	Second Floor	2x6		9.00	PLY					W	W	6.40		6.40	8.00	8.00							0.74	340	257	593	257	2,805	0	256	
										F	F	6.40		6.40	7.30	7.30													934	350	
										28																			320	256	
87	Second Floor	2x6		9.00	PLY					F	F	15.40		15.40	1.33	1.33							0.74	340	69	593	69	2,805	410	154	
88	Second Floor	2-2x6		9.00	PLY					29													0.74	340	182	593	182	5,610	1,872	1,123	
89	Second Floor	2x6		9.00	PLY					R	R	2.70		2.70	4.00	4.00							0.74	340	85	593	85	2,805	135	81	
										W	W	2.70		2.70	9.00	9.00													0	122	
										F	F	2.70		2.70	4.80	4.80													259	97	
90	Deck	6x6	14.00	14.00	SPF					D	D	18.40		18.40	6.80	6.80							0.33	425	155	440	155	12,856	3,754	938	
91	Deck	6x6	14.00	14.00	SPF					D	D	18.40		18.40	6.80	6.80							0.33	425	297	440	297	12,856	3,754	938	
										1																			2,971	1,303	
92	Deck	6x6	10.00	10.00	SPF					D	D	18.80		18.80	9.80	2.90							0.56	425	175	754	175	12,856	4,230	1,058	
93	Main Floor	6x8	14.00	14.00	DF2					R	R	14.00		2.10	10.00	10.00							0.33	625	414	440	414	17,537	486	291	
										R	R	14.00	11.90	14.00	10.00	10.00													39	24	
										W	W	14.00		2.10	1.00	1.00													0	19	
										W	W	14.00	11.90	14.00	1.00	1.00													0	2	
										F	F	14.00		2.10	1.33	1.33													103	39	
										F	F	14.00	11.90	14.00	1.33	1.33													8	3	
										W	W	14.00		14.00	9.00	9.00													0	630	
										F	F	14.00		14.00	1.33	1.33													372	140	
										39		14.00	2.10																412	272	
										40		14.00	5.40																596	393	
										40		14.00	8.60																374	247	
										39		14.00	11.90																73	48	
										R	R	5.70		5.70	3.00	3.00													214	128	
										W	W	5.70		5.70	4.00	4.00													0	114	

Post Calculations

Post					Bearing			Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)					
#	Location	I.D.	Length (ft.)		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.		
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead	
										F	F	5.70		5.70	7.20	7.20														821	308	
										W	W	5.70		5.70	9.00	9.00														0	257	
										F	F	5.70		5.70	7.20	7.20														821	308	
										38																				2,971	1,303	
										D	D	18.40		18.40	6.80	6.80														3,754	938	
93D1	Main Floor	6x8	14.00	14.00	DF2			0.75		R	R	14.00		2.10	10.00	10.00								0.33	625	500	440	500	17,537	364	291	
								0.75		R	R	14.00	11.90	14.00	10.00	10.00														30	24	
								0.75		W	W	14.00		2.10	1.00	1.00														0	19	
								0.75		W	W	14.00	11.90	14.00	1.00	1.00														0	2	
								0.75		F	F	14.00		2.10	1.33	1.33														78	39	
								0.75		F	F	14.00	11.90	14.00	1.33	1.33														6	3	
								0.75		W	W	14.00		14.00	9.00	9.00														0	630	
								0.75		F	F	14.00		14.00	1.33	1.33														279	140	
								0.75		39		14.00	2.10																	309	272	
								0.75		40		14.00	5.40																	447	393	
								0.75		40		14.00	8.60																	281	247	
								0.75		39		14.00	11.90																	55	48	
								0.75		R	R	5.70		5.70	3.00	3.00														160	128	
								0.75		W	W	5.70		5.70	4.00	4.00														0	114	
								0.75		F	F	5.70		5.70	7.20	7.20														616	308	
								0.75		W	W	5.70		5.70	9.00	9.00														0	257	
								0.75		F	F	5.70		5.70	7.20	7.20														616	308	
								0.75		38																				2,228	1,303	
								0.75		D	D	18.40		18.40	6.80	6.80														2,815	938	
								0.75		3M																				6,173	0	
93D2	Main Floor	6x8	14.00	13.00	DF2			0.00	0.60	R	R	14.00		2.10	10.00	10.00								0.33	625	289	440	289	17,537	0	175	
								0.00	0.60	R	R	14.00	11.90	14.00	10.00	10.00															0	14
								0.00	0.60	W	W	14.00		2.10	1.00	1.00															0	12
								0.00	0.60	W	W	14.00	11.90	14.00	1.00	1.00															0	1
								0.00	0.60	F	F	14.00		2.10	1.33	1.33															0	23
								0.00	0.60	F	F	14.00	11.90	14.00	1.33	1.33															0	2
								0.00	0.60	W	W	14.00		14.00	9.00	9.00															0	378
								0.00	0.60	F	F	14.00		14.00	1.33	1.33															0	84
								0.00	0.60	39		14.00	2.10																	0	163	
								0.00	0.60	40		14.00	5.40																	0	236	
								0.00	0.60	40		14.00	8.60																	0	148	
								0.00	0.60	39		14.00	11.90																	0	29	
								0.00	0.60	R	R	5.70		5.70	3.00	3.00														0	77	
								0.00	0.60	W	W	5.70		5.70	4.00	4.00															0	68
								0.00	0.60	F	F	5.70		5.70	7.20	7.20															0	185

Post Calculations

Post					Bearing			Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)				
#	Location	I.D.	Length (ft.)		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
								0.00	0.60	W	W	5.70		5.70	9.00	9.00														0	154
								0.00	0.60	F	F	5.70		5.70	7.20	7.20														0	185
								0.00	0.60	38																				0	782
								0.00	0.60	D	D	18.40		18.40	6.80	6.80														0	563
										3M																				8,231	0
93U1	Main Floor	6x8	13.00	13.00	DF2			0.75		R	R	14.00		2.10	10.00	10.00								0.37	625	190	500	190	19,954	364	291
								0.75		R	R	14.00	11.90	14.00	10.00	10.00														30	24
								0.75		W	W	14.00		2.10	1.00	1.00														0	19
								0.75		W	W	14.00	11.90	14.00	1.00	1.00														0	2
								0.75		F	F	14.00		2.10	1.33	1.33														78	39
								0.75		F	F	14.00	11.90	14.00	1.33	1.33														6	3
								0.75		W	W	14.00		14.00	9.00	9.00														0	630
								0.75		F	F	14.00		14.00	1.33	1.33														279	140
								0.75		39		14.00	2.10																	309	272
								0.75		40		14.00	5.40																	447	393
								0.75		40		14.00	8.60																	281	247
								0.75		39		14.00	11.90																	55	48
								0.75		R	R	5.70		5.70	3.00	3.00														160	128
								0.75		W	W	5.70		5.70	4.00	4.00														0	114
								0.75		F	F	5.70		5.70	7.20	7.20														616	308
								0.75		W	W	5.70		5.70	9.00	9.00														0	257
								0.75		F	F	5.70		5.70	7.20	7.20														616	308
								0.75		38																				2,228	1,303
								0.75		D	D	18.40		18.40	6.80	6.80														2,815	938
								0.75		3M-																				-6,173	0
93U2	Main Floor	6x8	13.00	13.00	DF2			0.00	0.60	R	R	14.00		2.10	10.00	10.00								0.37	625	-124	500	-124	19,954	0	175
								0.00	0.60	R	R	14.00	11.90	14.00	10.00	10.00														0	14
								0.00	0.60	W	W	14.00		2.10	1.00	1.00														0	12
								0.00	0.60	W	W	14.00	11.90	14.00	1.00	1.00														0	1
								0.00	0.60	F	F	14.00		2.10	1.33	1.33														0	23
								0.00	0.60	F	F	14.00	11.90	14.00	1.33	1.33														0	2
								0.00	0.60	W	W	14.00		14.00	9.00	9.00														0	378
								0.00	0.60	F	F	14.00		14.00	1.33	1.33														0	84
								0.00	0.60	39		14.00	2.10																	0	163
								0.00	0.60	40		14.00	5.40																	0	236
								0.00	0.60	40		14.00	8.60																	0	148
								0.00	0.60	39		14.00	11.90																	0	29
								0.00	0.60	R	R	5.70		5.70	3.00	3.00														0	77
								0.00	0.60	W	W	5.70		5.70	4.00	4.00														0	68
								0.00	0.60	F	F	5.70		5.70	7.20	7.20														0	185

Post Calculations

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Post				Bearing		Loading						Adjustment Factors						Stresses (psi)				Loads (lbs.)									
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
								0.00	0.60	W	W	5.70		5.70	9.00	9.00														0	154
								0.00	0.60	F	F	5.70		5.70	7.20	7.20														0	185
								0.00	0.60	38																			0	782	
								0.00	0.60	D	D	18.40		18.40	6.80	6.80													0	563	
										3M-																			-8,231	0	
94	Main Floor	2x6		10.00	SPF					41													0.67	425	360	537	360	3,506	2,214	748	
95	Main Floor	2x6		10.00	SPF					42													0.67	425	44	537	44	3,506	93	259	
96	Main Floor	2x6		10.00	SPF					R	R	4.40		1.20	2.00	2.00							0.67	425	328	537	328	3,506	52	31	
										W	W	4.40		4.40	19.00	19.00													0	418	
										F	F	4.40		4.40	1.33	1.33													117	44	
										D	D	4.40		4.40	3.00	3.00													396	99	
										44		4.40	1.20															712	831		
97	Main Floor	6x6		10.00	SPF					R	R	4.40	3.20	4.40	2.00	2.00							0.56	425	283	754	283	12,856	8	5	
										W	W	4.40		4.40	19.00	19.00													0	418	
										F	F	4.40		4.40	1.33	1.33													117	44	
										44		4.40	3.20															267	312		
										R	R	4.40	3.20	4.40	2.00	2.00													8	5	
										W	W	4.40		4.40	19.00	19.00													0	418	
										F	F	4.40		4.40	1.33	1.33													117	44	
										44		4.40	3.20															267	312		
										F	F	23.00		23.00	9.50	9.50													4,370	1,639	
										110		23.00	21.80															129	74		
98	Main Floor	6x10		10.00	SPF					F	F	23.00		23.50	9.90	9.90							0.87	425	419	1,169	419	21,622	4,552	1,707	
										55		23.00	16.10															2,766	1,604		
										113		23.00	21.80															181	105		
										46																		6,440	3,980		
98D1	Main Floor	(2)-2x6+6x10		10.00	SPF			0.75		F	F	23.00		23.50	9.90	9.90						1.04	0.56	442	368	754	368	29,780	3,414	1,707	
								0.75		55		23.00	16.10															2,075	1,604		
								0.75		113		23.00	21.80															135	105		
										46D1																		5,613	3,980		
								0.75		3M																		6,173	0		
98D2	Main Floor	6x10		10.00	SPF			0.00	0.60	F	F	23.00		23.50	9.90	9.90							0.87	425	270	1,169	270	21,622	0	1,024	
								0.00	0.60	55		23.00	16.10															0	962		
								0.00	0.60	113		23.00	21.80															0	63		
										46D2																		1,044	2,388		
										3M																		8,231	0		
98U1	Main Floor	6x10		10.00	SPF			0.75		F	F	23.00		23.50	9.90	9.90							0.87	425	214	1,169	214	21,622	3,414	1,707	
								0.75		55		23.00	16.10															2,075	1,604		
								0.75		113		23.00	21.80															135	105		
										46U1																		4,047	3,980		

Post Calculations

Post					Bearing			Loading								Adjustment Factors								Stresses (psi)				Loads (lbs.)				
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.		
			y-y	x-x		y-y	x-x	Live	Dead	#l _i	#l _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead	
								0.75		3M-																			-6,173	0		
98U2	Main Floor	6x10		10.00	SPF			0.00	0.60	F	F	23.00		23.50	9.90	9.90								0.87	425	-95	1,169	-95	21,622	0	1,024	
								0.00	0.60	55		23.00	16.10																0	962		
								0.00	0.60	113		23.00	21.80																0	63		
										46U2																			-1,044	2,388		
										3M-																			-8,231	0		
99	Deck	6x6	10.00	10.00	SPF					D	D	18.80		18.80	2.90	9.80									0.56	425	121	754	121	12,856	2,933	733
100	Main Floor	2x6		10.00	SPF					32														0.67	425	375	537	375	3,506	1,922	1,162	
101	Main Floor	2x6		10.00	SPF					33														0.67	425	390	537	390	3,506	2,028	1,189	
102	Main Floor	2x6		10.00	SPF					9														0.67	425	136	537	136	3,506	698	419	
103	Main Floor	2-2x6		10.00	SPF					R	R	3.40		2.30	7.70	7.70								0.67	425	214	537	214	7,013	293	176	
										R	R	3.40	2.30	3.40	2.00	2.00														9	5	
										W	W	3.40		3.40	8.00	8.00														0	136	
										F	F	3.40		3.40	7.60	7.60														517	194	
										W	W	3.40		3.40	9.00	9.00														0	153	
										F	F	3.40		3.40	12.40	12.40														843	316	
										47		3.40	2.30																551	331		
104	Main Floor	2-2x6		10.00	SPF					R	R	3.40		1.10	2.00	2.00								0.67	425	262	537	262	7,013	46	28	
										R	R	3.40	1.10	3.40	7.70	7.70														150	90	
										W	W	3.40		3.40	8.00	8.00														0	136	
										F	F	3.40		3.40	7.60	7.60														517	194	
										W	W	3.40		3.40	9.00	9.00														0	153	
										F	F	3.40		3.40	12.40	12.40														843	316	
										47		3.40	1.10																	1,152	691	
105	Main Floor	2x6		10.00	SPF					48														0.67	425	68	537	68	3,506	404	152	
106	Main Floor	2-2x6		10.00	SPF					F	F	9.30		9.30	1.33	1.33								0.67	425	319	537	319	7,013	247	93	
										53		9.30	3.90																	3,079	1,848	
107	Main Floor	2x6		10.00	SPF					52														0.67	425	405	537	405	3,506	2,422	908	
108	Main Floor	2-2x6		10.00	SPF					F	F	9.30		9.30	1.33	1.33								0.67	425	27	537	27	7,013	247	93	
										54		9.30	3.90																	74	28	
108A	Main Floor	2x6		10.00	SPF					F	F	9.30		9.30	1.33	1.33								0.67	425	51	537	51	3,506	247	93	
										54		9.30	5.40																	54	20	
109	Main Floor	2-2x6		10.00	SPF					F	F	14.70		14.70	1.33	1.33								0.67	425	41	537	41	7,013	391	147	
										54		14.70	3.90																	94	35	
109A	Main Floor	2-2x6		10.00	SPF					F	F	14.70		14.70	1.33	1.33								0.67	425	36	537	36	7,013	391	147	
										54		14.70	10.80																	34	13	
110	Main Floor	HHUS5.50/10			GLB					F	F	9.30		9.30	1.33	1.33														5,635	247	93
										53		9.30	5.40																	2,224	1,334	
111	Main Floor	6x6		10.00	SPF					F	F	23.50		23.50	9.50	9.50								0.56	425	325	754	325	12,856	4,465	1,674	
										110		23.50	1.20																	2,345	1,354	

Post Calculations

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#	Post				Bearing		Loading						Adjustment Factors							Stresses (psi)				Loads (lbs.)								
	Location	I.D.	Length (ft.)		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.		
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f		F _v , F _c	F _c	F _{c⊥}					E	F _c	F _{c⊥}	All.		Act.	All.	Act.
112	Main Floor	2-2x6		10.00	SPF					F	F	3.20		3.20	7.30	7.30									0.67	425	93	537	93	7,013	467	175
										115		3.20	2.80																	74	28	
										58																				577	216	
113	Main Floor	HGUS5.50/10			GLB					F	F	10.20		10.20	1.33	1.33													9,100	271	102	
										57		10.20	2.60																	3,189	1,913	
114	Main Floor	(2)-2x6+6x10		10.00	SPF					F	F	23.00		23.00	9.90	9.90									0.56	425	391	754	391	28,634	4,554	1,708
										113		23.00	1.20																	3,280	1,910	
										55		23.00	6.90																	6,454	3,743	
										60																				3,176	1,531	
115	Main Floor									F	F	9.00		9.00	3.30	3.30														594	223	
116	Main Floor	2-2x6		10.00	SPF					F	F	3.20		3.20	7.30	7.30									0.67	425	82	537	82	7,013	467	175
										115		3.20	0.40																	520	195	
117	Main Floor	2x6		10.00	SPF					F	F	3.50		3.50	1.33	1.33									0.67	425	16	537	16	3,506	93	35
118	Main Floor	4x4	10.00	10.00	SPF					63														0.26	425	91	357	91	4,375	801	300	
119	Main Floor	4x4	10.00	10.00	SPF					64														0.26	425	17	357	17	4,375	146	55	
120	Main Floor	2-2x6		10.00	SPF					F	F	9.00		9.00	3.30	3.30								0.67	425	58	537	58	7,013	594	223	
										65																				96	36	
121	Main Floor	2-2x6		10.00	SPF					66														0.67	425	33	537	33	7,013	398	149	
122	Main Floor	2-2x4		6.00	SPF					F	F	3.60		3.60	2.70	2.70								0.71	425	26	569	26	4,463	194	73	
123	Main Floor	2-2x4		6.00	SPF					70														0.71	425	50	569	50	4,463	380	142	
124	Main Floor	2-2x4		6.00	SPF					F	F	3.60		3.60	3.40	3.40								0.71	425	96	569	96	4,463	245	92	
										73		3.60	2.50																	75	28	
										71																				415	156	
125	Main Floor	2-2x4		6.00	SPF					F	F	3.60		3.60	3.40	3.40								0.71	425	65	569	65	4,463	245	92	
										73																				245	92	
126	Main Floor	2-2x6		10.00	SPF					74														0.67	425	45	537	45	7,013	465	279	
127	Main Floor	2-2x6		10.00	SPF					75														0.67	425	31	537	31	7,013	250	258	
128	Main Floor	2-2x6		10.00	SPF					76														0.67	425	87	537	87	7,013	745	683	
129	Main Floor	2-2x6		10.00	SPF					77														0.67	425	53	537	53	7,013	559	314	
130	Main Floor	2-2x6		10.00	SPF					69		2.20	1.50											0.67	425	40	537	40	7,013	62	23	
										78																				309	260	
131	Main Floor	2-2x6		10.00	SPF					69		2.20	0.70											0.67	425	88	537	88	7,013	133	50	
										80		2.20	1.90																	44	16	
										79																				671	539	
132	Main Floor	2-2x6		10.00	SPF					80		2.20	0.30											0.67	425	105	537	105	7,013	276	104	
										81																				771	577	
133	Main Floor	2-2x6		10.00	SPF					82														0.67	425	30	537	30	7,013	248	237	
134	Deck	2-2x4		3.00	SPF					D	D	8.80		8.80	4.70	4.70								0.95	425	149	757	149	4,463	1,241	310	
135	Main Floor	6x6	14.00	14.00	SPF					R	R	14.00		2.10	10.00	10.00								0.33	425	329	440	329	12,856	486	291	
										R	R	14.00	11.90	14.00	10.00	10.00														39	24	

Post Calculations

Post					Bearing			Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)				
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#l _i	#l _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
										W	W	14.00		2.10	1.00	1.00														0	19
										W	W	14.00	11.90	14.00	1.00	1.00														0	2
										F	F	14.00		2.10	1.33	1.33														103	39
										F	F	14.00	11.90	14.00	1.33	1.33														8	3
										W	W	14.00		14.00	9.00	9.00														0	630
										F	F	14.00		14.00	1.33	1.33														372	140
										39		14.00	2.10																	412	272
										40		14.00	5.40																	596	393
										40		14.00	8.60																	374	247
										39		14.00	11.90																	73	48
										R	R	6.00		2.50	4.00	4.00														198	119
										W	W	6.00		2.50	2.00	2.00														0	40
										F	F	6.00		2.50	7.30	7.30														578	217
										W	W	6.00		6.00	9.00	9.00														0	270
										F	F	6.00		6.00	7.30	7.30														876	329
										60		6.00	2.50																	1,853	893
135D1	Main Floor	6x6	14.00	14.00	SPF			0.75		R	R	14.00		2.10	10.00	10.00								0.33	425	308	440	308	12,856	364	291
								0.75		R	R	14.00	11.90	14.00	10.00	10.00														30	24
								0.75		W	W	14.00		2.10	1.00	1.00														0	19
								0.75		W	W	14.00	11.90	14.00	1.00	1.00														0	2
								0.75		F	F	14.00		2.10	1.33	1.33														78	39
								0.75		F	F	14.00	11.90	14.00	1.33	1.33														6	3
								0.75		W	W	14.00		14.00	9.00	9.00														0	630
								0.75		F	F	14.00		14.00	1.33	1.33														279	140
								0.75		39		14.00	2.10																	309	272
								0.75		AM		14.00	2.10																	3,221	0
								0.75		40		14.00	5.40																	447	393
								0.75		40		14.00	8.60																	281	247
								0.75		39		14.00	11.90																	55	48
								0.75		AM-		14.00	11.90																	-568	0
								0.75		R	R	6.00		2.50	4.00	4.00														148	119
								0.75		W	W	6.00		2.50	2.00	2.00														0	40
								0.75		F	F	6.00		2.50	7.30	7.30														433	217
								0.75		W	W	6.00		6.00	9.00	9.00														0	270
								0.75		F	F	6.00		6.00	7.30	7.30														657	329
								0.75		83		6.00	2.50																	274	214
135D2	Main Floor	6x6	14.00	14.00	SPF			0.00	0.60	R	R	14.00		2.10	10.00	10.00								0.33	425	182	440	182	12,856	0	175
								0.00	0.60	R	R	14.00	11.90	14.00	10.00	10.00														0	14
								0.00	0.60	W	W	14.00		2.10	1.00	1.00														0	12
								0.00	0.60	W	W	14.00	11.90	14.00	1.00	1.00														0	1

Post Calculations

Post					Bearing			Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)						
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.			
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead		
								0.00	0.60	F	F	14.00		2.10	1.33	1.33														0	23		
								0.00	0.60	F	F	14.00	11.90	14.00	1.33	1.33														0	2		
								0.00	0.60	W	W	14.00		14.00	9.00	9.00														0	378		
								0.00	0.60	F	F	14.00		14.00	1.33	1.33														0	84		
								0.00	0.60	39		14.00	2.10																	0	163		
										AM		14.00	2.10																4,294	0			
								0.00	0.60	40		14.00	5.40																	0	236		
								0.00	0.60	40		14.00	8.60																	0	148		
								0.00	0.60	39		14.00	11.90																	0	29		
										AM-		14.00	11.90																	-758	0		
								0.00	0.60	R	R	6.00		2.50	4.00	4.00														0	71		
								0.00	0.60	W	W	6.00		2.50	2.00	2.00														0	24		
								0.00	0.60	F	F	6.00		2.50	7.30	7.30														0	130		
								0.00	0.60	W	W	6.00		6.00	9.00	9.00														0	162		
								0.00	0.60	F	F	6.00		6.00	7.30	7.30														0	197		
								0.00	0.60	83		6.00	2.50																	0	129		
135U1	Main Floor	6x6	14.00	14.00	SPF			0.75		R	R	14.00		2.10	10.00	10.00								0.33	425	133	440	133	12,856	364	291		
								0.75		R	R	14.00	11.90	14.00	10.00	10.00															30	24	
								0.75		W	W	14.00		2.10	1.00	1.00															0	19	
								0.75		W	W	14.00	11.90	14.00	1.00	1.00															0	2	
								0.75		F	F	14.00		2.10	1.33	1.33															78	39	
								0.75		F	F	14.00	11.90	14.00	1.33	1.33															6	3	
								0.75		W	W	14.00		14.00	9.00	9.00															0	630	
								0.75		F	F	14.00		14.00	1.33	1.33															279	140	
								0.75		39		14.00	2.10																		309	272	
								0.75		AM-		14.00	2.10																		-3,221	0	
								0.75		40		14.00	5.40																		447	393	
								0.75		40		14.00	8.60																		281	247	
								0.75		39		14.00	11.90																		55	48	
								0.75		AM		14.00	11.90																		568	0	
								0.75		R	R	6.00		2.50	4.00	4.00															148	119	
								0.75		W	W	6.00		2.50	2.00	2.00															0	40	
								0.75		F	F	6.00		2.50	7.30	7.30															433	217	
								0.75		W	W	6.00		6.00	9.00	9.00															0	270	
								0.75		F	F	6.00		6.00	7.30	7.30															657	329	
								0.75		83		6.00	2.50																		274	214	
135U2	Main Floor	6x6	14.00	14.00	SPF			0.00	0.60	R	R	14.00		2.10	10.00	10.00								0.33	425	-52	440	-52	12,856	0	175		
								0.00	0.60	R	R	14.00	11.90	14.00	10.00	10.00																0	14
								0.00	0.60	W	W	14.00		2.10	1.00	1.00																0	12
								0.00	0.60	W	W	14.00	11.90	14.00	1.00	1.00																0	1

Post Calculations

Post					Bearing			Loading								Adjustment Factors							Stresses (psi)				Loads (lbs.)				
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
								0.00	0.60	F	F	14.00		2.10	1.33	1.33														0	23
								0.00	0.60	F	F	14.00	11.90	14.00	1.33	1.33														0	2
								0.00	0.60	W	W	14.00		14.00	9.00	9.00														0	378
								0.00	0.60	F	F	14.00		14.00	1.33	1.33														0	84
								0.00	0.60	39		14.00	2.10																	0	163
										AM-		14.00	2.10																	-4,294	0
								0.00	0.60	40		14.00	5.40																	0	236
								0.00	0.60	40		14.00	8.60																	0	148
								0.00	0.60	39		14.00	11.90																	0	29
										AM		14.00	11.90																	758	0
								0.00	0.60	R	R	6.00		2.50	4.00	4.00														0	71
								0.00	0.60	W	W	6.00		2.50	2.00	2.00														0	24
								0.00	0.60	F	F	6.00		2.50	7.30	7.30														0	130
								0.00	0.60	W	W	6.00		6.00	9.00	9.00														0	162
								0.00	0.60	F	F	6.00		6.00	7.30	7.30														0	197
								0.00	0.60	83		6.00	2.50																	0	129
136	Main Floor	2-2x6		10.00	SPF					R	R	6.00	3.50	6.00	4.00	4.00								0.67	425	259	537	259	7,013	52	31
										W	W	6.00	3.50	6.00	2.00	2.00														0	10
										F	F	6.00	3.50	6.00	7.30	7.30														152	57
										W	W	6.00		6.00	9.00	9.00														0	270
										F	F	6.00		6.00	7.30	7.30														876	329
										83		6.00	3.50																	261	153
										84																				1,254	830
137	Main Floor	6x8		10.00	SPF					R	R	21.00	0.90	9.10	4.00	4.00								0.75	425	311	1,018	311	16,947	625	375
										R	R	21.00	15.40	21.00	4.00	4.00														75	45
										W	W	21.00	0.90	9.10	8.00	8.00														0	500
										W	W	21.00	15.40	21.00	8.00	8.00														0	60
										F	F	21.00	0.90	9.10	7.30	7.30														1,824	684
										F	F	21.00	15.40	21.00	7.30	7.30														218	82
										W	W	21.00		21.00	9.00	9.00														0	945
										F	F	21.00		21.00	2.00	2.00														840	315
										83		21.00	0.90																	600	351
										85		21.00	6.80																	1,762	1,057
										86		21.00	9.10																	711	489
										86		21.00	15.40																	335	230
										87		21.00	16.30																	92	34
										88		21.00	19.80																	107	64
138	Main Floor	2-2x6		10.00	SPF					F	F	18.60		18.60	7.30	7.30								0.67	425	227	537	227	7,013	2,716	1,018
139	Main Floor	2-2x6		10.00	SPF					F	F	18.60		18.60	7.30	7.30								0.67	425	355	537	355	7,013	2,716	1,018
										F	F	10.20		10.20	1.33	1.33														271	102

Post Calculations

Post				Bearing		Loading						Adjustment Factors						Stresses (psi)				Loads (lbs.)									
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _M			C _F	C _b	K _f	C _p	Bearing		Buckling		All.	Trib.	
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	E	F _c	F _{c⊥}			All.	Act.	All.	Act.		Live	Dead
										57		10.20	7.60																	1,091	655
140	Main Floor	6x8		10.00	SPF					R	R	21.00		5.60	4.00	4.00								0.75	425	341	1,018	341	16,947	485	291
										R	R	21.00	11.90	20.10	4.00	4.00													195	117	
										W	W	21.00		5.60	8.00	8.00													0	388	
										W	W	21.00	11.90	20.10	8.00	8.00													0	156	
										F	F	21.00		5.60	7.30	7.30													1,417	531	
										F	F	21.00	11.90	20.10	7.30	7.30													570	214	
										W	W	21.00		21.00	9.00	9.00													0	945	
										F	F	21.00		21.00	2.00	2.00													840	315	
										88		21.00	1.20																1,765	1,059	
										87		21.00	4.70																318	119	
										86		21.00	5.60																920	632	
										86		21.00	11.90																544	374	
										85		21.00	14.20																844	506	
										83		21.00	20.10																27	16	
141	Main Floor	2x6		10.00	SPF					89														0.67	425	85	537	85	3,506	394	300
142	Main Floor									WI	WI	10.70		10.70	9.00	9.00													831	0	
143	Main Floor									WI	WI	8.80		8.80	9.00	9.00													683	0	

Beam Calculations

Beam			Loading								Adjustment factors				Stresses								Deflection								
#			Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _v	Loads (lb)		Shear (psi)			Moments				Live			Total			#
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#
1	Roof	6x12			3		18.60	9.30				1.15			1341	1341	32	196	602	12468	1290	1553	120	0.37	0.93	250	0.59	1.24	208	1	
2	Roof	6x12			R	R	6.00		6.00	9.30	9.30				1116	1116	27	170	628	1674	173	1350	780	0.01	0.30		0.01	0.40		2	
3	Roof	6x12			R	R	6.00		6.00	7.40	7.40				888	888	22	170	790	1332	138	1350	980	0.01	0.30		0.01	0.40		3	
4	Roof	2x8-			R	R	3.70		3.70	2.00	2.00				204	204	28	180	641	188	831	950	114	0.07	0.19	268	0.15	0.25	163	4	
					W	W	3.70		3.70	3.00	3.00																				
5	Roof	4x10			R	R	6.40		6.40	2.00	2.00			1.20	1515	1515	70	180	257	4283	1030	1140	111	0.05	0.32	710	0.08	0.43	566	5	
					W	W	6.40		6.40	3.00	3.00																				
					8		6.40	3.20																							
6	Roof	6x12			R	R	6.60		6.60	9.30	9.30				1228	1228	30	170	571	2026	210	1350	644	0.01	0.33		0.02	0.44		6	
7	Roof	6x12			10		18.60	9.30							1116	1116	27	170	628	10379	1074	1350	126	0.31	0.93	300	0.50	1.24	250	7	
8	Roof	6x12			R	R	6.60		6.60	9.30	9.30				1228	1228	30	170	571	2026	210	1350	644	0.01	0.33		0.02	0.44		8	
9	Roof	4x8			R	R	8.20		8.20	9.10	9.10			1.30	1492	1492	88	180	204	3059	1197	1235	103	0.14	0.41	295	0.22	0.55	246	9	
10	Roof	4x8			R	R	2.70		2.70	4.00	4.00			1.30	243	243	14	180		164	64	1235		0.00	0.14		0.00	0.18		10	
					W	W	2.70		2.70	2.00	2.00																				
11	Roof	6x12			R	R	18.60		18.60	6.00	6.00	1.15			2725	2725	66	196	296	14963	1548	1553	100	0.52	0.93	178	0.84	1.24	148	11	
					15		18.60	9.30																							
12	Roof	3.5x12 GLB			R	R	14.60		14.60	13.90	13.90				4059	4059	145	265	183	14815	2116	2586	122	0.39	0.73	186	0.63	0.97	155	12	
13	Roof	5.5x12 GLB			R	R	18.90		18.90	12.80	12.80				4838	4838	110	265	241	22861	2078	2408	116	0.64	0.95	147	1.03	1.26	122	13	
14	Roof	5.5x12 GLB			R	R	17.00		17.00	12.80	12.80				4352	4352	99	265	268	18496	1681	2434	145	0.42	0.85	202	0.67	1.13	168	14	
15	Roof	5.5x12 GLB			R	R	11.70		11.70	12.80	12.80				2995	2995	68	265	389	8761	796	2527	317	0.09	0.59	618	0.15	0.78	515	15	
16	Roof	4x8			R	R	2.70		2.70	7.40	7.40			1.30	400	400	24	180	762	270	106	1235		0.00	0.14		0.00	0.18		16	
17	Roof	4x8			R	R	3.20		3.20	7.40	7.40			1.30	792	792	47	180	385	888	347	1235	355	0.01	0.16		0.01	0.21		17	
					22		3.20	1.60																							
18	Roof	4x8			R	R	2.20		2.20	9.00	9.00			1.30	396	396	23	180	769	218	85	1235		0.00	0.11		0.00	0.15		18	
19	Roof	6x12			R	R	6.00		6.00	6.20	6.20				744	744	18	170	943	1116	115	1350		0.00	0.30		0.01	0.40		19	
20	Roof	6x12			R	R	6.00		6.00	5.30	5.30				636	636	15	170		954	99	1350		0.00	0.30		0.01	0.40		20	
21	Roof	6x12			27		10.60	5.30							565	565	14	170		2996	310	1350	436	0.03	0.53		0.05	0.71		21	
22	Roof	4x8			R	R	6.40		6.40	4.00	4.00			1.30	576	576	34	180	529	922	361	1235	342	0.02	0.32		0.04	0.43		22	
					W	W	6.40		6.40	2.00	2.00																				
23	Deck	P.T. 3.5x9.5 GLB			D	D	15.80		15.80	4.30	1.90				2074	1600	94	265	283	7275	1658	2626	158	0.40	0.53	131	0.50	0.53	105	23	
24	Deck	P.T. 3.5x9.5 GLB			D	D	8.00	8.00	12.00	1.33	1.33				900	900	41	265	653	7197	1640	2811	171	0.06	0.27	479	0.07	0.27	383	24	
					30		8.00	12.00																							
25	Second Floor	3.5x9 GLB			W	W	8.20		8.20	8.00	8.00				1725	1591	82	265	323	3399	863	2819	327	0.05	0.27	594	0.08	0.41	509	25	
					F	F	8.20		8.20	1.33	1.33																				
					D	D	8.20		8.20	4.00	2.70																				
26	Second Floor	4x8			W	W	2.70		2.70	8.00	8.00			1.30	672	672	40	180	453	454	178	1235	695	0.00	0.09		0.00	0.14		26	
					F	F	2.70		2.70	7.60	7.60																				
27	Second Floor	4x8			W	W	2.70		2.70	8.00	8.00			1.30	821	821	49	180	371	554	217	1235	570	0.00	0.09		0.00	0.14		27	

Beam Calculations

Beam			Loading									Adjustment factors				Stresses								Deflection							
#			Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _V	Loads (lb)		Shear (psi)			Moments				Live			Total			#
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#
					F	F	2.70		2.70	9.60	9.60																				
28	Second Floor	3.5x11.875 GLB			F	F	15.20		15.20	1.33	1.33					556	556	20	265		2113	308	2148	697	0.07	0.51	697	0.10	0.76	761	28
29	Second Floor	4x8			R	R	3.20		3.20	10.00	10.00			1.30		805	805	48	180	378	644	252	1235	490	0.00	0.11		0.01	0.16		29
					W	W	3.20		3.20	3.00	3.00																				
					F	F	3.20		3.20	1.33	1.33																				
30	Roof	4x8			W	W	3.70		3.70	8.00	8.00			1.30		148	148	9	180		137	54	1235		0.00	0.19		0.00	0.25		30
31	Roof	4x8			W	W	6.40		6.40	8.00	8.00			1.30		256	256	15	180		410	160	1235	770	0.00	0.32		0.02	0.43		31
32	Second Floor	5.5x18 GLB			R	R	16.20		12.00	7.70	7.70				0.98	9531	10312	156	265	170	50744	2050	2349	115	0.30	0.54	178	0.49	0.81	165	32
					R	R	16.20	12.00	16.20	2.00	2.00																				
					W	W	16.20		16.20	8.00	8.00																				
					F	F	16.20		16.20	7.30	7.30																				
					9		16.20	6.40																							
					16		16.20	8.90																							
					14		16.20	12.00																							
32D1	Second Floor	5.5x18 GLB	0.75		R	R	16.20		12.00	7.70	7.70				0.98	8844	9674	147	265	181	49850	2014	2349	117	0.28	0.54	191	0.47	0.81	173	32D1
			0.75		R	R	16.20	12.00	16.20	2.00	2.00																				
			0.75		W	W	16.20		16.20	8.00	8.00																				
			0.75		F	F	16.20		16.20	7.30	7.30																				
			0.75		9		16.20	6.40																							
			0.75		16		16.20	8.90																							
			0.75		3U		16.20	8.90																							
			0.75		14		16.20	12.00																							
32D2	Second Floor	5.5x18 GLB	0.00	0.60	R	R	16.20		12.00	7.70	7.70				0.98	3232	3637	55	265	481	20874	843	2349	278	0.07	0.54	743	0.18	0.81	439	32D2
			0.00	0.60	R	R	16.20	12.00	16.20	2.00	2.00																				
			0.00	0.60	W	W	16.20		16.20	8.00	8.00																				
			0.00	0.60	F	F	16.20		16.20	7.30	7.30																				
			0.00	0.60	9		16.20	6.40																							
			0.00	0.60	16		16.20	8.90																							
			0.00	0.60	3U		16.20	8.90																							
			0.00	0.60	14		16.20	12.00																							
32U1	Second Floor	5.5x18 GLB	0.75		R	R	16.20		12.00	7.70	7.70				0.98	7277	7764	118	265	225	35926	1452	2349	162	0.17	0.54	312	0.36	0.81	225	32U1
			0.75		R	R	16.20	12.00	16.20	2.00	2.00																				
			0.75		W	W	16.20		16.20	8.00	8.00																				
			0.75		F	F	16.20		16.20	7.30	7.30																				
			0.75		9		16.20	6.40																							
			0.75		16		16.20	8.90																							
			0.75		3U-		16.20	8.90																							
			0.75		14		16.20	12.00																							

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Beam			Loading									Adjustment factors				Stresses								Deflection							
#	Location	I.D.	Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _V	Loads (lb)		Shear (psi)			Moments				Live			Total			#
#			Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#
32U2	Second Floor	5.5x18 GLB	0.00	0.60	R	R	16.20		12.00	7.70	7.70				0.98	1144	1090	17	265		3549	143	2349		0.07	0.54	743	0.04	0.81		32U2
			0.00	0.60	R	R	16.20	12.00	16.20	2.00	2.00																				
			0.00	0.60	W	W	16.20		16.20	8.00	8.00																				
			0.00	0.60	F	F	16.20		16.20	7.30	7.30																				
			0.00	0.60	9		16.20	6.40																							
			0.00	0.60	16		16.20	8.90																							
					3U-		16.20	8.90																							
			0.00	0.60	14		16.20	12.00																							
33	Second Floor	3.5x11.875 GLB			F	F	18.20		18.20	1.33	1.33				666	666	24	265		3029	442	2110	478	0.15	0.61	406	0.21	0.91	443	33	
34	Second Floor	3.5x11.875 GLB			F	F	4.90		4.90	16.60	16.60				2237	2237	81	265	328	2740	400	2406	602	0.01	0.16		0.01	0.25		34	
35	Second Floor	3.5x11.875 GLB			W	W	6.80		6.80	10.00	10.00				3750	4256	154	265	173	7054	1029	2328	226	0.04	0.23	508	0.07	0.34	508	35	
					F	F	6.80		6.80	16.30	16.30																				
					49		6.80	4.80																							
					56		6.80	4.80																							
35D1	Second Floor	3.5x11.875 GLB	0.75		W	W	6.80		6.80	10.00	10.00				4101	4311	156	265	170	8543	1246	2328	187	0.06	0.23	409	0.08	0.34	438	35D1	
			0.75		F	F	6.80		6.80	16.30	16.30																				
			0.75		49		6.80	4.80																							
			0.75		56		6.80	4.80																							
			0.75		3U		6.80	3.00																							
35D2	Second Floor	3.5x11.875 GLB	0.00	0.60	W	W	6.80		6.80	10.00	10.00				2057	1867	74	265	357	5188	757	2328	308	0.03	0.23	775	0.04	0.34	799	35D2	
			0.00	0.60	F	F	6.80		6.80	16.30	16.30																				
			0.00	0.60	49		6.80	4.80																							
			0.00	0.60	56		6.80	4.80																							
					3U		6.80	3.00																							
35U1	Second Floor	3.5x11.875 GLB	0.75		W	W	6.80		6.80	10.00	10.00				2158	2777	100	265	264	3890	567	2328	410	0.01	0.23		0.03	0.34		35U1	
			0.75		F	F	6.80		6.80	16.30	16.30																				
			0.75		49		6.80	4.80																							
			0.75		56		6.80	4.80																							
			0.75		3U-		6.80	3.00																							
35U2	Second Floor	3.5x11.875 GLB	0.00	0.60	W	W	6.80		6.80	10.00	10.00				533	178	19	265		2460	359	2328	649	0.03	0.23	775	0.02	0.34		35U2	
			0.00	0.60	F	F	6.80		6.80	16.30	16.30																				
			0.00	0.60	49		6.80	4.80																							
			0.00	0.60	56		6.80	4.80																							
					3U-		6.80	3.00																							
36	Second Floor	3.5x11.875 GLB			F	F	14.70		14.70	1.33	1.33				538	538	19	265		1976	288	2155	748	0.06	0.49	771	0.09	0.74	841	36	
37	Second Floor	3.25x11.875 LSL			F	F	3.20		3.20	2.00	2.00				176	176	7	400		141	22	1700		0.00	0.11		0.00	0.16		37	
38	Second Floor	3.5x11.875 GLB			F	F	3.50		2.50	1.80	1.80				255	329	12	265		328	48	2488		0.00	0.12		0.00	0.18		38	
					61		3.50	2.50																							

Beam Calculations

Beam			Loading									Adjustment factors				Stresses								Deflection							
#			Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _v	Loads (lb)		Shear (psi)			Moments				Live			Total			#
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#
39	Second Floor	1.75x11.875 LSL			F	F	3.60		3.60	3.40	3.40					337	337	24	310		303	88	2327		0.00	0.12		0.00	0.18		39
40	Second Floor	3.5x11.875 GLB			F	F	15.40		15.40	1.33	1.33					563	563	20	265		2169	316	2145	678	0.08	0.51	670	0.11	0.77	731	40
41	Second Floor	2-2x8			F	F	3.60		3.60	3.40	3.40					418	522	36	180	500	467	213	1000	469	0.00	0.12		0.01	0.18		41
					69		3.60	2.50																							
42	Second Floor	2-2x8			F	F	3.60		3.60	1.30	1.30					129	129	9	180		116	53	1000		0.00	0.12		0.00	0.18		42
43	Second Floor	2-2x8			F	F	3.60		3.60	2.70	2.70					267	267	18	180	976	241	110	1000	910	0.00	0.12		0.00	0.18		43
44	Second Floor	2-2x8			F	F	3.60		3.60	3.40	3.40					570	439	39	180	458	516	236	1000	424	0.01	0.12		0.01	0.18		44
					73		3.60	1.10																							
45	Second Floor	2-2x8			F	F	3.60		3.60	3.40	3.40					337	337	23	180	775	303	138	1000	723	0.00	0.12		0.00	0.18		45
46	Second Floor	5.5x5.5 GLB			W	W	2.70		2.70	8.00	8.00					108	108	5	265		73	32	3163		0.00	0.09		0.00	0.14		46
47	Second Floor	5.5x5.5 GLB			W	W	5.90		5.90	8.00	8.00					236	236	12	265		348	151	2925		0.00	0.20		0.02	0.30		47
48	Second Floor	5.5x5.5 GLB			W	W	2.20		2.20	8.00	8.00					88	88	4	265		48	21	3229		0.00	0.07		0.00	0.11		48
49	Second Floor	4x8			R	R	3.20		3.20	4.00	4.00			1.30		994	994	59	180	306	796	311	1235	397	0.01	0.11		0.01	0.16		49
					W	W	3.20		3.20	6.00	6.00																				
					F	F	3.20		3.20	7.30	7.30																				
50	Second Floor	4x8			W	W	6.40		6.40	8.00	8.00			1.30		1541	1541	91	180	198	2465	965	1235	128	0.07	0.21	323	0.11	0.32	294	50
					F	F	6.40		6.40	7.30	7.30																				
51	Second Floor	4x8			R	R	2.70		2.70	4.00	4.00			1.30		694	694	41	180	439	468	183	1235	674	0.00	0.09		0.00	0.14		51
					W	W	2.70		2.70	9.00	9.00																				
					F	F	2.70		2.70	4.80	4.80																				
52	Deck	P.T. 5.5x13.5 GLB			D	D	18.00		18.00	6.80	6.80			1.00		4590	4590	93	265	286	20655	1484	2392	161	0.47	0.60	126	0.59	0.60	101	52
53	Deck	P.T. 5.5x13.5 GLB			D	D	18.00		18.00	6.80	6.80			1.00		4590	4590	93	265	286	20655	1484	2392	161	0.47	0.60	126	0.59	0.60	101	53
54	Second Floor	5.5x13.5 GLB			R	R	14.00		2.10	10.00	10.00					4572	4572	92	265	287	15448	1110	2453	221	0.27	0.47	175	0.47	0.70	150	54
					R	R	14.00	11.90	14.00	10.00	10.00																				
					W	W	14.00		2.10	1.00	1.00																				
					W	W	14.00	11.90	14.00	1.00	1.00																				
					F	F	14.00		2.10	1.33	1.33																				
					F	F	14.00	11.90	14.00	1.33	1.33																				
					W	W	14.00		14.00	9.00	9.00																				
					F	F	14.00		14.00	1.33	1.33																				
					39		14.00	2.10																							
					40		14.00	5.40																							
					40		14.00	8.60																							
					39		14.00	11.90																							
54D1	Second Floor	5.5x13.5 GLB	0.75		R	R	14.00		2.10	10.00	10.00				6608	1303	133	265	199	14835	1066	2453	230	0.20	0.47	230	0.40	0.70	175	54D1	
			0.75		R	R	14.00	11.90	14.00	10.00	10.00																				
			0.75		W	W	14.00		2.10	1.00	1.00																				
			0.75		W	W	14.00	11.90	14.00	1.00	1.00																				

Beam Calculations

Beam			Loading									Adjustment factors				Stresses								Deflection										
#			Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _v	Loads (lb)		Shear (psi)			Moments				Live			Total			#			
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#			
			0.75		F	F	14.00		2.10	1.33	1.33																							
			0.75		F	F	14.00	11.90	14.00	1.33	1.33																							
			0.75		W	W	14.00		14.00	9.00	9.00																							
			0.75		F	F	14.00		14.00	1.33	1.33																							
			0.75		39		14.00	2.10																										
			0.75		AM		14.00	2.10																										
			0.75		40		14.00	5.40																										
			0.75		40		14.00	8.60																										
			0.75		39		14.00	11.90																										
			0.75		AM-		14.00	11.90																										
54D2	Second Floor	5.5x13.5 GLB	0.00	0.60	R	R	14.00		2.10	10.00	10.00					4801	2272	97	265	273	5155	370	1226	331	0.02	0.47		0.13	0.70	553	54D2			
			0.00	0.60	R	R	14.00	11.90	14.00	10.00	10.00																							
			0.00	0.60	W	W	14.00		2.10	1.00	1.00																							
			0.00	0.60	W	W	14.00	11.90	14.00	1.00	1.00																							
			0.00	0.60	F	F	14.00		2.10	1.33	1.33																							
			0.00	0.60	F	F	14.00	11.90	14.00	1.33	1.33																							
			0.00	0.60	W	W	14.00		14.00	9.00	9.00																							
			0.00	0.60	F	F	14.00		14.00	1.33	1.33																							
			0.00	0.60	39		14.00	2.10																										
					AM		14.00	2.10																										
			0.00	0.60	40		14.00	5.40																										
			0.00	0.60	40		14.00	8.60																										
			0.00	0.60	39		14.00	11.90																										
					AM-		14.00	11.90																										
54U1	Second Floor	5.5x13.5 GLB	0.75		R	R	14.00		2.10	10.00	10.00					1303	6608	133	265	199	14835	1066	2453	230	0.20	0.47	230	0.40	0.70	175	54U1			
			0.75		R	R	14.00	11.90	14.00	10.00	10.00																							
			0.75		W	W	14.00		2.10	1.00	1.00																							
			0.75		W	W	14.00	11.90	14.00	1.00	1.00																							
			0.75		F	F	14.00		2.10	1.33	1.33																							
			0.75		F	F	14.00	11.90	14.00	1.33	1.33																							
			0.75		W	W	14.00		14.00	9.00	9.00																							
			0.75		F	F	14.00		14.00	1.33	1.33																							
			0.75		39		14.00	2.10																										
			0.75		AM-		14.00	2.10																										
			0.75		40		14.00	5.40																										
			0.75		40		14.00	8.60																										
			0.75		39		14.00	11.90																										
			0.75		AM		14.00	11.90																										

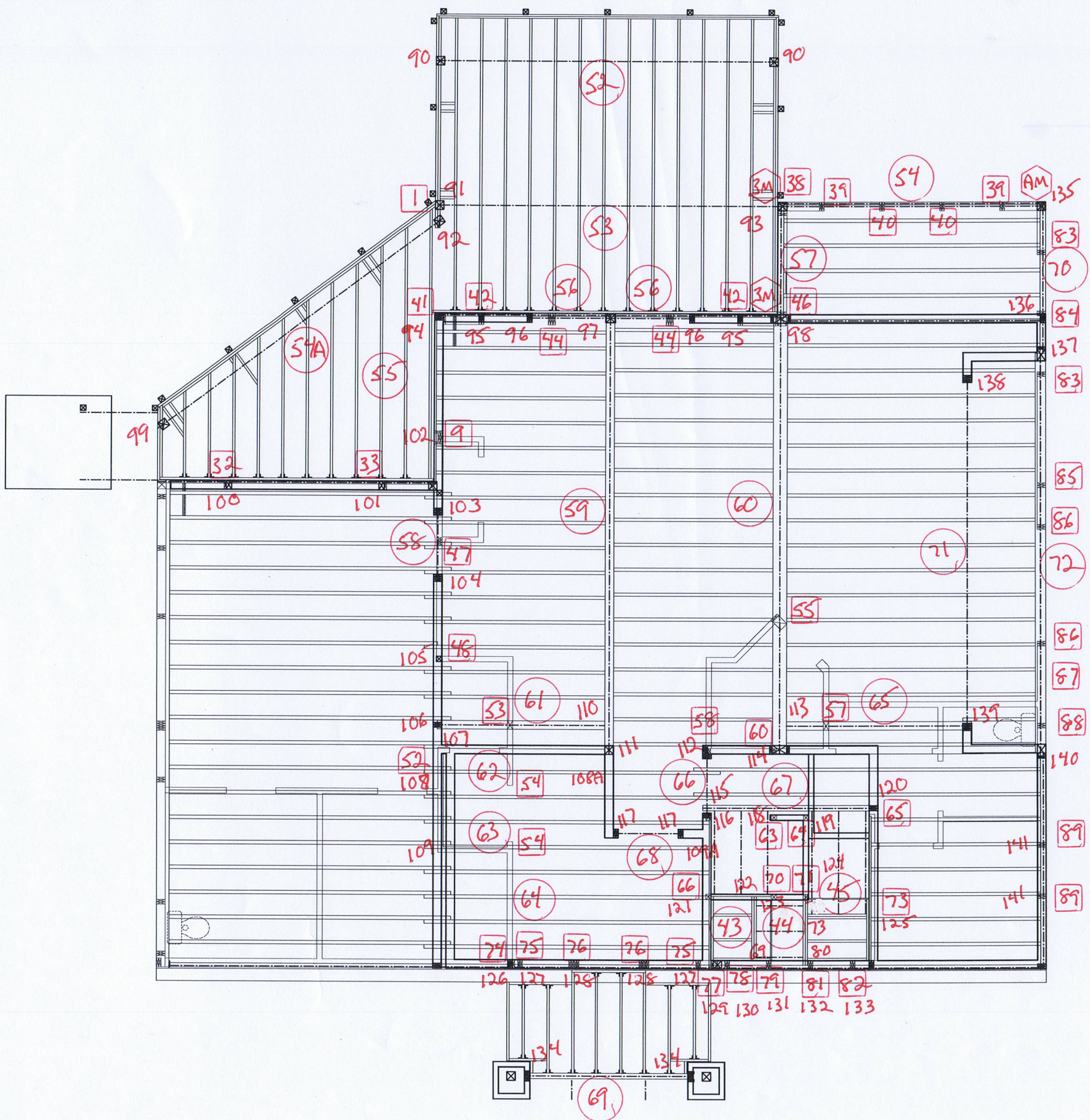
Beam Calculations

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Beam			Loading									Adjustment factors				Stresses								Deflection												
#	Location	I.D.	Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _v	Loads (lb)		Shear (psi)			Moments				Live			Total			#					
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#					
54U2	Second Floor	5.5x13.5 GLB	0.00	0.60	R	R	14.00		2.10	10.00	10.00					2272	4801	97	265	273	5155	370	1226	331	0.02	0.47		0.13	0.70	554	54U2					
			0.00	0.60	R	R	14.00	11.90	14.00	10.00	10.00																									
			0.00	0.60	W	W	14.00		2.10	1.00	1.00																									
			0.00	0.60	W	W	14.00	11.90	14.00	1.00	1.00																									
			0.00	0.60	F	F	14.00		2.10	1.33	1.33																									
			0.00	0.60	F	F	14.00	11.90	14.00	1.33	1.33																									
			0.00	0.60	W	W	14.00		14.00	9.00	9.00																									
			0.00	0.60	F	F	14.00		14.00	1.33	1.33																									
			0.00	0.60	39		14.00	2.10																												
					AM-		14.00	2.10																												
			0.00	0.60	40		14.00	5.40																												
			0.00	0.60	40		14.00	8.60																												
			0.00	0.60	39		14.00	11.90																												
					AM		14.00	11.90																												
54A	Deck	P.T. 5.5x13.5 GLB			D	D	18.80		18.80	9.80	2.90			0.99	5287	3666	107	265	248	21208	1523	2381	156	0.41	0.63	154	0.51	0.63	123	54A						
55	Deck	P.T. 2x12			D	D	13.40		13.40	1.33	1.33				668	668	59	150	252	2239	849	850	100	0.20	0.45	220	0.25	0.45	176	55						
56	Main Floor	4x8			R	R	4.40		1.20	2.00	2.00			1.30	2205	1171	130	180	138	2358	923	1235	134	0.02	0.15	886	0.04	0.22	511	56						
					W	W	4.40		4.40	19.00	19.00																									
					F	F	4.40		4.40	1.33	1.33																									
					44		4.40	1.20																												
57	Second Floor	3.5x11.875 GLB			R	R	6.00		6.00	4.00	4.00				3279	3279	118	265	224	4919	718	2358	329	0.02	0.20	882	0.04	0.30	828	57						
					W	W	6.00		6.00	4.00	4.00																									
					F	F	6.00		6.00	7.30	7.30																									
					W	W	6.00		6.00	9.00	9.00																									
					F	F	6.00		6.00	7.30	7.30																									
58	Main Floor	6x8			R	R	3.40		2.30	7.70	7.70				3524	4316	162	170	105	3934	980	1350	138	0.02	0.11	632	0.03	0.17	595	58						
					R	R	3.40	2.30	3.40	2.00	2.00																									
					W	W	3.40		3.40	8.00	8.00																									
					F	F	3.40		3.40	7.60	7.60																									
					W	W	3.40		3.40	9.00	9.00																									
					F	F	3.40		3.40	12.40	12.40																									
					47		3.40	2.30																												
59	Main Floor	5.5x21 GLB			F	F	23.00		23.00	9.50	9.50			0.93	6212	9704	126	265	210	36889	1095	2233	204	0.34	0.77	229	0.47	1.15	247	59						
					110		23.00	21.80																												
60	Main Floor	8.75x24 GLB			F	F	23.00		23.50	9.90	9.90			0.88	10915	21651	155	265	171	105156	1502	2103	140	0.33	0.77	234	0.49	1.15	235	60						
					55		23.00	16.10																												
					113		23.00	21.80																												
61	Main Floor	5.5x11.875 GLB			F	F	10.20		10.20	1.33	1.33				795	489	18	265		1635	152	2564		0.02	0.34		0.02	0.51		61						

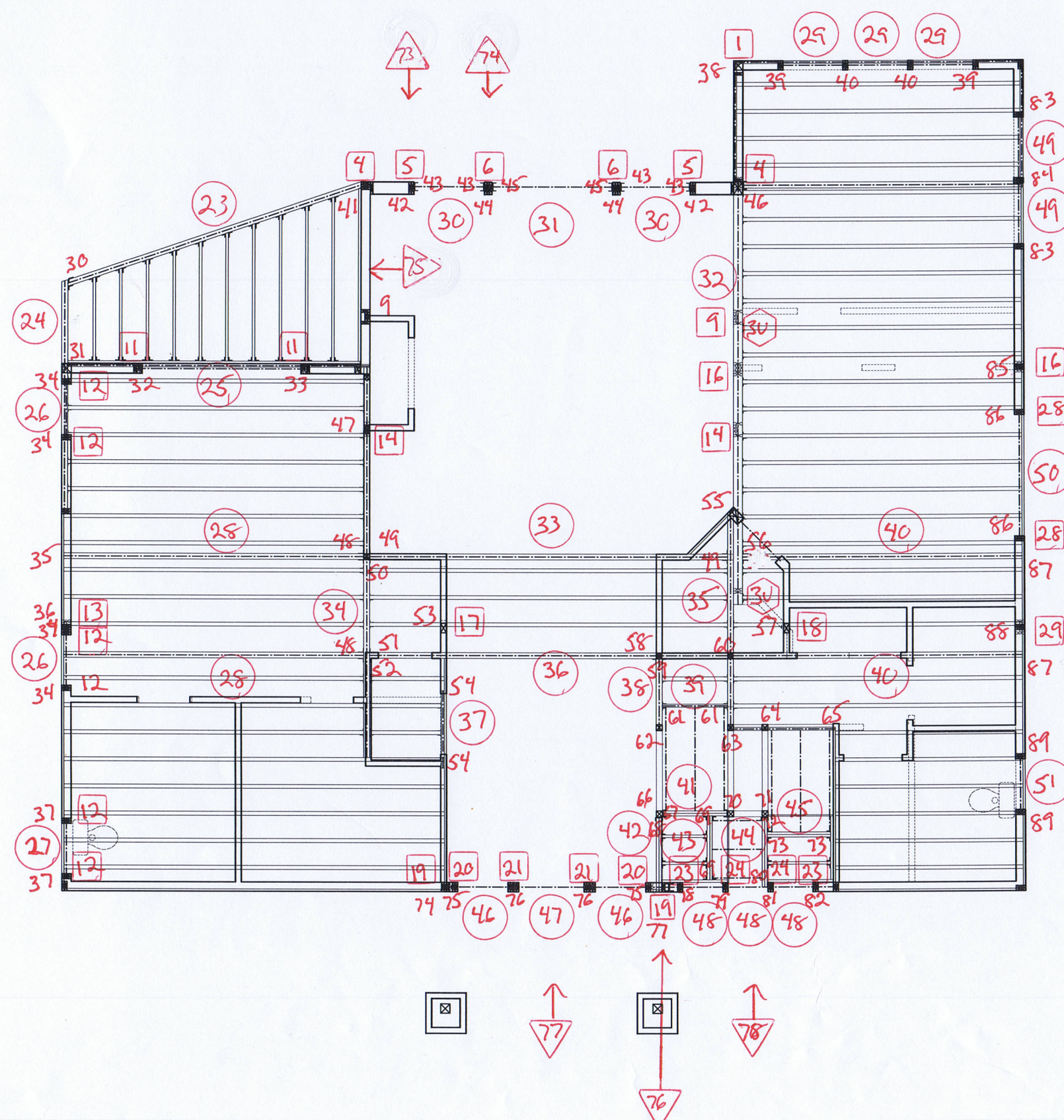
Beam Calculations

Beam			Loading								Adjustment factors				Stresses								Deflection												
#			Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _V	Loads (lb)		Shear (psi)			Moments				Live			Total			#				
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#				
					51		10.20	2.20																											
65	Main Floor	5.5x11.875 GLB			F	F	10.20		10.20	1.33	1.33					5475	2118	126	265	211	13723	1274	2564	201	0.09	0.34	365	0.15	0.51	347	65				
					57		10.20	2.60																											
66	Main Floor	4x8			F	F	3.20		3.20	7.30	7.30			1.30		744	1357	80	180	224	689	270	1235	458	0.01	0.11		0.01	0.16		66				
					115		3.20	2.80																											
67	Main Floor	3.5x9.5 glb			F	F	9.00		9.00	3.30	3.30					817	817	37	265	719	1838	419	2778	663	0.04	0.30	693	0.06	0.45	756	67				
68	Main Floor	4x8			F	F	3.50		3.50	1.33	1.33			1.30		128	128	8	180		112	44	1235		0.00	0.12		0.00	0.18		68				
69	Deck	P.T. 4x10			D	D	8.80		8.80	4.70	4.70			1.20		1551	1551	72	150	209	3412	820	1020	124	0.10	0.29	285	0.13	0.29	228	69				
70	Main Floor	3.5x11.875 GLB			R	R	6.00	3.50	6.00	4.00	4.00					2192	3205	116	265	229	4603	671	2358	351	0.03	0.20	714	0.04	0.30	681	70				
					W	W	6.00	3.50	6.00	2.00	2.00																								
					F	F	6.00	3.50	6.00	7.30	7.30																								
					W	W	6.00		6.00	9.00	9.00																								
					F	F	6.00		6.00	7.30	7.30																								
					83		6.00	3.50																											
71	Main Floor	5.5x13.5 GLB			F	F	18.60		18.60	7.30	7.30			0.99		3734	3734	75	265	351	17363	1247	2384	191	0.39	0.62	160	0.53	0.93	175	71				
72	Main Floor	6.75x24 GLB			R	R	21.00	0.90	9.10	4.00	4.00			0.91		12420	13590	126	265	211	65096	1205	2178	181	0.31	0.70	223	0.53	1.05	196	72				
					R	R	21.00	15.40	21.00	4.00	4.00																								
					W	W	21.00	0.90	9.10	8.00	8.00																								
					W	W	21.00	15.40	21.00	8.00	8.00																								
					F	F	21.00	0.90	9.10	7.30	7.30																								
					F	F	21.00	15.40	21.00	7.30	7.30																								
					W	W	21.00		21.00	9.00	9.00																								
					F	F	21.00		21.00	2.00	2.00																								
					83		21.00	0.90																											
					85		21.00	6.80																											
					86		21.00	9.10																											
					86		21.00	15.40																											
					87		21.00	16.30																											
					88		21.00	19.80																											
73	Front Wall	2-2x8			WI	WI	16.80		16.80	3.10	3.10	1.60				449	449	31	288	929	1887	862	1600	186	0.59	0.84	142	0.59	0.84	142	73				
74	Front Wall	3-2x8	0.70		WI	WI	19.10		19.10	5.10	5.10	1.60				588	588	27	288		2809	855	1600	187	0.76	0.96	126	0.76	0.96	126	74				
75	Side Wall	2x6	0.70		WI	WI	15.70		15.70	1.33	1.33	1.60				126	126	23	288		495	785	1600	204	0.62	0.79	126	0.62	0.79	126	75				
76	Entry Wall	W5x16			142		18.00	6.20				1.60				1049	465	334	38400		5435	7628	38400	503	0.41	0.90	218	0.41	0.90	218	76				
					143		18.00	4.70																											
77	Entry Wall	5.5x5.5 glb-			WI	WI	10.70		10.70	9.00	9.00					831	831	41	265	643	2222	962	2297	239	0.32	0.54	169	0.32	0.54	169	77				
78	Entry Wall	5.5x5.5 glb-			WI	WI	8.10		8.10	9.00	9.00					629	629	31	265	850	1273	551	2362	429	0.10	0.41	390	0.10	0.41	390	78				

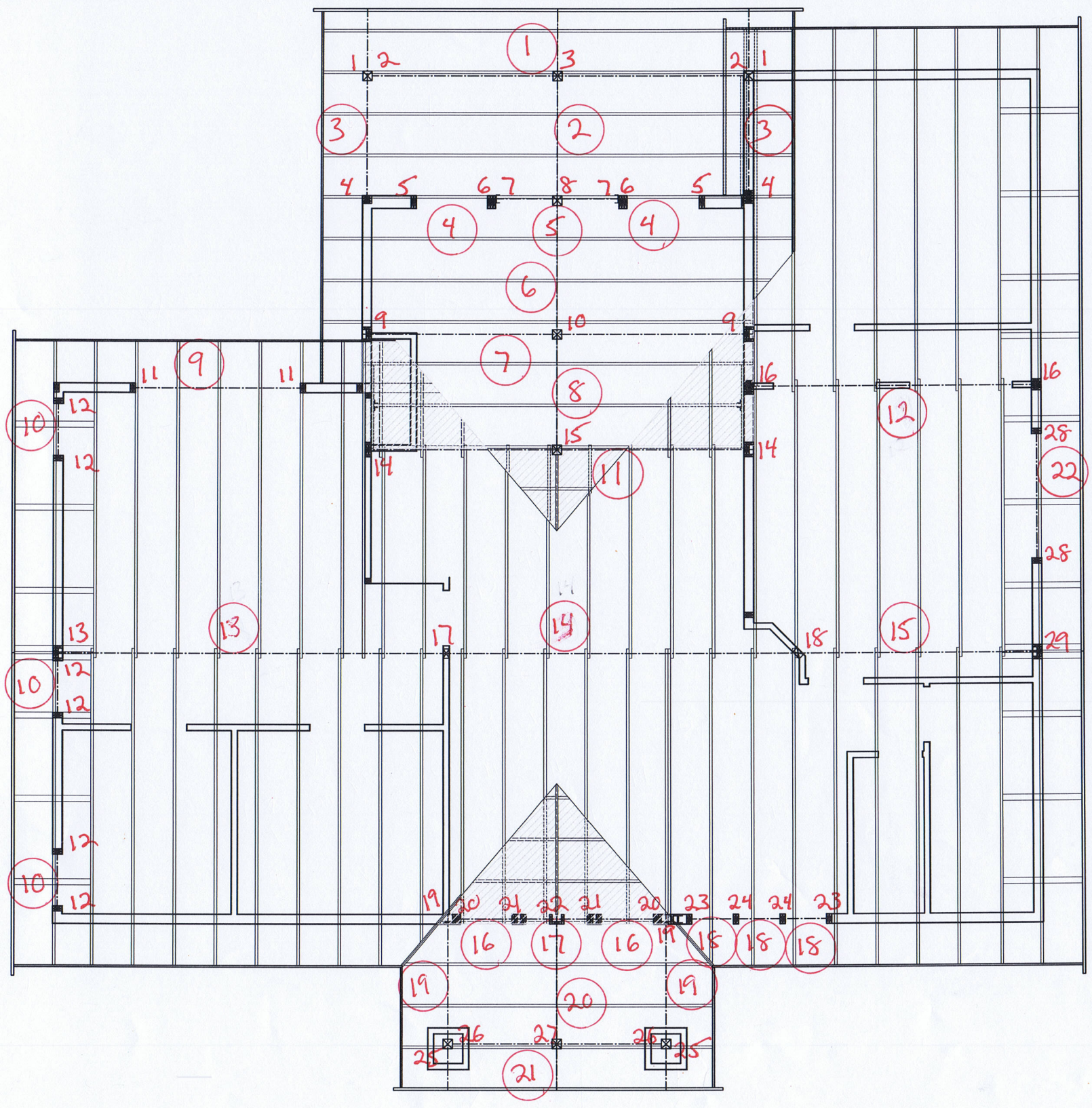


Post Numbers
 # Posts Above
 # Beam Numbers
 # Lateral loads Above

Gravity Load Keyplan



- # Post Numbers
- # Posts Above
- # Beam Numbers
- # Lateral loads Above
- △ Lateral Loads on Stud walls



Post Numbers

⊙ Beam Numbers

Main Wind Force Resisting System

18-025 Lat

3/30/2020

Grid #	Factor	Grid # for Load Above	L (ft)	B (ft)	Proj. Area (ft ²)	Surface Direction	Surface Type	Roof Angle		Pressure Coefficients		Design Pressure p (Eq 6-17) (psf)	Design Load		Min. Design Load		Load used for Design F (lb)
								Pitch	θ (Deg)	C_p (Fig 27.4.1) External	GC_{pi} (Table 26.11-1) Internal		Tributary F (lb)	Total F (lb)	Tributary F (lb)	Total F (lb)	
1U			41.0	48.0	30	Windward	Wall			0.80	-0.18	18.3	548	2718	480	1120	1631
			41.0	48.0	30	Leeward	Wall			-0.50	0.18	11.4	343				
			41.0	48.0	80	Windward	Roof	6	26.6	0.40	-0.18	9.1	731		640		
			41.0	48.0	80	Leeward	Roof	6	26.6	-0.60	0.18	13.7	1096				
2BU			41.0	48.0	84	Windward	Wall			0.80	-0.18	18.3	1535	4655	1344	2336	2793
			41.0	48.0	30	Leeward	Wall			-0.50	0.18	11.4	343				
			41.0	48.0	124	Windward	Roof	6	26.6	0.40	-0.18	9.1	1133		992		
			41.0	48.0	120	Leeward	Roof	6	26.6	-0.60	0.18	13.7	1645				
3U			41.0	48.0	82	Windward	Wall			0.80	-0.18	18.3	1499	5263	1312	2256	3158
			41.0	48.0	60	Leeward	Wall			-0.50	0.18	11.4	685				
			41.0	48.0	118	Windward	Roof	6	26.6	0.40	-0.18	9.1	1078		944		
			41.0	48.0	146	Leeward	Roof	6	26.6	-0.60	0.18	13.7	2001				
4U			41.0	48.0	32	Windward	Wall			0.80	-0.18	18.3	585	2796	512	1056	1678
			41.0	48.0	68	Windward	Roof	6	26.6	0.40	-0.18	9.1	621		544		
			41.0	48.0	116	Leeward	Roof	6	26.6	-0.60	0.18	13.7	1590				
AU			48.0	41.0	60	Windward	Wall			0.80	-0.18	18.3	1096	1096	960	960	658
CU			48.0	41.0	130	Windward	Wall			0.80	-0.18	18.3	2376	3518	2080	2480	2111
			48.0	41.0	50	Windward	Roof	7	30.3	0.40	-0.18	9.1	457		400		
			48.0	41.0	50	Leeward	Roof	7	30.3	-0.60	0.18	13.7	685				
DU			48.0	41.0	196	Windward	Wall			0.80	-0.18	18.3	3582	5937	3136	3536	3562
			48.0	41.0	114	Leeward	Wall			-0.47	0.18	10.6	1213				
			48.0	41.0	50	Windward	Roof	7	30.3	0.40	-0.18	9.1	457		400		
			48.0	41.0	50	Leeward	Roof	7	30.3	-0.60	0.18	13.7	685				
1M			41.0	48.0	72	Windward	Wall			0.80	-0.18	18.3	1316	4856	1152	2272	2914
			41.0	48.0	72	Leeward	Wall			-0.50	0.18	11.4	822				
		1U											2718		1120		
2AM			41.0	48.0	152	Windward	Wall			0.80	-0.18	18.3	2778	2778	2432	2432	1667
2BM			41.0	48.0	160	Windward	Wall			0.80	-0.18	18.3	2924	8402	2560	4896	5041
			41.0	48.0	72	Leeward	Wall			-0.50	0.18	11.4	822				
		2BU											4655		2336		
3M			41.0	48.0	156	Windward	Wall			0.80	-0.18	18.3	2851	10060	2496	4752	6036
			41.0	48.0	132	Leeward	Wall			-0.50	0.18	11.4	1508				
			41.0	48.0	32	Leeward	Roof			-0.60	0.18	13.7	439				
		3U											5263		2256		
4M			41.0	48.0	70	Windward	Wall			0.80	-0.18	18.3	1279	5217	1120	2176	3130

Main Wind Force Resisting System

18-025 Lat

3/30/2020

Grid #	Factor	Grid # for Load Above	L (ft)	B (ft)	Proj. Area (ft ²)	Surface Direction	Surface Type	Roof Angle		Pressure Coefficients		Design Pressure p (Eq 6-17) (psf)	Design Load		Min. Design Load		Load used for Design F (lb)
								Pitch	θ (Deg)	C_p (Fig 27.4.1) External	GC_{pi} (Table 26.11-1) Internal		Tributary F (lb)	Total F (lb)	Tributary F (lb)	Total F (lb)	
			41.0	48.0	52	Leeward	Wall			-0.50	0.18	11.4	594				
			41.0	48.0	40	Leeward	Roof			-0.60	0.18	13.7	548				
		4U											2796		1056		
AM			48.0	41.0	182	Windward	Wall			0.80	-0.18	18.3	3326	7867	2912	5840	4720
			48.0	41.0	24	Leeward	Wall			-0.47	0.18	10.6	255				
	0.85	BM											3189		1968		
		AU											1096		960		
BM			48.0	41.0	72	Windward	Wall			0.80	-0.18	18.3	1316	3752	1152	1968	2251
			48.0	41.0	10	Leeward	Wall			-0.47	0.18	10.6	106				
			48.0	41.0	102	Windward	Roof			0.40	-0.18	9.1	932		816		
			48.0	41.0	102	Leeward	Roof			-0.60	0.18	13.7	1398				
CM			48.0	41.0	160	Windward	Wall			0.80	-0.18	18.3	2924	6442	2560	5040	3865
		CU											3518		2480		
DM			48.0	41.0	198	Windward	Wall			0.80	-0.18	18.3	3618	11438	3168	8672	6863
			48.0	41.0	124	Leeward	Wall			-0.47	0.18	10.6	1320				
	0.15	BM											563		1968		
		DU											5937		3536		
1B			48.0	41.0	78	Windward	Wall			0.80	-0.18	18.3	1425	6282	1248	3520	3769
		1M											4856		2272		
2B			48.0	41.0	178	Windward	Wall			0.80	-0.18	18.3	3253	20125	2848	17712	12075
	0.43	3B											5693		7536		
		2AM											2778		2432		
		2BM											8402		4896		
3B			48.0	41.0	174	Windward	Wall			0.80	-0.18	18.3	3180	13240	2784	7536	7944
		3M											10060		4752		
4B			48.0	41.0	76	Windward	Wall			0.80	-0.18	18.3	1389	8936	1216	8752	5361
	0.57	3B											7547		7536		
BB			41.0	48.0	230	Windward	Wall			0.80	-0.18	18.3	4203	13644	3680	9520	8186
	1.20	AM											9441		5840		
CB			41.0	48.0	230	Windward	Wall			0.80	-0.18	18.3	4203	10645	3680	8720	6387
		CM											6442		5040		
DB			41.0	48.0	230	Windward	Wall			0.80	-0.18	18.3	4203	19844	3680	16032	11906
			41.0	48.0	230	Windward	Wall			0.80	-0.18	18.3	4203		3680		
		DM											11438		8672		

Seismic Calculations

Spectral Response Acceleration, $S_s = 144.40$

Maximum Spectral Response Acceleration, $S_{MS} = 1.44$

Site Class = D

5%Damped Design Spectral Response Acceleration, $S_{DS} = 0.96$

Site Coefficient, $F_a = 1.00$

Default Response Modification Coefficient, $R = 6.50$

Height Coefficient, $F = 1.20$

Seismic Design Category = D

Grid #	Load Type	Level	Direction (On Page)	Areas (ft ²)	Code Sect.	Fctr.	Ω_o	R	Loads						Eq. 12.4-3 $E = \rho Q_E$ (lb)	Eq. 5 0.7*E (lb)	Eq. 16-52 $E_m = \Omega_o Q_E$ (lb)	
									Live (lb/ft ²)	Dead (lb/ft ²)	w_x (lb)	FS_{DS}/R	F_{xi} (lb)	Q_E (lb)				ρ_{used}
1U	R	Upper Floor	U-D	292						15.0	4380	0.178	778	778	1.30	1012	779	
2BU	R	Upper Floor	U-D	564						15.0	8460	0.178	1504	1504	1.30	1955	1505	
3U	R	Upper Floor	U-D	770						15.0	11550	0.178	2053	2053	1.30	2669	2055	
4U	R	Upper Floor	U-D	420						15.0	6300	0.178	1120	1120	1.30	1456	1121	
AU	R	Upper Floor	L-R	478						15.0	7170	0.178	1274	1274	1.30	1657	1276	
CU	R	Upper Floor	L-R	438						15.0	6570	0.178	1168	1168	1.30	1518	1169	
DU	R	Upper Floor	L-R	1054						15.0	15810	0.178	2810	2810	1.30	3653	2813	
1M	F	Main Floor	U-D	196						25.0	4900	0.178	871	1761	1.30	2290	1763	
	D			42						15.0	630	0.178	112					
	1U												778					
2AM	R	Main Floor	U-D	240						15.0	3600	0.178	640	800	1.30	1040	801	
	D			60						15.0	900	0.178	160					
2BM	F	Main Floor	U-D	302						25.0	7550	0.178	1342	2845	1.30	3699	2848	
	2BU												1504					
3M	F	Main Floor	U-D	406						25.0	10150	0.178	1804	3857	1.30	5014	3860	
	3U												2053					
4M	F	Main Floor	U-D	304						25.0	7600	0.178	1351	2470	1.30	3211	2473	
	4U												1120					
AM	F	Main Floor	L-R	304			1.25			25.0	7600	0.178	1351	3454	1.30			4318
	BM					0.85							829					
	AU												1274					
BM	R	Main Floor	L-R	316						15.0	4740	0.178	842	976	1.30	1268	977	
	D			50						15.0	750	0.178	133					
CM	F	Main Floor	L-R	238						25.0	5950	0.178	1057	2337	1.30	3038	2339	
	D			42						15.0	630	0.178	112					
	CU												1168					
DM	F	Main Floor	L-R	666			1.25			25.0	16650	0.178	2959	5915	1.30			7394
	BM					0.15							146					
	DU												2810					
1B	F	Basement	U-D	196						25.0	4900	0.178	871	2771	1.30	3602	2773	
	D			52						15.0	780	0.178	139					
	1M												1761					
2B	F	Basement	U-D	524			1.25			25.0	13100	0.178	2328	9608	1.30			12010

Seismic Calculations

Spectral Response Acceleration, $S_s = 144.40$

Maximum Spectral Response Acceleration, $S_{MS} = 1.44$

Site Class = D

5%Damped Design Spectral Response Acceleration, $S_{DS} = 0.96$

Site Coefficient, $F_a = 1.00$

Default Response Modification Coefficient, $R = 6.50$

Height Coefficient, $F = 1.20$

Seismic Design Category = D

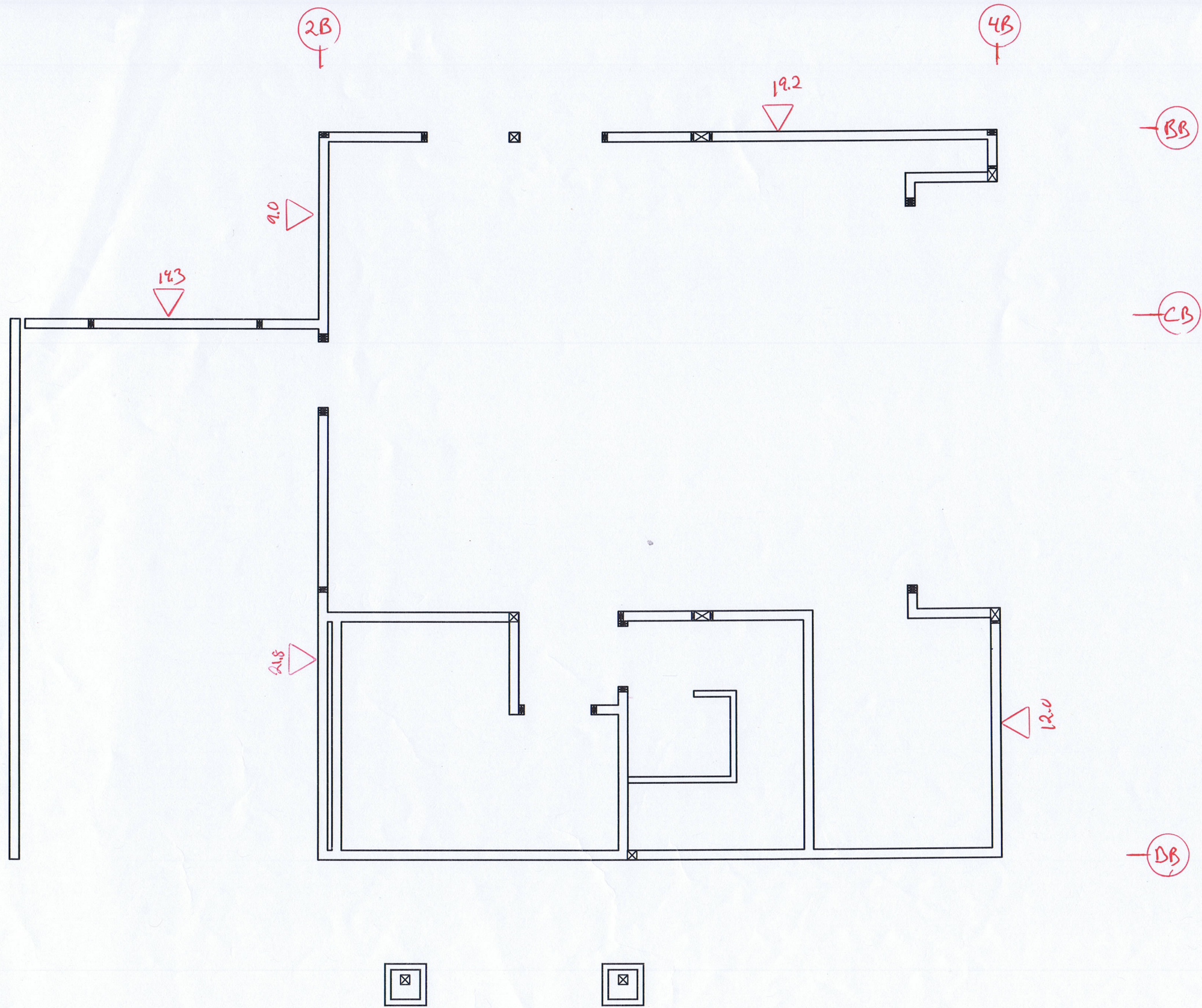
Grid #	Load Type	Level	Direction (On Page)	Areas (ft ²)	Code Sect.	Fctr.	Ω_o	R	Loads						Eq. 12.4-3 $E = \rho Q_E$ (lb)	Eq. 5 0.7*E (lb)	Eq. 16-52 $E_m = \Omega_o Q_E$ (lb)
									Live (lb/ft ²)	Dead (lb/ft ²)	w_x (lb)	FS_{DS}/R	F_{xi} (lb)	Q_E (lb)			
	D			238						15.0	3570	0.178	634				
	3B					0.43							3000				
	2AM												800				
	2BM												2845				
3B	F	Basement	U-D	616						25.0	15400	0.178	2737	6977	1.30	9071	6984
	D			144						15.0	2160	0.178	384				
	3M												3857				
4B	F	Basement	U-D	306			1.25			25.0	7650	0.178	1360	7807	1.30		9759
	3B					0.57							3977				
	4M												2470				
BB	F	Basement	L-R	668			1.25			25.0	16700	0.178	2968	8857	1.30		11071
	D			288						15.0	4320	0.178	768				
	AM					1.20							4145				
	BM												976				
CB	F	Basement	L-R	196						25.0	4900	0.178	871	3597	1.30	4676	3601
	D			146						15.0	2190	0.178	389				
	CM			406								0.178	2337				
DB	F	Basement	L-R	778						25.0	19450	0.178	3457	9372	1.30	12184	9381
	DM												5915				

Panel Analysis

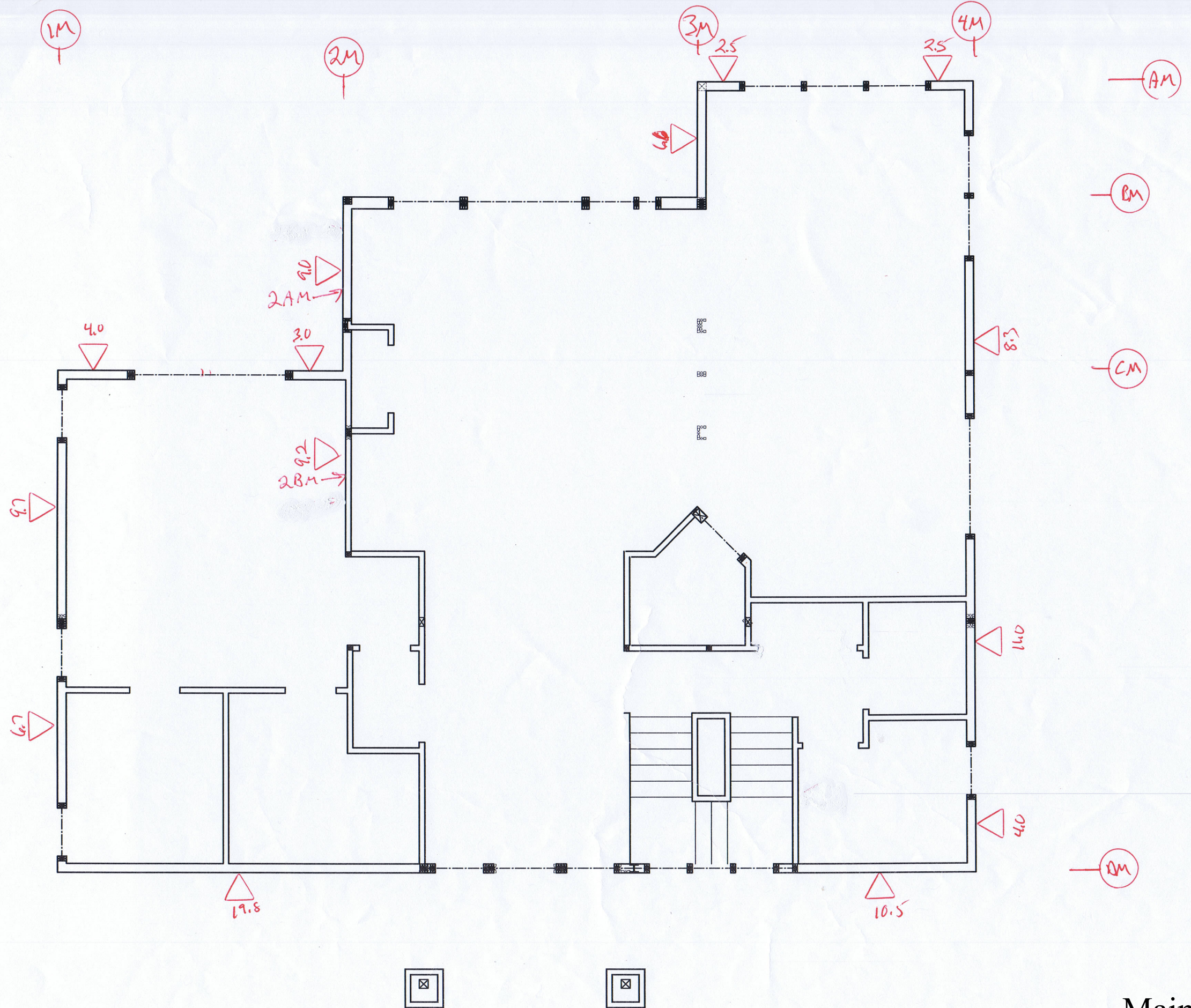
Panel															Design Loads		Panel Shears								Holddown Options												
Grid #		Materials				Height (ft.)	Individual Panel Lengths						Shear Panel Adjustments			Wind (lb)	Seismic (lb)	Wind			Seismic				Post Loads			Anchor Bolt Holdowns					Tie Straps				
Level _i	Grid Above	Wall Size	Nail Size	Panel Type	S.G.		#1 (ft)	#2 (ft)	#3 (ft)	#4 (ft)	#5 (ft)	#6 (ft)	Perforated Panel					S.G.	Act. (lb/ft)	Allowable			Act. (lb/ft)	Allowable			Uplift (lb)	2/3 Dead (lb)	Net (lb)	Model	Post		Cap. (lb)	Model	Cap. (lb)	Min. Lgth. (in)	
													Max Height (ft)	Total Width (ft)	%					C _o	C _{SG}	Type		Base (lb/ft)	Cap. (lb/ft)	Type					Base (lb/ft)	C _s					Cap. (lb/ft)
Defaults (Dflt.)				2x6	8d	15/32" Ply	0.4																														
1U						8.0	9.7	6.7							0.93	1,631	779	99	P1-6	365	339	48	P1-6	260		242	796		796								
2BU						8.0	9.2								0.93	2,793	1,505	304	P1-6	365	339	164	P1-6	260		242	2429		2429	HDU4			3285	MSTC52	3650	13	
3U						8.0	10.9								0.93	3,158	2,055	290	P1-6	365	339	189	P1-6	260		242	2318		2318	HDU4			3285	MSTC40	2325	12	
4U						8.0	17.5	17.5							0.93	1,678	1,121	48	P1-6	365	339	32	P1-6	260		242	383		383								
AU						0.5	14.4								0.93	658	1,276	46	P1-6	365	339	89	P1-6	260		242	44		44								
CU						8.0	3.0	4.0							0.93	2,111	1,169	302	P1-6	365	339	167	P1-6	260	0.75	181	2412		2412	HDU4			3285	MSTC52	3650	12	
DU						8.0	10.5	19.8							0.93	3,562	2,813	118	P1-6	365	339	93	P1-6	260		242	941		941								
1M						9.0	9.7	6.7							0.93	2,914	1,763	178	P1-6	365	339	107	P1-6	260		242	1599		1599	HDU2			2215	CS16	1705	8	
2AM						16.5	9.0								0.93	1,667	801	185	P1-6	365	339	89	P1-6	260		242	3056		3056	HDU4			3285	MSTC52	3650	16	
2BM	2BU					9.0	9.2								0.93	5,041	2,848	548	P1-3	685	637	310	P1-4	380		353	4931		4931	HDU5	DF	4x6	5645	MSTC78	5505	26	
3M						9.0	6.6								0.93	6,036	3,860	915	P2-4	1065	990	585	P1-2	640		595	8231		8231	HDQ8	DF	6x6	9230				
4M						9.0	8.3	11.0	4.0						0.93	3,130	2,473	134	P1-6	365	339	106	P1-6	260	0.89	215	1209		1209	HDU2			2215	CS16	1705	6	
AM						6.0	2.5	2.5							0.93	4,720	4,318	944	P2-4	1065	990	864	P2-2	1280	0.83	992	5664	200	5464	HDU5	DF	4x6	5645	MSTC78	5505	28	
CM	CU					9.0	4.0	3.0							0.93	3,865	2,339	552	P1-3	685	637	334	P1-2	640	0.67	397	4969		4969	HDU5	DF	4x6	5645	MSTC78	5505	26	
DM	DU					9.0	9.5	19.2							0.93	6,863	7,394	239	P1-6	365	339	258	P1-4	380		353	2319		2319	HDU4			3285	MSTC40	2325	12	
1B						0.0	26.0								0.93	3,769	2,773	145	P1-6	365	339	107	P1-6	260		242	0		0								

Panel Analysis

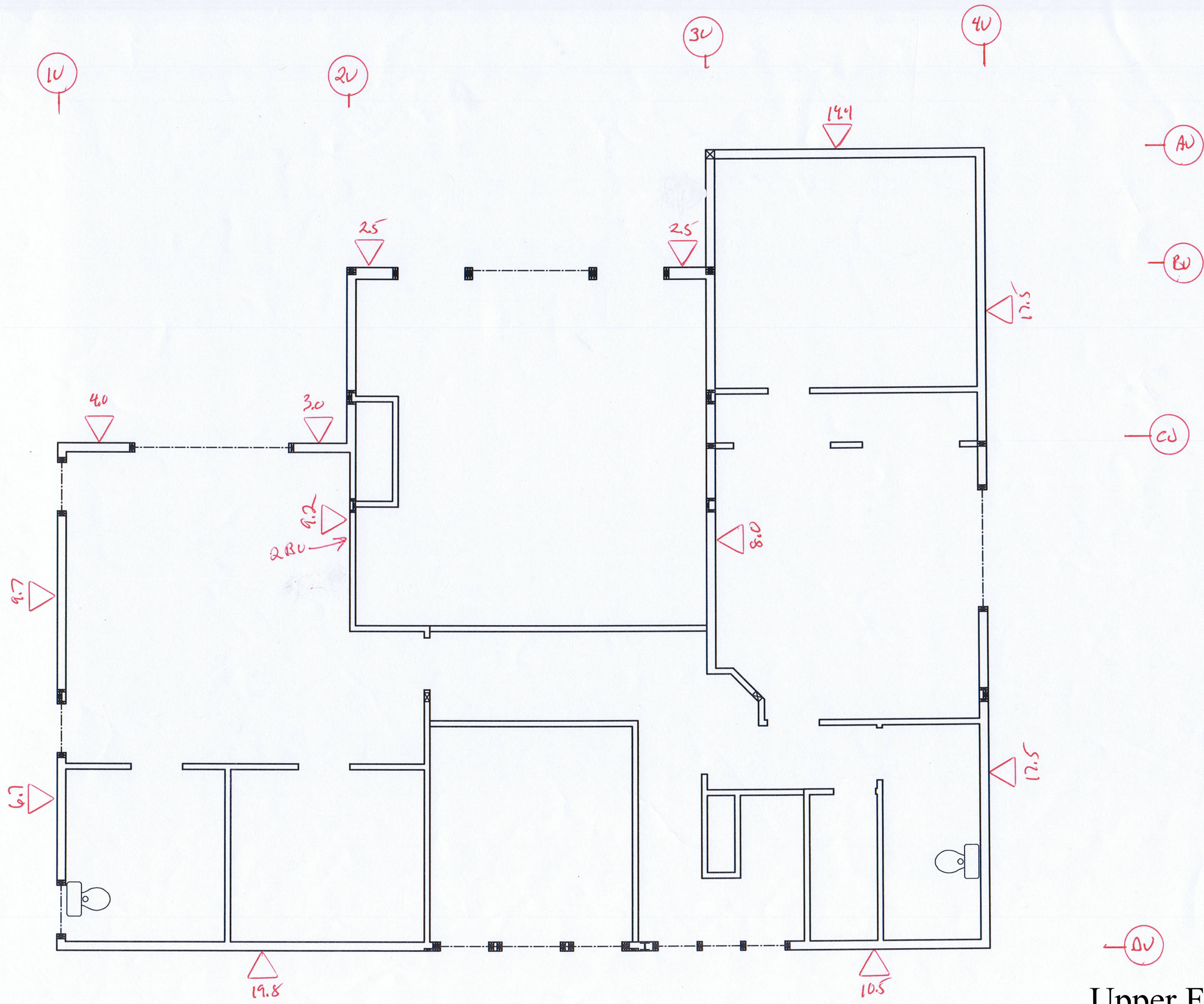
Panel														Design Loads		Panel Shears								Holdown Options														
Grid #		Materials				Individual Panel Lengths						Shear Panel Adjustments		Wind (lb)	Seismic (lb)	Wind			Seismic				Post Loads			Anchor Bolt Holdowns				Tie Straps								
Level _i	Grid Above	Wall Size	Nail Size	Panel Type	S.G.	Height (ft.)	#1 (ft)	#2 (ft)	#3 (ft)	#4 (ft)	#5 (ft)	#6 (ft)	Perforated Panel				S.G.	Act. (lb/ft)	Allowable			Act. (lb/ft)	Allowable				Uplift (lb)	2/3 Dead (lb)	Net (lb)	Model	Post		Cap. (lb)	Model	Cap. (lb)	Min. Lgth. (in)		
													Max Height (ft)			Total Width (ft)			%	C _o	C _{SG}		Type	Base (lb/ft)	Cap. (lb/ft)	Type					Base (lb/ft)	C _s					Cap. (lb/ft)	Grade
Defaults (Dflt.)				C _o		C _{SG}		Type		Base (lb/ft)		Cap. (lb/ft)		Grade		Size																						
2x6	8d	15/32" Ply		0.4																																		
2B						6.0	9.0	21.8							0.93	12,075	12,010	392	P1-4	532	495	390	P1-3	490		456	2352		2352	HDU4			3285	MSTC52	3650	12		
4B						9.0	12.0								0.93	5,361	9,759	447	P1-4	532	495	813	P2-3	980		911	7319		7319	HDQ8	DF	4x6	7630					
BB						9.0	19.2								0.93	8,186	11,071	426	P1-4	532	495	577	P1-2	640		595	5189		5189	HDU5	DF	4x6	5645	MSTC78	5505	27		
CB	CM					6.0	14.3								0.93	6,387	3,601	447	P1-4	532	495	252	P1-4	380		353	2680		2680	HDU4			3285	MSTC52	3650	14		
DB						0.0	48.0								0.93	11,906	9,381	248	P1-6	365	339	195	P1-6	260		242	0		0									



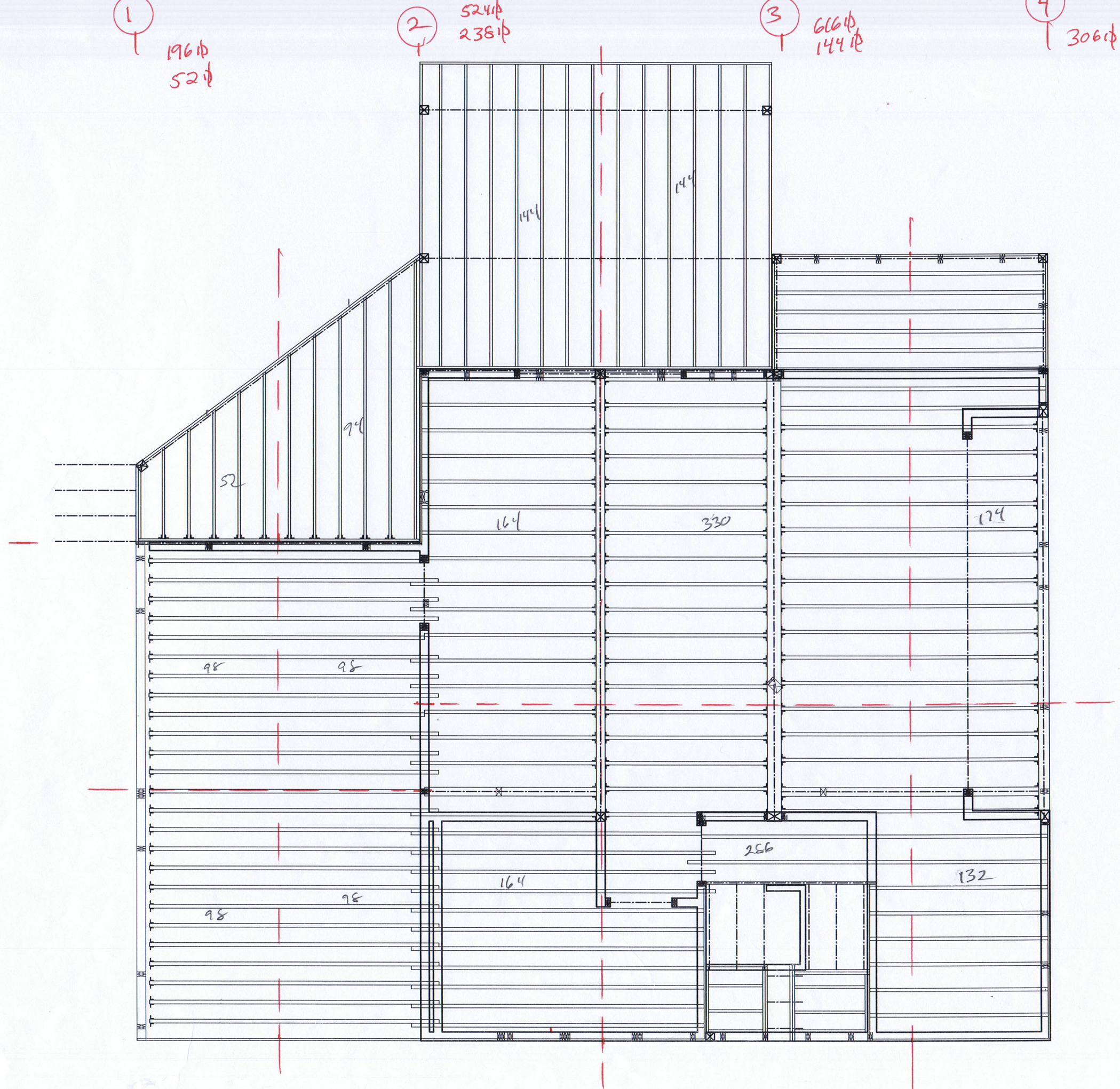
Basement Floor
Shearwall Plan



Main Floor
Shearwall Plan

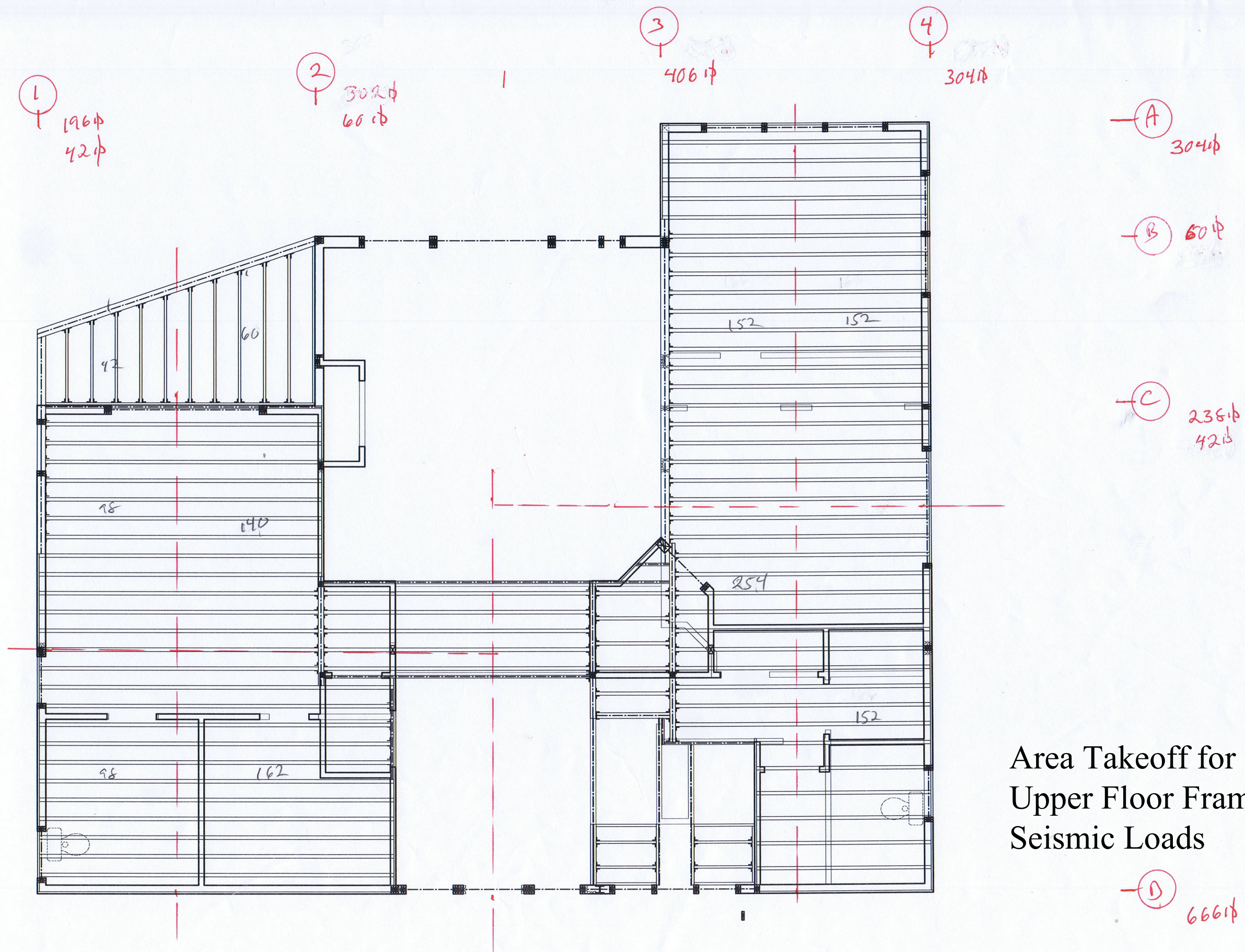


Upper Floor
Shearwall Plan

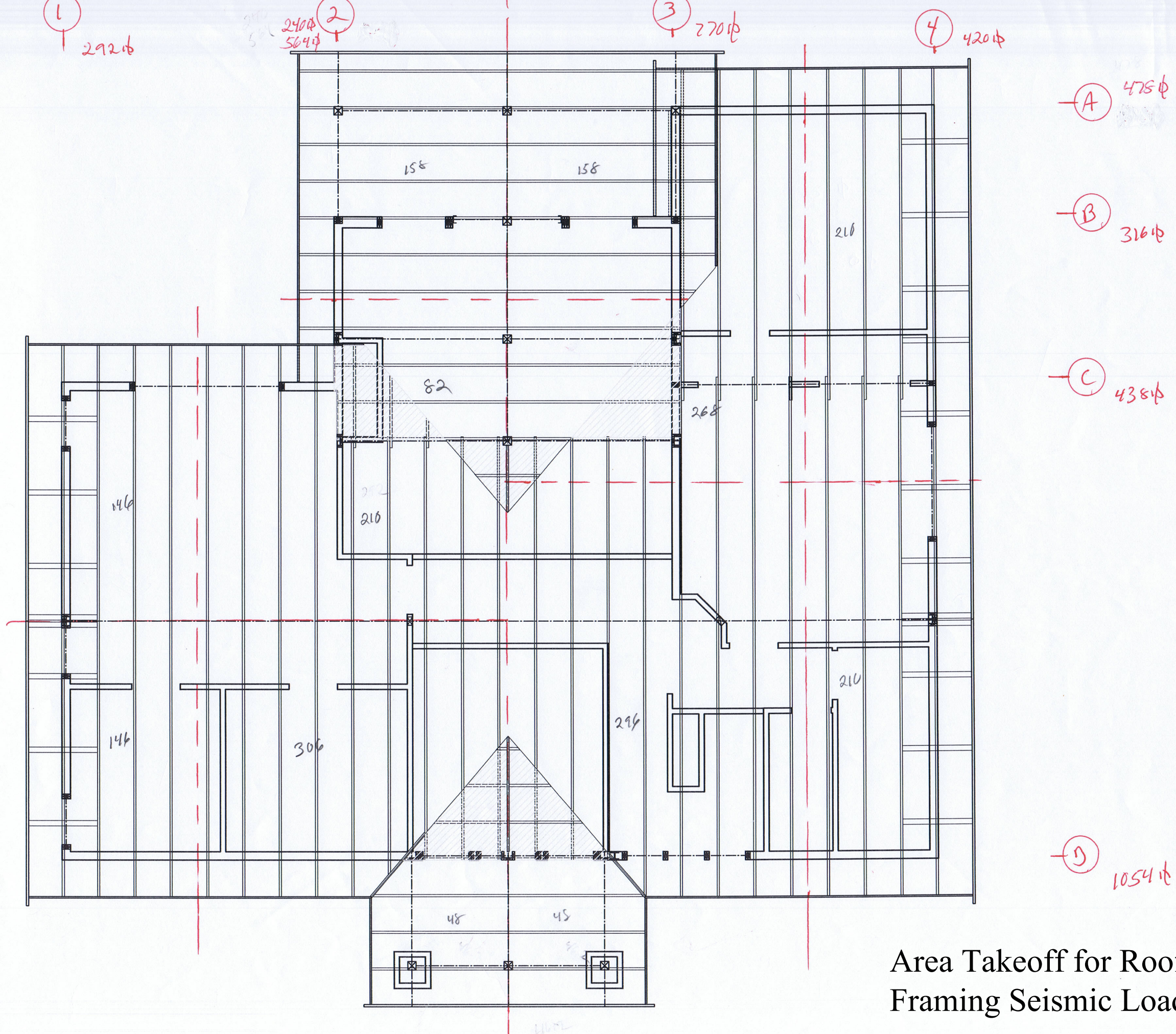


Area Takeoff for
Main Floor Framing
Seismic Loads

⑤ 778φ



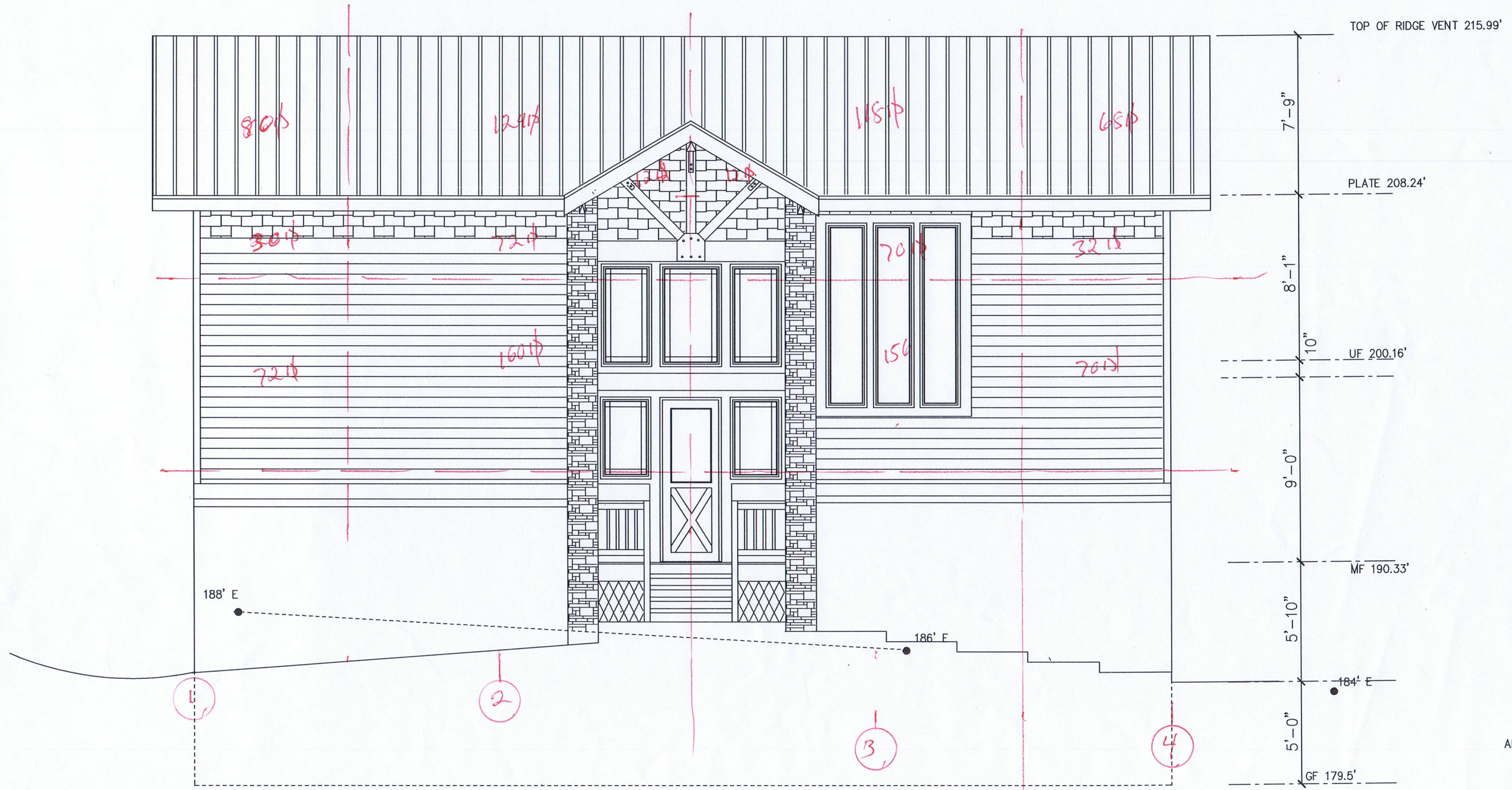
Area Takeoff for
Upper Floor Framing
Seismic Loads



Area Takeoff for Roof Framing Seismic Loads

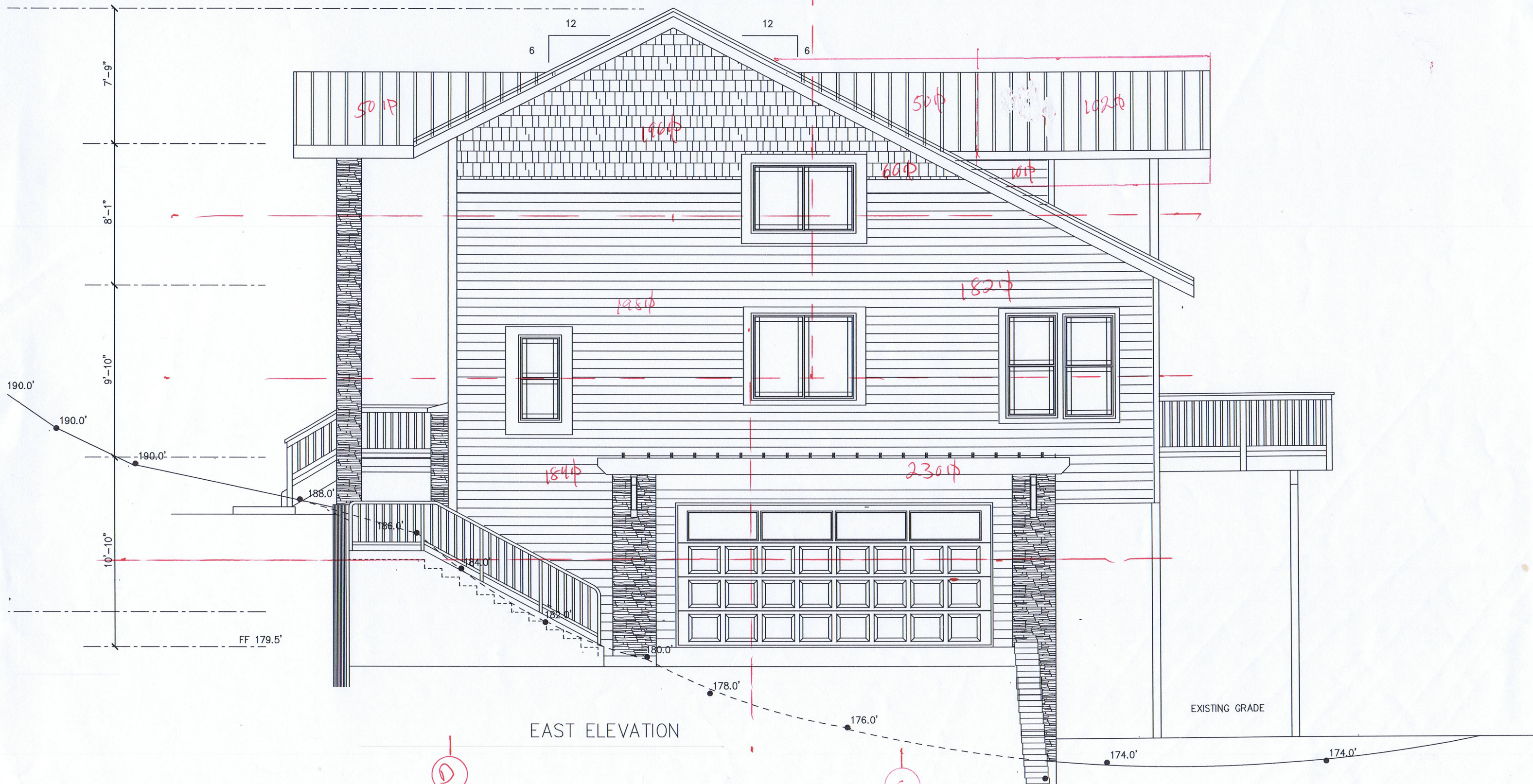


Area Takeoff for
Wind Loads

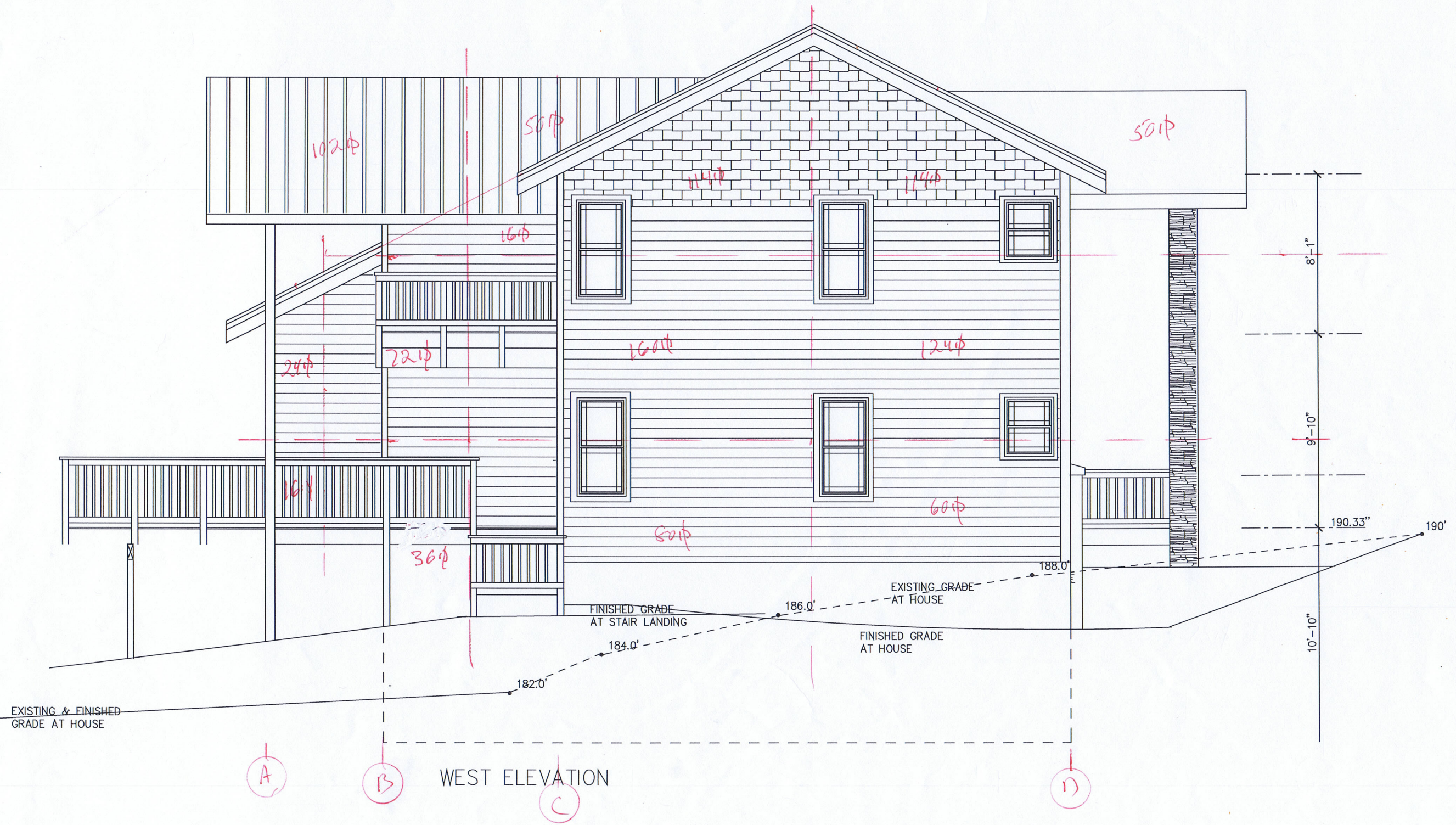


Area Takeoff for
Wind Loads

OUTH ELEVATION



Area Takeoff for
Wind Loads



Floor Diaphragm Calculations

$$F_{2 \text{ Wind}} = \frac{(193 \text{ lb/ft})(32.5')}{2} + 0.43(6036 \text{ lb}) = 5732 \text{ lb}$$

$$T_{2 \text{ Wind}} = \frac{5732 \text{ lb}}{35'} = 164 \text{ lb/ft}$$

$$T_{\text{allow}} = \frac{600 \text{ pcf}}{2} = 300 \text{ lb/ft Case 3}$$

164 lb/ft < 300 lb/ft OK Wind

$$F_{2 \text{ Seis}} = \frac{(198 \text{ lb/ft})(32.5')}{2} + 0.43(3860 \text{ lb}) = 4878 \text{ lb}$$

$$T_{2 \text{ Seis}} = \frac{4878 \text{ lb}}{35'} = 140 \text{ lb/ft}$$

$$T_{\text{allow seis}} = \frac{570 \text{ pcf}}{2} = 285 \text{ lb/ft}$$

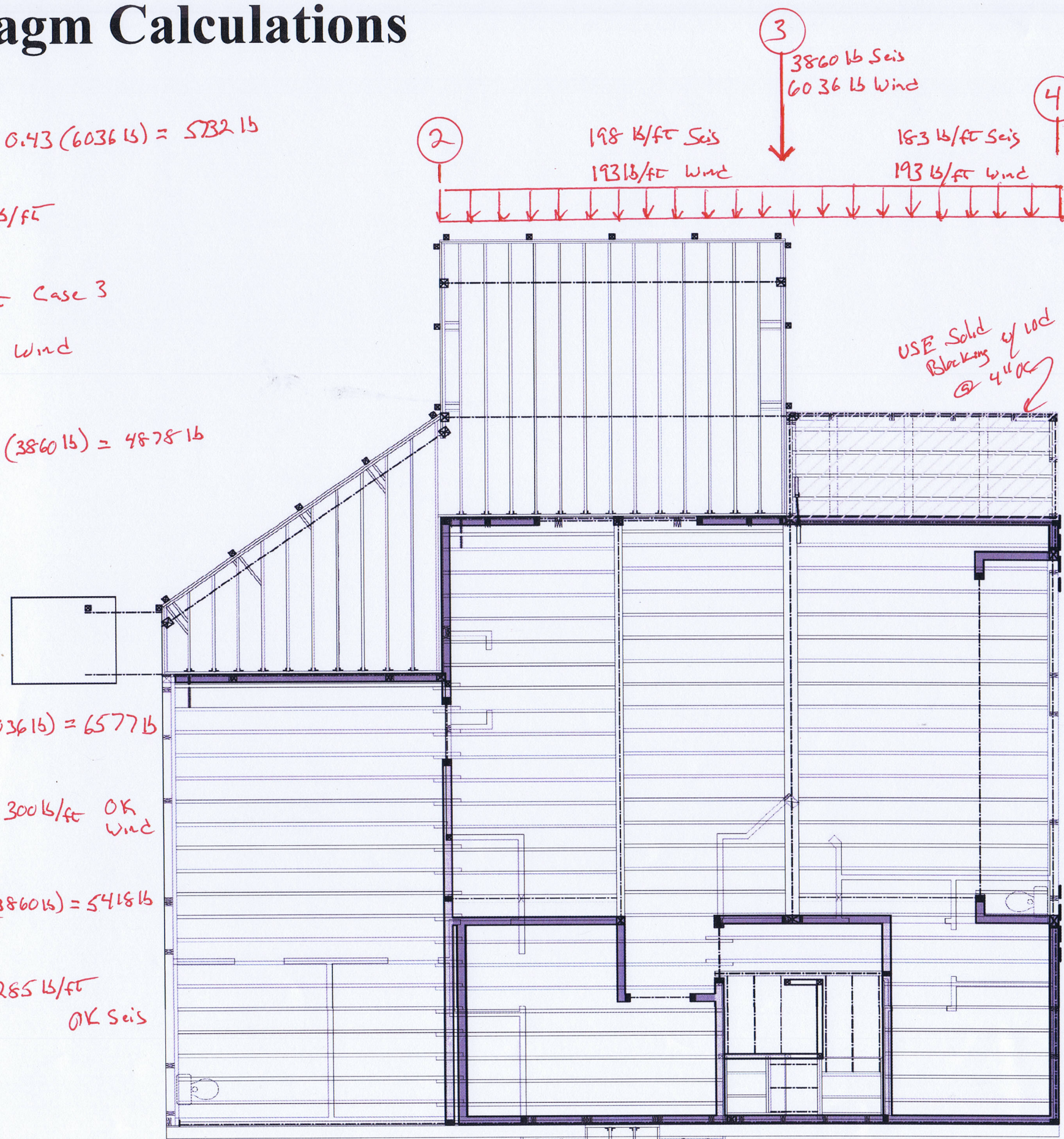
140 lb/ft < 285 lb/ft OK Seis

$$F_{4 \text{ Wind}} = \frac{(193 \text{ lb/ft})(32.5')}{2} + 0.57(6036 \text{ lb}) = 6577 \text{ lb}$$

$$T_{4 \text{ Wind}} = \frac{6577 \text{ lb}}{32.3'} = 203 \text{ lb/ft} < 300 \text{ lb/ft OK Wind}$$

$$F_{4 \text{ Seis}} = \frac{(198 \text{ lb/ft})(32.5')}{2} + 0.57(3860 \text{ lb}) = 5418 \text{ lb}$$

$$T_{4 \text{ Seis}} = \frac{5418 \text{ lb}}{32.3'} = 168 \text{ lb/ft} < 285 \text{ lb/ft OK Seis}$$



$$T_{\text{allow Wind}} = \frac{895}{2} = 447 \text{ lb/ft}$$

w/ 10d @ 6" OC

$$T_{\text{allow Seis}} = \frac{850}{2} = 425 \text{ lb/ft}$$

w/ 10d @ 4" OC

$$F_{B1 \text{ Wind}} = (198 \text{ lb/ft})(6') + 4720 \text{ lb} = 5908 \text{ lb}$$

$$T_{B1 \text{ Wind}} = \frac{5908 \text{ lb}}{14.4'} = 411 \text{ lb/ft}$$

$$F_{B1 \text{ Seis}} = (147 \text{ lb/ft})(6') + 5109 = 5992 \text{ lb}$$

$$T_{B1 \text{ Seis}} = \frac{5992 \text{ lb}}{14.4'} = 417 \text{ lb/ft}$$

← 4318 lb Seis + 791 lb Seis deck
4720 lb Wind

F
B

198 lb/ft Wind
147 lb/ft Seis

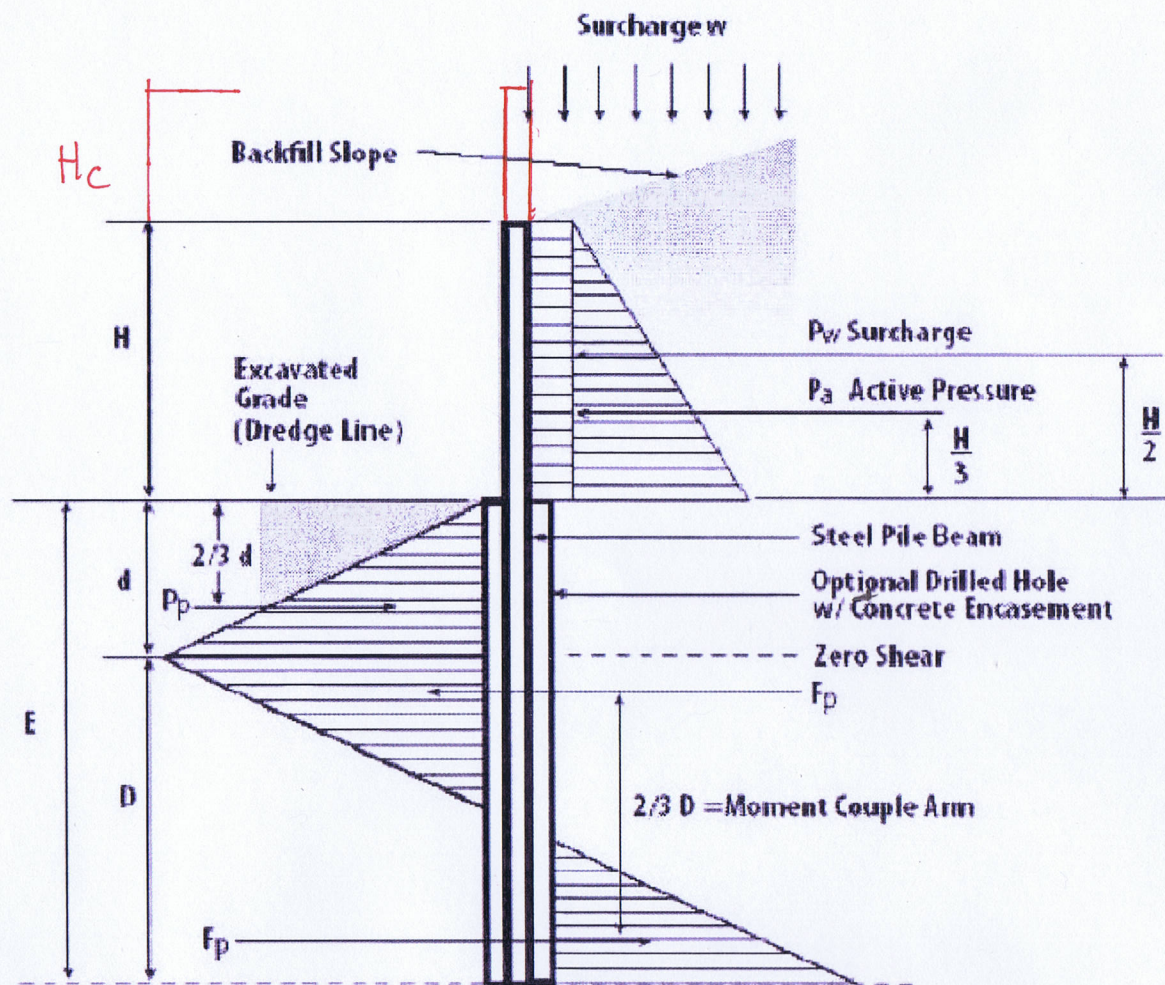
$$F_{D \text{ Wind}} = \frac{(198 \text{ lb/ft})(35'^2 + 6'^2)}{2(35')} = 3364 \text{ lb}$$

$$F_{D \text{ Seis}} = \frac{(147 \text{ lb/ft})(35'^2 + 6'^2)}{2(35')} = 2497 \text{ lb}$$

$$T_{D \text{ Wind}} = \frac{3364 \text{ lb}}{41.3'} = 82 \text{ lb/ft OK}$$

$$T_{D \text{ Seis}} = \frac{2497 \text{ lb}}{41.3'} = 60 \text{ lb/ft OK}$$

Soldier Pile Wall Design



Catchment Wall Piles 1-9

$$H = 7.2'$$

$$H_c = 8.0'$$

$$P_p = P_w + P_a$$

$$P = 275 \text{ pcf}$$

$$D = 2.0'$$

$$A = 2$$

$$P_a = 75 \text{ pcf}$$

$$P_w = 60 \text{ pcf}$$

$$\text{Spacing} = 6.0'$$

$$d = \left(\frac{(2)(P_p)(SF)}{PDA} \right)^{1/2}$$

$$d = \left(\frac{(2)(17,136)(1.5)}{(275 \text{ pcf})(2.0')(2)} \right)^{1/2} = 6.8363'$$

$$M_{max} = P_a(0.33H + 0.67d) + P_w(0.5(H + H_c) + 0.67d)$$

$$M_{max} = 11,644 \text{ lb} \left[(0.33)(7.2') + (0.67)(6.8363') \right] + 5472 \text{ lb} \left[0.5(8' + 7.2') + (0.67)(6.8363') \right]$$

$$M_{max} = 147,650 \text{ lb-ft} = 1,771,801 \text{ lb-in}$$

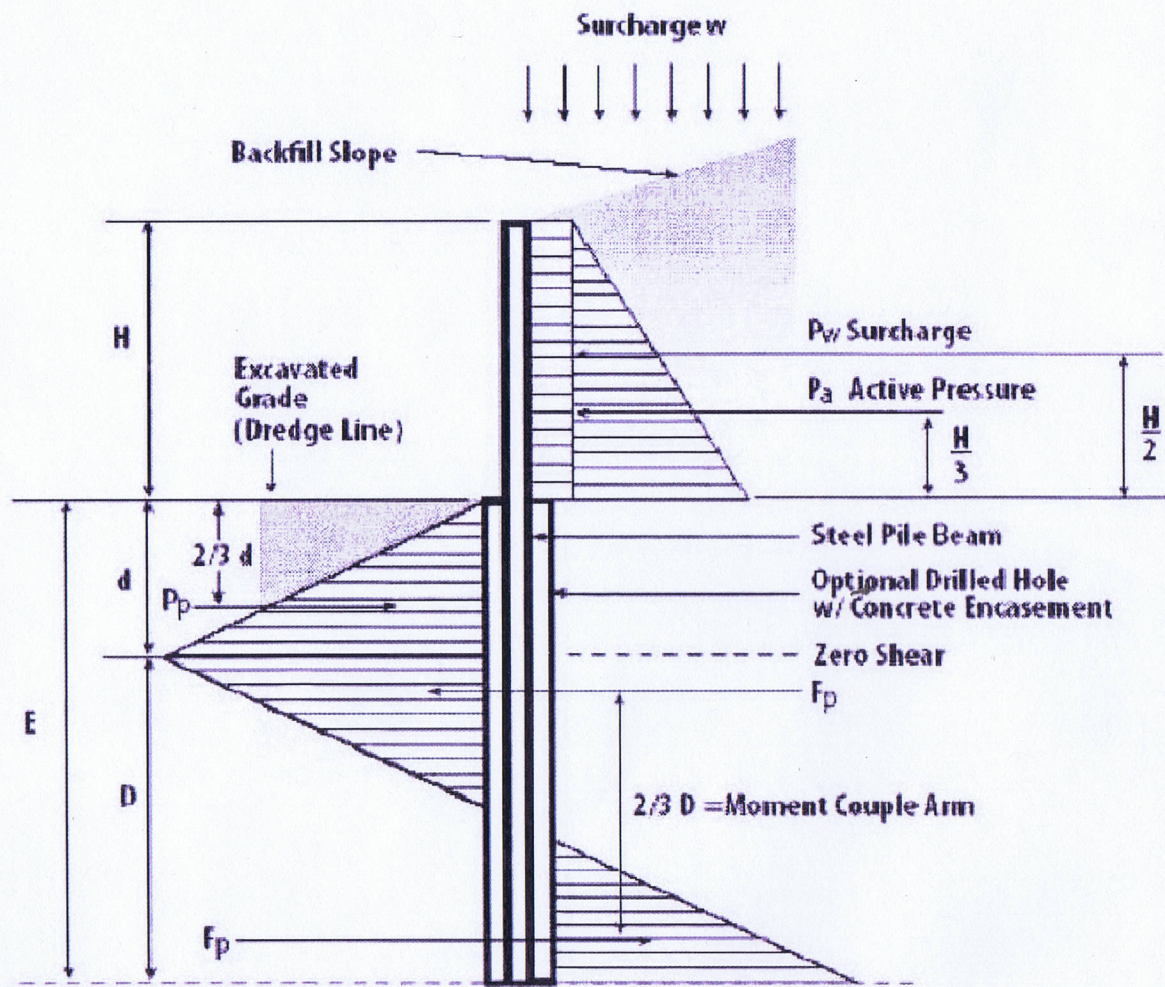
$$S_{req} = \frac{1,771,801}{36,000 \text{ lb/in}^2} = 49.22 \text{ in}^3 \quad \text{Use W10x45, } S = 49.1 \text{ in}^3 \approx 49.22 \text{ in}^3 \leftarrow \text{Steel}$$

$$D = \left[\frac{(M_{max})(SF)}{P D^2 A (0.25)(0.67)} \right]^{1/2} = \left[\frac{(147,650)(1.5)}{(275 \text{ pcf})(2.0')^2(2)(0.25)(0.67)} \right]^{1/2} = 24.5157'$$

$$D_{Tot} = 24.5157' + 6.8363' = 31.35' = 31'-6'' \leftarrow \text{Total Pile Depth}$$

Catchment Wall

Soldier Pile Wall Design



Standard Wall Piles 10-13

$$H = 9.0'$$

$$P_p = P_w + P_a$$

$$P = 275 \text{ pcf}$$

$$D = 2.0'$$

$$A = 2$$

$$P_a = 75 \text{ pcf}$$

$$P_w = 8H = 72 \text{ pcf}$$

$$\text{Spacing} = 6.0'$$

$$d = \left[\frac{(2)(P_p)(SF)}{PDA} \right]^{1/2}$$

$$d = \left[\frac{(2)(22,113 \text{ lb})(1.2)}{(275 \text{ pcf})(2.0')(2)} \right]^{1/2} = 6.9460'$$

$$M_{max} = P_a(0.33H + 0.67d) + P_w(0.5H + 0.67d)$$

$$M_{max} = (18,225 \text{ lb})(0.33(9.0) + 0.67(6.946')) + 3888 \text{ lb}(0.5(9.0) + 0.67(6.946'))$$

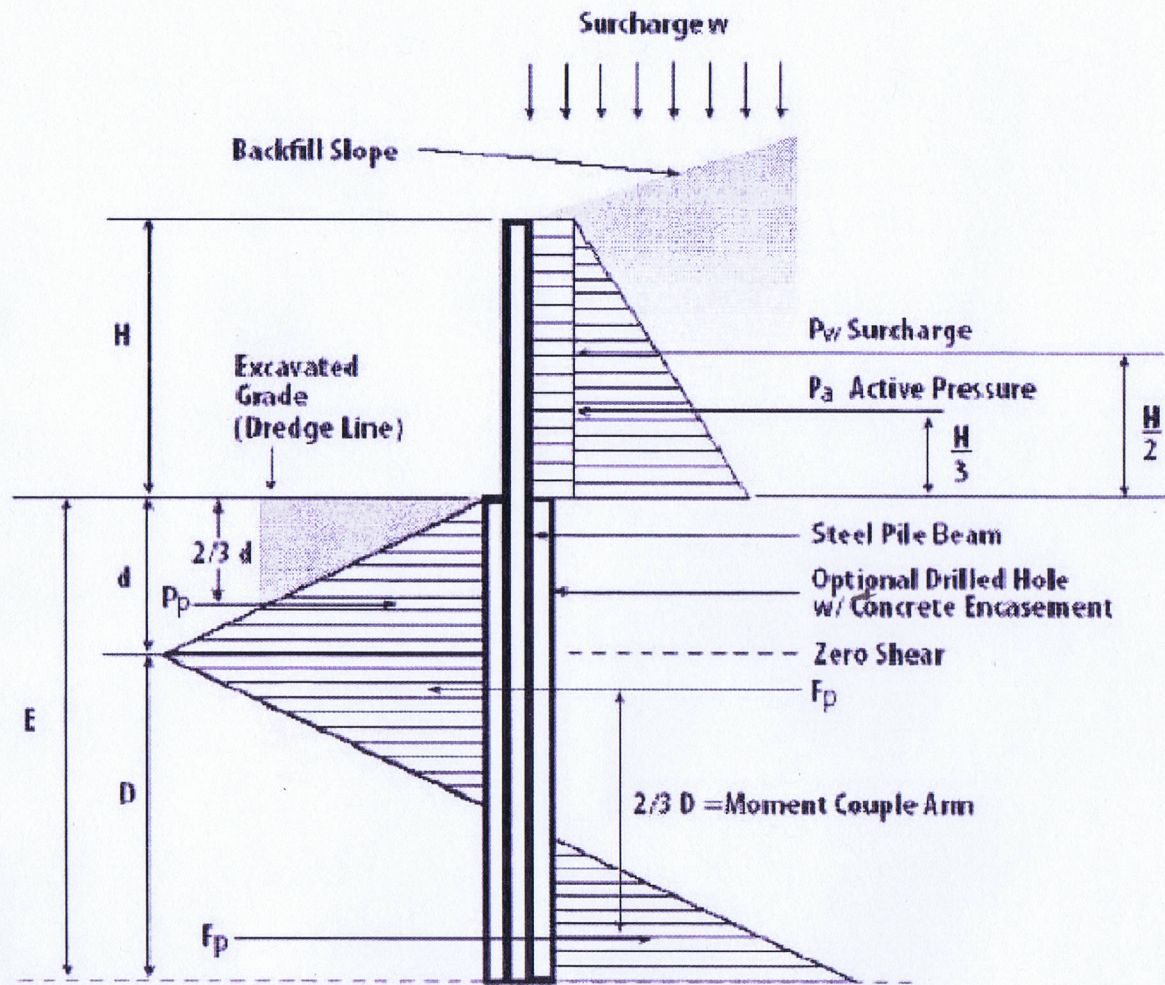
$$M_{max} = 174,534 \text{ lb-in} = 2,094,410 \text{ lb-in}$$

$$S_{req} = \frac{2,094,410 \text{ lb-in}}{36,000 \text{ lb/in}^2} = 58.17 \text{ in}^3 \quad \text{USE W10x54 } S = 60.0 \text{ in}^3 \approx \text{Steel}$$

$$D = \left[\frac{(M_{max})(SF)}{PDA(0.25)(0.67)} \right]^{1/2} = \left[\frac{(174,534 \text{ lb-in})(1.2)}{(275 \text{ pcf})(2.0')^2(2)(0.25)(0.67)} \right]^{1/2} = 23.8403'$$

$$D_{TOT} = 23.8403' + 6.9460' = 30.7863' = 30'-10" \quad \leftarrow \text{Total Pile Depth}$$

Soldier Pile Wall Design



Standard Wall Piles 14-16

$$H = 8.0'$$

$$P_w = (6') (64 \text{pcf}) (8') = 3072 \text{ lb}$$

$$P_p = P_w + P_a$$

$$P_a = (6') (5 \text{pcf}) \frac{(8')^2}{2} = 14,400 \text{ lb}$$

$$P = 275 \text{pcf}$$

$$D = 20'$$

$$A = 2$$

$$P_a = 75 \text{pcf}$$

$$P_w = 8H = 64 \text{pcf}$$

$$\text{Spacing} = 6.0'$$

$$d = \left[\frac{(2)(P_p)(SF)}{PDA} \right]^{1/2}$$

$$d = \left[\frac{(2)(17,472)(1.2)}{(275 \text{pcf})(2.0')(2)} \right]^{1/2} = 6.1742'$$

$$M_{max} = P_a (0.33H + 0.67d) + P_w (0.5H + 0.67d)$$

$$M_{max} = 14,400 \text{ lb} [(0.33)(8.0') + (0.67)(6.1742')] + 3072 \text{ lb} [0.5(8.0') + (0.67)(6.1742')] = 122,581 \text{ lb-ft}$$

$$M_{max} = 122,581 \text{ lb-ft} = 1,470,968 \text{ lb-in}$$

$$S_{req} = \frac{1,470,968 \text{ lb-in}}{36,000 \text{ lb/in}} = 40.86 \text{ in}^3 \text{ Use W10x39, } S = 42.1 \text{ in}^3 \leftarrow \text{Steel}$$

$$D = \left[\frac{(M_{max})(SF)}{P D^2 A (0.25)(0.67)} \right]^{1/2} = \left[\frac{(122,581 \text{ lb-ft})(1.2)}{(275 \text{pcf})(2.0')^2 (2)(0.25)(0.67)} \right]^{1/2} = 19.9794'$$

$$D_{TOT} = 19.9794' + 6.1742' = 26.15' = 26'-2" \leftarrow \text{Total Pile Depth}$$

Concrete Retaining Wall Design (All values are per foot of wall)

Retaining Wall #1 3/30/2020

Wall Stability Calculations

 Equivalent Fluid Pressure, $p_{efp} = 35$ psf/ft
 Passive soil pressure, $p_p = 300$ psf/ft
 Height of fluff, $h_f =$ ft

 Allowable bearing pressure, $q_{all} = 3000$ psf
 Coefficient of friction, $f_{fr} = 0.55$

 Soil Density, $\delta_s = 108$ pcf
 Concrete Density, $\delta_c = 135$ pcf

#	Wall	Depth of Unbalanced Fill	Soil Parameters							Wall Parameters						Vertical Loads					Horizontal Forces						Stability										
			Active Pressures		Surcharge q_{sur} (psf)	Depth		Slope		Wall		Footing				Load above W_a (lb)	Concrete		Soil			Total W_T (lb)	Resistive Forces			Active Forces			Slide F.S. 1.50	Bearing			Overturning				
			k_v (pcf)	k_h (pcf)		Toe h_{st} (ft)	Heel h_{sh} (ft)	Angle θ (deg)	Hgt. h^{θ}_{sh} (ft)	Top t_{wt} (in)	Base t_{wb} (in)	Hgt. h_w (ft)	Toe l_i (in)	Heel l_h (in)	Hgt. t_{fig} (in)		Lgth. l_{fig} (ft)	Wall W_w (lb)	Ftg W_{fig} (lb)	Toe W_{st} (lb)	Heel W_{sh} (lb)		Heel P_v (lb)	Base w_{pb} (lb/ft)	Total P_{pT} (lb)	Frict. P_{fr} (lb)	Surf. w_{as} (lb/ft)	Base w_{ab} (lb/ft)		Total P_{aT} (lb)	F.S. e (in)	Pressures		F.S. 1.00	Moments		F.S. 1.50
1	4'		35	100	0.67	4.00		8.00	8.00	4.50	6.00	12.00	10.00	2.17	405	244	36	432		1117	451	339	614	32	202	565	1.69	6.67	1411		2.13	1500	911	1.65			
2	5'		35	100	0.67	5.00		8.00	8.00	5.50	6.00	18.00	10.00	2.67	495	300	36	810		1641	451	339	903	32	237	785	1.58	8.55	1763		1.70	2544	1525	1.67			
3	6'		35	100	0.67	6.00		8.00	8.00	6.50	12.00	22.00	10.00	3.50	585	394	72	1188		2239	451	339	1232	32	272	1039	1.51	8.25	1405		2.13	4744	2366	2.01			
4	7'		35	100	0.50	7.00		8.00	8.00	7.50	12.00	30.00	12.00	4.17	675	563	54	1890		3182	450	338	1750	32	312	1379	1.51	9.53	1645		1.82	7780	3678	2.12			
5	8'		35	100	0.50	8.00		8.00	8.00	8.50	12.00	36.00	12.00	4.67	765	630	54	2592		4041	450	338	2223	32	347	1709	1.50	10.88	1888		1.59	10894	5128	2.12			
6	9'		35	100	0.33	9.00		8.00	8.00	9.50	12.00	44.00	14.00	5.33	855	840	36	3564		5295	449	336	2912	32	388	2138	1.52	12.07	2125		1.41	16039	7246	2.21			
7	10'		35	100	0.17	10.00		8.00	8.00	10.50	12.00	50.00	16.00	5.83	945	1050	18	4500		6513	451	339	3582	32	429	2615	1.50	13.82	2460		1.22	21377	9879	2.16			
8																																					
9																																					
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Wall Reinforcement Calculations

Service Load Factor, SLF = 1.60

 Strength Reduction Factor, $\phi = 0.90$ for flexure

 ρ_{min} horizontal footing = 0.0015

 $\rho_{bal} = 0.0178$

 Steel Strength, $f_y = 60.0$ ksi

 Strength Reduction Factor, $\phi_s = 1.00$ for stress block

 ρ_{min} horizontal wall = 0.0025

 $0.75\rho_{bal} = 0.0134$

 Concrete Strength, $f'_c = 2500$ psi

 ρ_{min} vertical wall = 0.0015

 $\rho_{min} = 0.0033$

Wall	Stemwall Capacities																						Footing Capacities																					
	Footing to Stemwall (Bar 'A')										Stem (Bar 'B')												Horiz. (Bar 'C')	Toe (Bar 'D')					Heel (Bar 'E')					Longitude (Bar 'F')										
	Rebar										Rebar						Rebar							Moments		Rebar			Moments		Bar#	Qty.												
	Bar#	Spc.	Cov.	A_s	d	a	ρ	l_{dh}	l_b	ϕM_n	M_u	Bar#	Spc.	Cov.	A_s	d	a	ρ	ϕM_n	$h_{\phi M_n}$	Bar#	Spc.	Cov.	A_s	d	a	ρ	ϕM_n	M_u	Bar#			Spc.	Cov.	A_s	d	a	ρ	ϕM_n	M_u	Bott.	Top		
1	4'	4	18.0	1.50	0.13	6.25	0.31	0.0018	6.0	51	43.9	7.6									4	10.0	4	18.0	3.00	0.13	6.75	0.31	0.0016	47.5	2.6							5.0	4	2	4			
2	5'	4	18.0	1.50	0.13	6.25	0.31	0.0018	6.0	63	43.9	14.9									4	10.0	4	18.0	3.00	0.13	6.75	0.31	0.0016	47.5	3.4	4	16.0	2.00	0.15	7.75	0.35	0.0016	61.3	13.1	4	2	5	
3	6'	4	18.0	1.50	0.13	6.25	0.31	0.0018	6.0	32	43.9	25.8	4	18.0	1.50	0.13	6.25	0.31	0.0018	43.9	6.0	4	10.0	4	18.0	3.00	0.13	6.75	0.31	0.0016	47.5	10.3	4	16.0	2.00	0.15	7.75	0.35	0.0016	61.3	19.6	4	2	5
4	7'	4	12.0	1.50	0.20	6.25	0.47	0.0027	8.4	31	65.0	43.9	4	18.0	1.50	0.13	6.25	0.31	0.0018	43.9	6.5	4	10.0	4	12.0	3.00	0.20	8.75	0.47	0.0019	92.0	12.6	4	12.0	2.00	0.20	9.75	0.47	0.0017	102.8	38.9	4	2	6
5	8'	4	9.0	1.50	0.27	6.25	0.63	0.0036	8.4	43	85.5	64.8	4	18.0	1.50	0.13	6.25	0.31	0.0018	43.9	6.5	4	10.0	4	9.0	3.00	0.27	8.75	0.63	0.0025	121.5	14.9	4	12.0	2.00	0.20	9.75	0.47	0.0017	102.8	61.1	4	2	6
6	9'	5	9.0	1.50	0.41	6.19	0.97	0.0056	10.5	61	127.3	96.4	4	18.0	1.50	0.13	6.25	0.31	0.0018	43.9	6.5	4	10.0	5	9.0	3.00	0.41	10.69	0.97	0.0032	227.7	17.2	5	16.0	2.00	0.23	11.69	0.55	0.0017	143.3	96.0	4	2	7
7	10'	6	9.0	2.00	0.59	5.63	1.38	0.0087	12.6	66	156.3	136.4	5	18.0	1.50	0.21	6.19	0.49	0.0028	66.3	7.5	4	10.0	6	9.0	3.00	0.59	12.63	1.38	0.0039	378.1	20.2	5	12.0	2.00	0.31	13.69	0.73	0.0019	223.0	139.0	4	2	7
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