STRUCTURAL DESIGN CALCULATIONS

COUNTY OF IMPERIAL
CALIFORNIA

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DESIGN CRITERIA AND SPECIFICATIONS

A. CODE: 2003 International Building Code
B. SEISMIC: ZONE _ FAULT_____ TYPE__ Distance ____
C. WIND: Basic wind speed __ MPH.Exposure __
D. SOILS: Allowable soil bearing pressure _____ psf
E. LUMBER: Douglas Fir-Larch,
1. 2X Joists & Rafters-#2 or Better
2. 4X, 6X, 8X Beams & Headers- #1 orBetter
3. Plates, Blocking & Studs – Stud Grade or Better

F. GLUED-LAMINATED BEAM: Combination: 24 F- V4 Species: DF/DF
PARALLAM BEAM: Truss Joist – MacMillan, 2.0E Parallam PSL
MICROLLAM BEAM: Truss Joist – MacMillan, 1.9E Microllam LVL

G. CONCRETE: Non- Monolithic Pour Foundation System, U.N.O.
All slab-on-grade/ continuous footing/ pads / pole footing _ _ _ _ _ _ f'c= 2500 psi
All structural concrete/ retaining wall / column / beam / _ _ _ _ _ _ f'c= 3000 psi

H. STEEL: ASTM A36, Fy = 36 ksi for Structural Steel
ASTM A615, Gr, 40 for #3 & 4, Gr.60 for # 5 and larger rebar steel
ASTM A53, Gr. B for Pipe Steel
ASTM A500, Gr. BB for Tube Steel

I. CONCRETE BLOCK:
ASTM C90, Grade N medium weight, Solid grouted all cells

J. COLD FORM STEEL:
ASTM A570-79 Gr.33 for 18 through 25 Gauge
ASTM A570-79 Gr 50 for 12 through 16 Gauge

K. WOOD CONSTRUCTION CONNECTOR:
SIMPSON Strong-Tie or Approved Equal

L. TRUSS CALCULATIONS: Provided by: _____

It is the full intention of the Engineer that these calculations conform to the International Building Code, 2003 edition. These calculations shall govern the structural portion of the working drawings. However, where any discrepancies occur between these calculations and the working drawings, the Engineer shall be notified immediately so proper action may be taken. The structural calculations included here are for the analysis and design of primary structural system. The attachment of non- structural elements is the responsibility of the architect or designer, unless specifically shown otherwise. The Engineer assumes no responsibility for work not a part of these calculations. When structural observation or field investigation the Engineer is required, the architect/ contractor shall make separate arrangements with the Engineer.

Project Name
Job # **S5161**

GRAVITY LOADS

ROOF

	Live Load	=	20 psf (for pitch 4:12 or greater)
	Dead Load		
	Roof cover	=	10 psf (for tile)
	1/2" Plywood Shuttering	=	1.5 psf
	Roof Framing	=	3.5 psf
	1/2" Drywall Ceiling	=	2.0 psf
	Insulation	=	2.0 psf
	D.L	=	19 psf
	Total Load	=	35 psf

EXTERNAL WALL

	Dead Load		
	2x stud wall	=	1.5 psf
	1/2" Plywood Panel	=	1.5 psf
	1/2" Drywall	=	2.0 psf
	7/8" Stucco	=	10.0 ps
	Insulation	=	1.0 psf
	Total	=	16.0 psf

INTERNAL WALL

	Dead Load		
	2x stud wall	=	1.5 psf
	3/8" Plywood Panel	=	1.1 psf
	(2)-1/2" Drywall	=	4.0 psf
	Misc	=	3.4 psf
	Total	=	10.0 psf

PROPERTIES OF STRUCTURAL LUMBER — Sectional Properties of Standard Dressed (S4S) Lumber Sizes

NOMINAL SIZE b(inches)d	STANDARD DRESSED SIZE (S4S) b(inches)d	AREA OF SECTION A	MOMENT OF INERTIA I	SECTION MODULUS S	Weight in pounds per linear foot of piece when weight of wood per cubic foot equals:					
					25 lb.	30 lb.	35 lb.	40 lb.	45 lb.	50 lb.
1 x 3	3/4 x 2 1/2	1.875	0.977	0.781	0.326	0.391	0.456	0.521	0.586	0.651
1 x 4	3/4 x 3 1/2	2.625	2.680	1.531	0.456	0.547	0.638	0.729	0.820	0.911
1 x 6	3/4 x 5 1/2	4.125	10.398	3.781	0.716	0.859	1.003	1.146	1.289	1.432
1 x 8	3/4 x 7 1/4	5.438	23.817	6.570	0.944	1.133	1.322	1.510	1.699	1.888
1 x 10	3/4 x 9 1/4	6.938	49.466	10.695	1.204	1.445	1.686	1.927	2.168	2.409
1 x 12	3/4 x 11 1/4	8.438	88.989	15.820	1.465	1.758	2.051	2.344	2.637	2.930
2 x 3	1 1/2 x 2 1/2	3.750	1.953	1.563	0.651	0.781	0.911	1.042	1.172	1.302
2 x 4	1 1/2 x 3 1/2	5.250	5.359	3.063	0.911	1.094	1.276	1.458	1.641	1.823
2 x 6	1 1/2 x 5 1/2	8.250	20.797	7.563	1.432	1.719	2.005	2.292	2.578	2.865
2 x 8	1 1/2 x 7 1/4	10.875	47.635	13.141	1.888	2.266	2.643	3.021	3.398	3.776
2 x 10	1 1/2 x 9 1/4	13.875	98.932	21.391	2.409	2.891	3.372	3.854	4.336	4.818
2 x 12	1 1/2 x 11 1/4	16.875	177.979	31.641	2.930	3.516	4.102	4.688	5.273	5.859
2 x 14	1 1/2 x 13 1/4	19.875	290.775	43.891	3.451	4.141	4.831	5.521	6.211	6.901
3 x 1	2 1/2 x 3/4	1.875	0.088	0.234	0.326	0.391	0.456	0.521	0.586	0.651
3 x 2	2 1/2 x 1 1/2	3.750	0.703	0.938	0.651	0.781	0.911	1.042	1.172	1.302
3 x 4	2 1/2 x 3 1/2	8.750	8.932	5.104	1.519	1.823	2.127	2.431	2.734	3.038
3 x 6	2 1/2 x 5 1/2	13.750	34.661	12.604	2.387	2.865	3.342	3.819	4.297	4.774
3 x 8	2 1/2 x 7 1/4	18.125	79.391	21.901	3.147	3.776	4.405	5.035	5.664	6.293
3 x 10	2 1/2 x 9 1/4	23.125	164.886	35.651	4.015	4.818	5.621	6.424	7.227	8.030
3 x 12	2 1/2 x 11 1/4	28.125	296.631	52.734	4.883	5.859	6.836	7.813	8.789	9.766
3 x 14	2 1/2 x 13 1/4	33.125	484.625	73.151	5.751	6.901	8.051	9.201	10.352	11.502
3 x 16	2 1/2 x 15 1/4	38.125	738.870	96.901	6.619	7.943	9.266	10.590	11.914	13.238
4 x 1	3 1/2 x 3/4	2.625	0.123	0.328	0.456	0.547	0.638	0.729	0.820	0.911
4 x 2	3 1/2 x 1 1/2	5.250	0.984	1.313	0.911	1.094	1.276	1.458	1.641	1.823
4 x 3	3 1/2 x 2 1/2	8.750	4.557	3.646	1.519	1.823	2.127	2.431	2.734	3.038
4 x 4	3 1/2 x 3 1/2	12.250	12.505	7.146	2.127	2.552	2.977	3.403	3.828	4.253
4 x 6	3 1/2 x 5 1/2	19.250	48.526	17.646	3.342	4.010	4.679	5.347	6.016	6.684
4 x 8	3 1/2 x 7 1/4	25.375	111.148	30.661	4.405	5.286	6.168	7.049	7.930	8.811
4 x 10	3 1/2 x 9 1/4	32.375	230.840	49.911	5.621	6.745	7.869	8.933	10.117	11.241
4 x 12	3 1/2 x 11 1/4	39.375	415.283	73.828	6.836	8.203	9.570	10.938	12.305	13.672
4 x 14	3 1/2 x 13 1/4	46.38	678.5	102.4	8.051	9.661	11.27	12.88	14.49	16.10
4 x 16	3 1/2 x 15 1/4	53.38	1034	135.7	9.266	11.12	12.97	14.83	16.68	18.53
6 x 1	5 1/2 x 3/4	4.125	0.193	0.516	0.716	0.859	1.003	1.146	1.289	1.432
6 x 2	5 1/2 x 1 1/2	8.250	1.547	2.063	1.432	1.719	2.005	2.292	2.578	2.865
6 x 3	5 1/2 x 2 1/2	13.750	7.161	5.729	2.387	2.865	3.342	3.819	4.297	4.774
6 x 4	5 1/2 x 3 1/2	19.250	19.651	11.229	3.342	4.010	4.679	5.347	6.016	6.684
6 x 6	5 1/2 x 5 1/2	30.250	76.255	27.729	5.252	6.302	7.352	8.403	9.453	10.503
6 x 8	5 1/2 x 7 1/2	41.250	193.359	51.563	7.161	8.594	10.026	11.458	12.891	14.323
6 x 10	5 1/2 x 9 1/2	52.250	392.963	82.729	9.071	10.885	12.700	14.514	16.328	18.142
6 x 12	5 1/2 x 11 1/2	63.250	697.068	121.229	10.981	13.177	15.373	17.569	19.766	21.962
6 x 14	5 1/2 x 13 1/2	74.250	1127.672	167.063	12.891	15.469	18.047	20.625	23.203	25.781
6 x 16	5 1/2 x 15 1/2	85.250	1706.776	220.229	14.800	17.760	20.720	23.681	26.641	29.601
6 x 18	5 1/2 x 17 1/2	96.250	2456.380	280.729	16.710	20.052	23.394	26.736	30.078	33.420
6 x 20	5 1/2 x 19 1/2	107.250	3398.484	348.563	18.620	22.344	26.068	29.792	33.516	37.240
6 x 22	5 1/2 x 21 1/2	118.250	4555.086	423.729	20.530	24.635	28.741	32.847	36.953	41.059
6 x 24	5 1/2 x 23 1/2	129.250	5948.191	506.229	22.439	26.927	31.415	35.903	40.391	44.878
8 x 1	7 1/4 x 3/4	5.438	0.255	0.680	0.944	1.133	1.322	1.510	1.699	1.888
8 x 2	7 1/4 x 1 1/2	10.875	2.039	2.719	1.888	2.266	2.643	3.021	3.398	3.776
8 x 3	7 1/4 x 2 1/2	18.125	9.440	7.552	3.147	3.776	4.405	5.035	5.664	6.293
8 x 4	7 1/4 x 3 1/2	25.375	25.904	14.802	4.405	5.286	6.168	7.049	7.930	8.811
8 x 6	7 1/2 x 5 1/2	41.250	103.984	37.813	7.161	8.594	10.026	11.458	12.891	14.323
8 x 8	7 1/2 x 7 1/2	56.250	263.672	70.313	9.766	11.719	13.672	15.625	17.578	19.531
8 x 10	7 1/2 x 9 1/2	71.250	535.859	112.813	12.370	14.844	17.318	19.792	22.266	24.740
8 x 12	7 1/2 x 11 1/2	86.250	950.547	165.313	14.974	17.969	20.964	23.958	26.953	29.948
8 x 14	7 1/2 x 13 1/2	101.250	1537.734	227.813	17.578	21.094	24.609	28.125	31.641	35.156
8 x 16	7 1/2 x 15 1/2	116.250	2327.422	300.313	20.182	24.219	28.255	32.292	36.328	40.365
8 x 18	7 1/2 x 17 1/2	131.250	3349.609	382.813	22.786	27.344	31.901	36.458	41.016	45.573
8 x 20	7 1/2 x 19 1/2	146.250	4634.297	475.313	25.391	30.469	35.547	40.625	45.703	50.781
8 x 22	7 1/2 x 21 1/2	161.250	6211.484	577.813	27.995	33.594	39.193	44.792	50.391	55.990
8 x 24	7 1/2 x 23 1/2	176.250	8111.172	690.313	30.599	36.719	42.839	48.958	55.078	61.198

PROPERTIES OF STRUCTURAL LUMBER — Sectional Properties of Standard Dressed (S4S) Lumber Sizes

NOMINAL SIZE b(inches)d	STANDARD DRESSED SIZE (S4S) b(inches)d	AREA OF SECTION A	MOMENT OF INERTIA I	SECTION MODULUS S	Weight in pounds per linear foot of piece when weight of wood per cubic foot equals: 25 lb.	30 lb.	35 lb.	40 lb.	45 lb.	50 lb.
10 x 1	9 1/4 x 3/4	6.938	0.325	0.867	1.204	1.445	1.686	1.927	2.168	2.409
10 x 2	9 1/4 x 1 1/2	13.875	2.602	3.469	2.409	2.891	3.372	3.854	4.336	4.818
10 x 3	9 1/4 x 2 1/2	23.125	12.044	9.635	4.015	4.818	5.621	6.424	7.227	8.030
10 x 4	9 1/4 x 3 1/2	32.375	33.049	18.885	5.621	6.745	7.869	8.993	10.117	11.241
10 x 6	9 1/2 x 5 1/2	52.250	131.714	47.896	9.071	10.885	12.700	14.514	16.328	18.142
10 x 8	9 1/2 x 7 1/2	71.250	333.984	89.063	12.370	14.844	17.318	19.792	22.266	24.740
10 x 10	9 1/2 x 9 1/2	90.250	678.755	142.896	15.668	18.802	21.936	25.069	28.203	31.337
10 x 12	9 1/2 x 11 1/2	109.250	1204.026	209.396	18.967	22.760	26.554	30.347	34.141	37.934
10 x 14	9 1/2 x 13 1/2	128.250	1947.797	288.563	22.266	26.719	31.172	35.625	40.078	44.531
10 x 16	9 1/2 x 15 1/2	147.250	2948.068	380.396	25.564	30.677	35.790	40.903	46.016	51.128
10 x 18	9 1/2 x 17 1/2	166.250	4242.836	484.896	28.863	34.635	40.408	46.181	51.953	57.726
10 x 20	9 1/2 x 19 1/2	185.250	5870.109	602.063	32.161	38.594	45.026	51.458	57.891	64.323
10 x 22	9 1/2 x 21 1/2	204.250	7867.879	731.896	35.460	42.552	49.644	56.736	63.828	70.920
10 x 24	9 1/2 x 23 1/2	223.250	10274.148	874.396	38.759	46.510	54.262	62.014	69.766	77.517
12 x 1	11 1/4 x 3/4	8.438	0.396	1.055	1.465	1.758	2.051	2.344	2.637	2.930
12 x 2	11 1/4 x 1 1/2	16 875	3.164	4.219	2.930	3.516	4.102	4.688	5.273	5.859
12 x 3	11 1/4 x 2 1/2	28.125	14.648	11.719	4.883	5.859	6.836	7.813	8.789	9.766
12 x 4	11 1/4 x 3 1/2	39.375	40.195	22.969	6.836	8.203	9.570	10 938	12.305	13.672
12 x 6	11 1/2 x 5 1/2	63.250	159.443	57.979	10.981	13.177	15.373	17.569	19.766	21.962
12 x 8	11 1/2 x 7 1/2	86.250	404.297	107.813	14.974	17.969	20.964	23.958	26.953	29.948
12 x 10	11 1/2 x 9 1/2	109.250	821.651	172.979	18.967	22.760	26.554	30.347	34.141	37.934
12 x 12	11 1/2 x 11 1/2	132.250	1457.505	253.479	22.960	27.552	32.144	36.736	41.328	45.920
12 x 14	11 1/2 x 13 1/2	155.250	2357.859	349.313	26.953	32.344	37.734	43.125	48.516	53.906
12 x 16	11 1/2 x 15 1/2	178.250	3568.713	460.479	30.946	37.135	43.325	49.514	55.703	61.892
12 x 18	11 1/2 x 17 1/2	201.250	5136.066	586.979	34.939	41.927	48.915	55.903	62.891	69.878
12 x 20	11 1/2 x 19 1/2	224.250	7105.922	728.813	38.932	46.719	54.505	62.292	70.078	77.865
12 x 22	11 1/2 x 21 1/2	247.250	9524.273	885.979	42.925	51.510	60.095	68.681	77.266	85.851
12 x 24	11 1/2 x 23 1/2	270.250	12437.129	1058.479	46.918	56.302	65.686	75.069	84.453	93.837
14 x 2	13 1/4 x 1 1/2	19.875	3.727	4.969	3.451	4.141	4.831	5.521	6.211	6.901
14 x 3	13 1/4 x 2 1/2	33.125	17.253	13.802	5.751	6.901	8.051	9.201	10.352	11.502
14 x 4	13 1/2 x 3 1/2	47.250	48.234	27.563	8.203	9.844	11.484	13.125	14.766	16.406
14 x 6	13 1/2 x 5 1/2	74.250	187.172	68.063	12.891	15.469	18.047	20.625	23.203	25.781
14 x 8	13 1/2 x 7 1/2	101.250	474.609	126.563	17.578	21.094	24.609	28.125	31.641	35.156
14 x 10	13 1/2 x 9 1/2	128.250	964.547	203.063	22.266	26.719	31.172	35.625	40.078	44.531
14 x 12	13 1/2 x 11 1/2	155.250	1710.984	297.563	26.953	32.344	37.734	43.125	48.516	53.906
14 x 16	13 1/2 x 15 1/2	209.250	4189.359	540.563	36.328	43.594	50.859	58.125	65.391	72.656
14 x 18	13 1/2 x 17 1/2	236.250	6029.297	689.063	41.016	49.219	57.422	65.625	73.828	82.031
14 x 20	13 1/2 x 19 1/2	263.250	8341.734	855.563	45.703	54.844	63.984	73.125	82.266	91.406
14 x 22	13 1/2 x 21 1/2	290.250	11180.672	1040.063	50.391	60.469	70.547	80.625	90.703	100.781
14 x 24	13 1/2 x 23 1/2	317.250	14600.109	1242.563	55.078	66.094	77.109	88.125	99.141	110.156
16 x 3	15 1/2 x 2 1/2	38.750	20.182	16.146	6.727	8.073	9.418	10.764	12.109	13.455
16 x 4	15 1/2 x 3 1/2	54.250	55.380	31.646	9.418	11.302	13.186	15.069	16.953	18.837
16 x 6	15 1/2 x 5 1/2	85.250	214.901	78.146	14.800	17.760	20.720	23.681	26.641	29.601
16 x 8	15 1/2 x 7 1/2	116.250	544.922	145.313	20.182	24.219	28.255	32.292	36.328	40.365
16 x 10	15 1/2 x 9 1/2	147.250	1107.443	233.146	25.564	30.677	35.790	40.903	46.016	51.128
16 x 12	15 1/2 x 11 1/2	178.250	1964.463	341.646	30.946	37.135	43.325	49.514	55.703	61.892
16 x 14	15 1/2 x 13 1/2	209.250	3177.984	470.813	36.328	43.594	50.859	58.125	65.391	72.656
16 x 16	15 1/2 x 15 1/2	240.250	4810.004	620.646	41.710	50.052	58.394	66.736	75.078	83.420
16 x 18	15 1/2 x 17 1/2	271.250	6922.523	791.146	47.092	56.510	65.929	75.347	84.766	94.184
16 x 20	15 1/2 x 19 1/2	302.250	9577.547	982.313	52.474	62.969	73.464	83.958	94.453	104.948
16 x 22	15 1/2 x 21 1/2	333.250	12837.066	1194.146	57.856	69.427	80.998	92.569	104.141	115.712
16 x 24	15 1/2 x 23 1/2	364.250	16763.086	1426.646	63.238	75.885	88.533	101.181	113.828	126.476
18 x 6	17 1/2 x 5 1/2	96.250	242.630	88.229	16.710	20.052	23.394	26.736	30.078	33.420
18 x 8	17 1/2 x 7 1/2	131.250	615.234	164.063	22.786	27.344	31.901	36.458	41.016	45.573
18 x 10	17 1/2 x 9 1/2	166.250	1250.338	263.229	28.863	34.635	40.408	46.181	51.953	57.726
18 x 12	17 1/2 x 11 1/2	201.250	2217.943	385.729	34.939	41.927	48.915	55.903	62.891	69.878
18 x 14	17 1/2 x 13 1/2	236.250	3588.047	531.563	41.016	49.219	57.422	65.625	73.828	82.031
18 x 16	17 1/2 x 15 1/2	271.250	5430.648	700.729	47.092	56.510	65.929	75.347	84.766	94.184
18 x 18	17 1/2 x 17 1/2	306.250	7815.754	893.229	53.168	63.802	74.436	85.069	95.703	106.337
18 x 20	17 1/2 x 19 1/2	341.250	10813.359	1109.063	59.245	71.094	82.943	94.792	106.641	118.490
18 x 22	17 1/2 x 21 1/2	376.250	14493.461	1348.229	65.321	78.385	91.450	104.514	117.578	130.642
18 x 24	17 1/2 x 23 1/2	411.250	18926.066	1610.729	71.398	85.677	99.957	114.236	128.516	142.795

Allowable Stress for Visually Graded Lumber from 97 NDS

Douglas Fir-Larch

Grading Rule Agency: WCLIB/WWPA

Size	Size Factor	Select Structure			No.1 & better			No. 1			No. 2			No.2 Repetitive		
		Fb	Fv	E	Fb	Fv	E	Fb	Fv	E	Fb	Fv	E	Fb	Fv	E
	CF	1450	95	1.9	1150	95	1.8	1000	95	1.7	875	95	1.6	875	95	1.6
2X4	1.5	2175	95	1.9	1725	95	1.8	1500	95	1.7	1350	95	1.6	1552	95	1.6
2X6	1.3	2885	95	1.9	1495	95	1.8	1300	95	1.7	1170	95	1.6	1345	95	1.6
2X8	1.2	1740	95	1.9	1380	95	1.8	1200	95	1.7	1080	95	1.6	1242	95	1.6
2X10	1.1	1595	95	1.9	1265	95	1.8	1100	95	1.7	990	95	1.6	1138	95	1.6
2X12	1	1450	95	1.9	1150	95	1.8	1000	95	1.7	900	95	1.6	1035	95	1.6
2X14	0.9	1305	95	1.9	1035	95	1.8	900	95	1.7	810	95	1.6	931	95	1.6
4X4	1.5	2175	95	1.9	1725	95	1.8	1500	95	1.7	1313	95	1.6	1510	95	1.6
4X6	1.4	1885	95	1.9	1495	95	1.8	1300	95	1.7	1138	95	1.6	1309	95	1.6
4X8	1.3	1885	95	1.9	1495	95	1.8	1300	95	1.7	1138	95	1.6	1309	95	1.6
4X10	1.2	1740	95	1.9	1380	95	1.8	1200	95	1.7	1050	95	1.6	1207	95	1.6
4X12	1.1	1595	95	1.9	1265	95	1.8	1100	95	1.7	963	95	1.6	1107	95	1.6
4x14 & UP	1	1450	95	1.9	1150	95	1.8	1000	95	1.7	875	95	1.6	1006	95	1.6

FOR HEM-FIR: 975 75 1.5

$F_c = 405$

FOR HEM FIR:

USE 850 75 1.3

$F_c = 405$

Allowable Stress for Visually Graded Lumber from 97 NDS

Douglas Fir-Larch

Grading Rule Agency: WCLIB/WWPA

Size	d	Size Factor $C_F = (12/d)^{1/9}$	Select Structure			Dense No. 1			No. 1			No. 2		
			Fb	Fv	E	Fb	Fv	E	Fb	Fv	E	Fb	Fv	E
			1600	85	1.6	1550	85	1.7	1350	85	1.6	875	85	1.
6X6	5.5	1.0	1600	85	1.6	1550	85	1.7	1350	85	1.6	875	85	1.
6X8	7.5	1.0	1600	85	1.6	1550	85	1.7	1350	85	1.6	875	85	1.
6X10	9.5	1.0	1600	85	1.6	1550	85	1.7	1350	85	1.6	875	85	1.
6X12	11.5	1.0	1600	85	1.6	1550	85	1.7	1350	85	1.6	875	85	1.
6X14	13.5	0.99	1579	85	1.6	1530	85	1.7	1332	85	1.6	864	85	1.
6X16	15.5	0.97	1555	85	1.6	1507	85	1.7	1312	85	1.6	850	85	1.
6X18	17.5	0.96	1534	85	1.6	1486	85	1.7	1295	85	1.6	839	85	1.
6X20	19.5	0.95	1516	85	1.6	1469	85	1.7	1279	85	1.6	829	85	1.

FOR HEM FIR:

USE 1050 70 1.3

$F_c = 405$

Note: Duration of Load. NDS TABLE 2.3.2

The allowable stress may increase as follows:

15% for snow load

25% for seven days duration as for roof loads

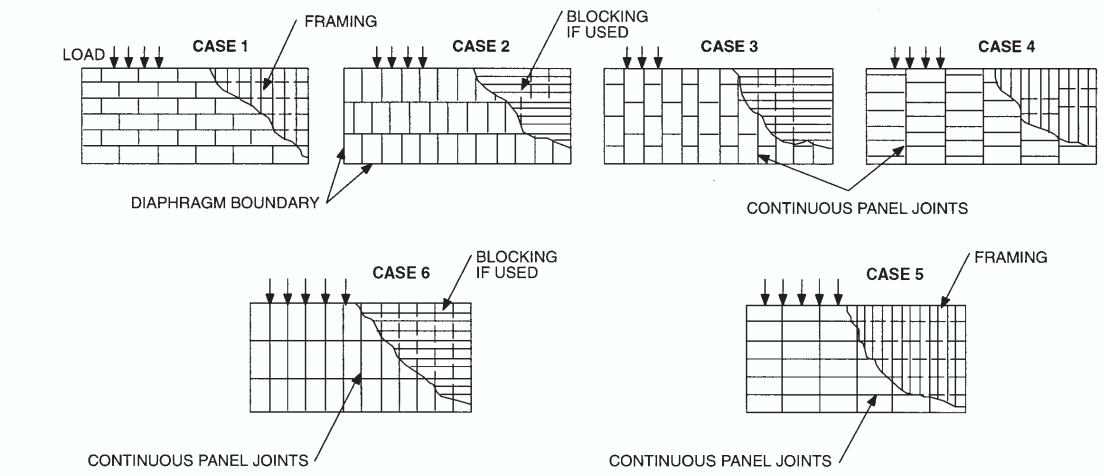
Fb for 2x and 4x member have been multiplied by the repetitive member factor of 1.15 when such members are used as joist, truss chords, rafters, studs, planks, decking, or similar members which are spaced not more than 24 inches on center.

TABLE 2306.3.1
RECOMMENDED SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL DIAPHRAGMS WITH FRAMING OF DOUGLAS-FIR-LARCH, OR SOUTHERN PINE[a] FOR WIND OR SEISMIC LOADING

PANEL GRADE	COMMON NAIL SIZE OR STAPLE[f] LENGTH AND GAGE	MINIMUM FASTENER PENETRATION IN FRAMING (inches)	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBER (inches)	BLOCKED DIAPHRAGMS				UNBLOCKED DIAPHRAGMS	
					Fastener spacing (inches) at diaphragm boundaries (all cases) at continuous panel edges parallel to load (Cases 3, 4), and at all panel edges (Cases 5 and 6)[b]				Fasteners spaced 6" max. At supported edges[b]	
					6	4	2 1/2[c]	2[c]		
					Fastener spacing (inches) at other panel edges (Cases 1, 2, 3 and 4)[b]					
					6	6	4	3	Case 1 (No unblocked edges or continuous joints parallel to load)	All other configurations (Cases 2, 3, 4, 5 and 6)
Structural I Grades	6d[e]	1 1/4	5/16	2	185	250	375	420	165	125
				3	210	280	420	475	185	140
	1 1/2 16 Gage	1		2	155	205	310	350	135	105
				3	175	230	345	390	155	115
	8d	1 3/8	3/8	2	270	360	530	600	240	180
				3	300	400	600	675	265	200
	1 1/2 16 Gage	1		2	175	235	350	400	155	115
				3	200	265	395	450	175	130
	10d[d]	1 1/2	15/32	2	320	425	640	730	285	215
				3	360	480	720	820	320	240
	1 1/2 16 Gage	1		2	175	235	350	400	155	120
				3	200	265	395	450	175	130
Sheathing, single floor and other grades covered in DOC PS 1 and PS 2	6d[e]	1 1/4	5/16	2	170	225	335	380	150	110
				3	190	250	380	430	170	125
	1 1/2 16 Gage	1		2	140	185	275	315	125	90
				3	155	205	310	350	140	105
	6d[e]	1 1/4	3/8	2	185	250	375	420	165	125
				3	210	280	420	475	185	140
	8d	1 3/8		2	240	320	480	545	215	160
				3	270	360	540	610	240	180

(continued)

TABLE 2306.3.1—continued
RECOMMENDED SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL DIAPHRAGMS WITH FRAMING OF DOUGLAS-FIR-LARCH, OR SOUTHERN PINE[a] FOR WIND OR SEISMIC LOADING



For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. For framing of other species: (1) Find specific gravity for species of lumber in AFPA National Design Specification. (2) For staples find shear value from table above for Structural I panels (regardless of actual grade) and multiply value by 0.82 for species with specific gravity of 0.42 or greater, or 0.65 for all other species. (3) For nails find shear value from table above for nail size for actual grade and multiply value by the following adjustment factor: Specific Gravity Adjustment Factor = [1-(0.5 - SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor shall not be greater than 1.

b. Space fasteners maximum 12 inches o.c. along intermediate framing members (6 inches o.c. where supports are spaced 48 inches o.c.).

c. Framing at adjoining panel edges shall be 3 inches nominal or wider, and nails shall be staggered where nails are spaced 2 inches o.c. or $2\,{}^{1}/_{2}$ inches o.c.

d. Framing at adjoining panel edges shall be 3 inches nominal or wider, and nails shall be staggered where both of the following conditions are met: (1) 10d nails having penetration into framing of more than $1\,{}^{1}/_{2}$ inches and (2) nails are spaced 3 inches o.c. or less.

e. 8d is recommended minimum for roofs due to negative pressures of high winds.

f. Staples shall have a minimum crown width of ${}^{7}/_{16}$ inch.

SHEAR WALL PANEL SCHEDULE

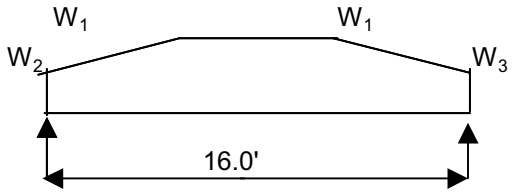
MARK	WALL TYPE & NAIL SPACING (COMMON OR BOX)	ALLOWABLE SHEAR,PLF	ANCHOR BOLTS (12" LONG OR 15" FOR 2- POUR)	UPPER FLOOR SILL NAILING
7	5/8" Drywall, blocked, with 6d cooler nails @ o.c at edges and field.	85.5 (*175)	5/8" @ 6'(*5/8 @ 3') ---DBL SIDED	16d @ 16" (*16d @ 8")
8	7/8" stucco over paper backed lath w/11 Ga.x1.5" galv. Nail @ 6" o.c at top and bottom plates, edge of wall and in field .see note # 3 below.	180	5/8" @ 6'	16d @ 8"
10	3/8" CDX plywood or OSB w/8d nails @ 6" o.c at edges and @ 12" o.c in field. See note # 5 below.	260 (*520)	5/8"@ 4' (*5/8" @ 2')---IF DBL SIDED	16D @ 6" (*16d @ 3")
11	3/8" CDX plywood or OSB w/8d nails @ 4" o.c at edges and @ 12" o.c in field .USE 3X FOUNDATION SILL PLATE & 3X STUDS AND BLOCKS AT ADJACENT PANELS.	380 (*760)	5/8"@ 4' (*5/8" @ 2')---IF DBL SIDED	16D @ 4" (*16d @ 2")
12	3/8" CDX plywood or OSB w/8d nails @ 3" o.c at edges and @ 12" o.c in field .USE 3X FOUNDATION SILL PLATE & 3X STUDS AND BLOCKS AT ADJACENT PANELS.	490 (*980)	5/8"@ 3' (*5/8" @ 1.5')---IF DBL SIDED	16D @ 3.5" (*2-16d @ 3.5")
13	3/8" CDX plywood or OSB w/8d nails @ 2" o.c at edges and @ 12" o.c in field .USE 3X FOUNDATION SILL PLATE & 3X STUDS AND BLOCKS AT ADJACENT PANELS.	640 (*1280)	5/8"@ 18'' (*5/8" @ 14'')---IF DBL SIDED	16D @2.5" (*2-16d @ 2.5")
14	½" Str. 1 plywood w/10d nails @ 2" o.c of edges and @ 12" o.c in field. USE 3X FOUNDATION SILL PLATE & 3X STUDS AND BLOCKS AT ADJACENT PANELS.	870 (*1740)	5/8"@ 20'' (*5/8" @ 10'')---IF DBL SIDED	16D @2" (*2-16d @ 2")

NOTES:

1. (* ----) in the table designates that shear wall sheating is to be applied on both faces of wall.
2. All plywood edges must be blocked with 2x solid blocking. Field nailing shall be 12" o.c for stud spaced at 16" o.c and 6" o.c otherwise.
3. Paper hacked self-furring expanded metal lath with ICBO approval.
4. Where allowable shear values exceed 350 plf, foundation sill plates and all framing members receiving
5. All interior bearing and non- bearing footing's shall have 7/32" shot pins @ 32" o.c & 48" o.c respectively.
6. All anchor bolt shall have plate wahers a minimum of 2"x2"x3/16" thick.

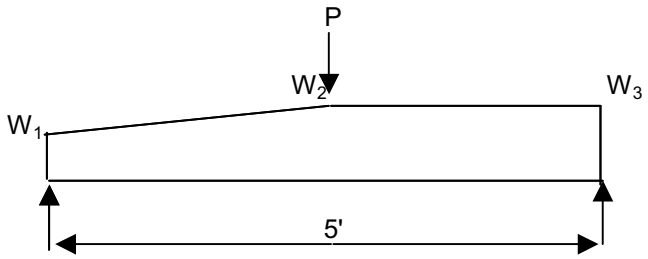
LOAD CALCULATIONS

BM#1-16' GARAGE DR.HDR



W_1	=	35PSF*((8'/2)+2')	=	210P.L.F
W_2	=	35PSF*((1'/2)+2')	=	87.5PLF
W_3	=	35PSF*((4'/2)+2')	=	140PLF

BM#2-HDR AT REAR OF MASTER BEDROOM



W_1	=	35 * 4'	=	140 PLF
W_2	=	35 * 6'	=	210 PLF
W_3	=	35 * 15.5'	=	542.5 PLF
			=	545 PLF
P	=	35* 4' *14'	=	1960 LBS

General Timber Beam

Description BM#1-16' GARAGE DR.HDR

al Information

Calculations are designed to 1997 NDS and 1997 UBC Requirements

Section Name	**4x14**		Center Span	16.00	ft	. . . . .Lu	0.00 ft
Beam Width	3.500	in	Left Cantilever		ft	. . . . .Lu	0.00 ft
Beam Depth	13.250	in	Right Cantilever		ft	. . . . .Lu	0.00 ft
Member Type	Sawn		Douglas Fir - Larch, No.1				
Bm Wt. Added to Loads			Fb Base Allow	1,000.0	psi		
Load Dur. Factor	1.250		Fv Allow	95.0	psi		
Beam End Fixity	Pin-Pin		Fc Allow	625.0	psi		
Wood Density	35.000	pcf	E	1,700.0	ksi		

Trapezoidal Loads

#1	DL @ Left	87.50	#/ft	LL @ Left	#/ft	Start Loc	0.000	ft
	DL @ Right	210.00	#/ft	LL @ Right	#/ft	End Loc	6.500	ft
#2	DL @ Left	210.00	#/ft	LL @ Left	#/ft	Start Loc	6.500	ft
	DL @ Right	210.00	#/ft	LL @ Right	#/ft	End Loc	12.000	ft
#3	DL @ Left	210.00	#/ft	LL @ Left	#/ft	Start Loc	12.000	ft
	DL @ Right	140.00	#/ft	LL @ Right	#/ft	End Loc	16.000	ft

Summary

Beam Design OK

Span= 16.00ft, Beam Width = 3.500in x Depth = 13.25in, Ends are Pin-Pin

Max Stress Ratio	0.615 : 1		
Maximum Moment	6.6 k-ft	Maximum Shear * 1.5	2.1 k
Allowable	10.7 k-ft	Allowable	5.5 k

Max. Positive Moment	6.56 k-ft	at	8.192 ft	Shear:	@ Left	1.41 k
Max. Negative Moment	-0.00 k-ft	at	16.000 ft		@ Right	1.59 k
Max @ Left Support	0.00 k-ft			Camber:	@ Left	0.000 in
Max @ Right Support	0.00 k-ft				@ Center	0.389 in
Max. M allow	10.67				@ Right	0.000 in

				Reactions...			
fb	768.67 psi	fv	45.70 psi	Left DL	1.41 k	Max	1.41 k
Fb	1,250.00 psi	Fv	118.75 psi	Right DL	1.59 k	Max	1.59 k

Deflections

	Dead Load	Total Load
Center Span...		
Deflection	-0.259 in	-0.259 in
...Location	8.064 ft	8.064 ft
...Length/Defl	740.7	740.71
Camber (using 1.5 * D.L. Defl) ...		
@ Center	0.389 in	
@ Left	0.000 in	
@ Right	0.000 in	

	Dead Load	Total Load
Left Cantilever...		
Deflection	0.000 in	0.000 in
...Length/Defl	0.0	0.0
Right Cantilever...		
Deflection	0.000 in	0.000 in
...Length/Defl	0.0	0.0

General Timber Beam

Description BM#2- HDR AT REAR OF MASTER BEDROOM

General Information — Calculations are designed to 1997 NDS and 1997 UBC Requirements

Section Name	**4x12**	Center Span	5.00 ft	. . . . .Lu	0.00 ft
Beam Width	3.500 in	Left Cantilever	ft	. . . . .Lu	0.00 ft
Beam Depth	11.250 in	Right Cantilever	ft	. . . . .Lu	0.00 ft
Member Type	Sawn	Douglas Fir - Larch, No.1			
Bm Wt. Added to Loads		Fb Base Allow	1,000.0 psi		
Load Dur. Factor	1.250	Fv Allow	95.0 psi		
Beam End Fixity	Pin-Pin	Fc Allow	625.0 psi		
Wood Density	35.000 pcf	E	1,700.0 ksi		

Trapezoidal Loads

#1	DL @ Left	140.00 #/ft	LL @ Left	#/ft	Start Loc	0.000 ft
	DL @ Right	210.00 #/ft	LL @ Right	#/ft	End Loc	3.500 ft
#2	DL @ Left	545.00 #/ft	LL @ Left	#/ft	Start Loc	3.500 ft
	DL @ Right	545.00 #/ft	LL @ Right	#/ft	End Loc	5.000 ft

Point Loads

Dead Load	1,960.0 lbs	lbs	lbs	lbs	lbs	lbs	-0.3 lbs
Live Load	lbs	lbs	lbs	lbs	lbs	lbs	lbs
...distance	3.500 ft	0.000 ft	0.000 ft	0.000 ft	0.000 ft	0.000 ft	0.000 ft

Summary

Beam Design OK

Span= 5.00ft, Beam Width = 3.500in x Depth = 11.25in, Ends are Pin-Pin

Max Stress Ratio	0.580 : 1		
Maximum Moment	2.9 k-ft	Maximum Shear * 1.5	2.7 k
Allowable	8.5 k-ft	Allowable	4.7 k

Max. Positive Moment	2.86 k-ft	at	3.500 ft	Shear:	@ Left	1.12 k
Max. Negative Moment	-0.00 k-ft	at	5.000 ft		@ Right	2.32 k
Max @ Left Support	0.00 k-ft			Camber:	@ Left	0.000 in
Max @ Right Support	0.00 k-ft				@ Center	0.023 in
Max. M allow	8.46				@ Right	0.000 in

				Reactions...			
fb	464.10 psi	fv	68.92 psi	Left DL	1.12 k	Max	1.12 k
Fb	1,375.00 psi	Fv	118.75 psi	Right DL	2.32 k	Max	2.32 k

Deflections

Center Span...	Dead Load	Total Load
Deflection	-0.015 in	-0.015 in
...Location	2.700 ft	2.700 ft
...Length/Defl	3,921.8	3,921.77

Camber (using 1.5 * D.L. Defl) ...

@ Center	0.023 in
@ Left	0.000 in
@ Right	0.000 in

Left Cantilever...	Dead Load	Total Load
Deflection	0.000 in	0.000 in
...Length/Defl	0.0	0.0

Right Cantilever...		
Deflection	0.000 in	0.000 in
...Length/Defl	0.0	0.0

SEISMIC FORCES

Seismic zone 4	4	Z	=	0.4	
Soil profile	=	S_D			
Bearing wall system		R	=	5.5	
Seismic fault:					
Closest distance to the fault			=	1.35	
Seismic coefficient		C_a	=	0.44	
		N_a	=	0.594	
Standard occupancy		I	=	1	

Simplified total design base shear:

	V	= $(3.0C_a/R)$	W
		= 0.324	W

Forces at each level:

	Fx	= (3.0Ca/R)	wi

Diaphragm force:

	Fpx	= (3.0Ca/R)	wpx

For allowable stress design

	V_{ASD}	= V/1.4	
		= 0.23143	W

WIND FORCES

Design Wind Pressure

	P	= $C_e\ C_q\ q_s\ I_w$		(20-1)
Combined Height,Exposure and Guest Factor Coefficient				(Table16-G)
	Ce	= 1.06		
	Ce	= 1.13		
	Ce	= 1.19		
	Ce	= 1.23		
	Ce	= 1.31		
	H	= 0-15'.Exposure C		
	H	= 20'. Exposure C		
	H	= 25'. Exposure C		
	H	= 30'. Exposure C		
	H	= 40'. Exposure C		
				(Table 16-II)
Pressure Coefficient				
	Cq	= 1.3		Primary frame,projected area method
	Cq	= 1.2		Wall not in discontinuity area
	Cq	= 1.5		ll corners in discontinuity area(outward wi
	Cq	= 1.6		Partially enclosed structure wall
Wind Stagnation Pressure at Standard Height of 33 feet				(Table 16-F)
	q_s	= 12.6	psf	Basic Wind Speed=70MPH
	q_s	= 16.4	psf	Basic Wind Speed=80MPH
	q_s	= 20.8	psf	Basic Wind Speed=90MPH
Standard Occupancy	I_w	= 1		(Table 16-K)
Mean Roof Height		= 11.0625	feet	
		= **11.1**	**feet**	
Hence,	P	= 22.5992	psf	
	P	= **22.6**	**psf**	

1st FLOOR SHEAR WALL DIAGRAM

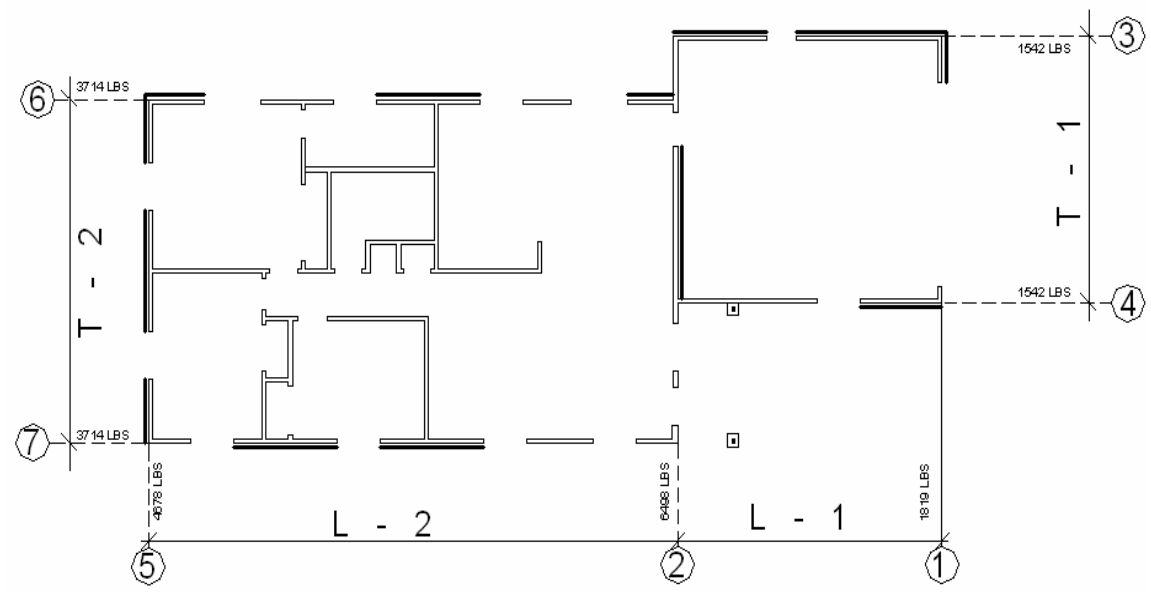
◯ --- Designates Shear Wall Number

L --- Designates Longitudinal Direction Sw #2, L=11.5'

Imax=max{ Vw x (10/lw) / Vi}	=	{5730 x (10/11.5)/11461}	=	0.435
Reliability/Redundancy Factor	ρ=	2-20/r_{max}SQ.RT A_B	=	2-{20/(0.435 X SQ.RT of 1782
			=	0.91
		Use (ρmin)	=	1.0

T --- Designates Transverse Direction Sw #6,L=16.0'

Imax=max{ Vw x (10/lw) / Vi}	=	{3714 x (10/16)/10236}	=	0.227
Reliability/Redundancy Factor	ρ=	2-20/r_{max}SQ.RT A_B	=	2-{20/(0.227 X SQ.RT of 1782
			=	0.0391
		Use (ρmin)	=	1.0



LATERAL LOADS

Reliability/ Redundancy Factor			=	1.00			
	Seismic Coefficient		=	0.231			
	Wind Pressure		=	22.6psf			
	Roof weight		=	19.0			
	Floor weight		=	0.0			
	Exterior wall weight		=	16.0			
	Interior wall weight		=	10.0			

Section L-1

Input:

	Roof height		=	3.0			
	Roof depth		=	25.0			
	Wall height		=	8.0			
	Floor depth		=	0.0			
	# of exterior walls		=	LATERAL LOADS			
	# of interior walls		=	0.0			
Wind Load,		Vw	=	22.6*(3.0+8.0/2)	=	158.2 plf	◀------ controls
Seismic Load,	Roof DL		=	19.0*25.0	=	475.0	
	Floor DL		=	0.0*0.0	=	0.0	
	Ext.Wall DL		=	2*16.0*8.0/2	=	128.0	
	Int.Wall DL		=	0*10.0*8.0/2	=	0.0	
	Total DL,W		=	475.0+0.0+128.0+0.0	=	603.0plf	
	Seismic Load		=	0.231*603.0*1.00	=	139.3plf	

Section L-2

Input:

	Roof height		=	5.0			
	Roof depth		=	31.0			
	Wall height		=	8.0			
	Floor depth		=	0.0			
	# of exterior walls		=	2.0			
	# of interior walls		=	1.5			
Wind Load,		Vw	=	22.6*(5.0+8.0/2)	=	203.4plf	◀------ controls
Seismic Load,	Roof DL		=	19.0*31.0	=	589.0	
	Floor DL		=	0.0*0.0	=	0.0	
	Ext.Wall DL		=	2*16.0*8.0/2	=	128.0	
	Int.Wall DL		=	2*10.0*8.0/2	=	60.0	
	Total DL,W		=	589.0+0.0+128.0+60.0	=	777.0plf	
	Seismic Load		=	0.231*777.0*1.00	=	179.5plf	

LATERAL LOADS

Reliability/ Redundancy Factor			=	1.00			
	Seismic Coefficient		=	0.231			
	Wind Pressure		=	22.6			
	Roof weight		=	19.0			
	Floor weight		=	0.0			
	Exterior wall weight		=	16.0			
	Interior wall weight		=	10.0			
Section T-1							
Input:	Roof height		=	2.5			
	Roof depth		=	25.0			
	Wall height		=	8.0			
	Floor depth		=	0.0			
	# of exterior walls		=	1.0			
	# of interior walls		=	1.0			
Wind Load,		Vw	=	22.6*(2.5+8.0/2)	=	146.9plf	◄----- controls
Seismic Load,	Roof DL		=	19.0*25.0	=	475.0	
	Floor DL		=	0.0*0.0	=	0.0	
	Ext.Wall DL		=	1*16.0*8.0/2	=	64.0	
	Int.Wall DL		=	1*10.0*8.0/2	=	40.0	
	Total DL,W		=	475.0+0.0+64.0+40.0	=	579.0plf	
	Seismic Load		=	0.231*579.0*1.00	=	133.7plf	
Section L-2							
Input:	Roof height		=	3.0			
	Roof depth		=	53.0			
	Wall height		=	8.0			
	Floor depth		=	0.0			
	# of exterior walls		=	1.0			
	# of interior walls		=	3.0			
Wind Load,		Vw	=	22.6*(3.0+8.0/2)	=	158.2plf	
Seismic Load,	Roof DL		=	19.0*53.0	=	1007.0	
	Floor DL		=	0.0*0.0	=	0.0	
	Ext.Wall DL		=	1*16.0*8.0/2	=	64.0	
	Int.Wall DL		=	3*10.0*8.0/2	=	120.0	
	Total DL,W		=	1007.0+0.0+64.0+120.0	=	1191.0plf	
	Seismic Load		=	0.231*1191.0*1.00	=	275.1plf	◄----- controls

ROOF DIAPHRAGM DESIGN

ROOF DIAPHRAGM

Direction:	L-2	Between Shear Walls:		2&5		
		Width L(ft)	=	46		
		Depth D(ft)	=	27		
Diaphragm Force:						
		Wind Load	=	179.5plf		Cntl
		Seismic Load Fpx	=	(3.0Ca/R)Wpx	203.4 plf ←	
Diaphragm Shear	=	203.4x(L/2)D	=	173.3 plf		

Use:	1/2" APA Rated Sheathing, or O.S.B. unblocked disphragm, exterior grade, Index 24/0 w/8 nails@6"o.c. at edges and boundaries, @12" o.c in field

Splice Chord Force, F= M/D= 1/8 x 203.4 x (46.0)**2/27.0=1993lb

16d sinker nails: allowable shear for double top plate, single shear, 1.5" penetration(p)

v = 103lbs x Cd
= 103 x (p/12 dia.)
= 103 x (1.5"/12x0.135")
= 95lbs

Top Plate Splice: n = F/(1.33x95)
= 1993/127
= 15.7

Use(16)- 16d sinkers

SHEAR WALL LINE # 1

PANEL DESIGN:

Section a-	Tributary width(ft)	=	23.0		Seismic(plf)	=	139.3	Wind(plf)	=	158.2
Section b-	Tributary width(ft)	=	0.0		Seismic(plf)	=	0	Wind(plf)	=	0
Seismic load above this floor(lb)		=	0		Wind load above this floor(lb)				=	0
Total seismic load =	139.3*23/2+0	=	1602lbs							
Total wind load =	158.2*23/2+0	=	1819lbs	←	controls					
Total panel length =	3'-8"									
Shear =	1819/3.67	=	495.6lb/ft							
>>> **Panel type used**	3/8" CDX Plywood, Mark-	13	see sheet SD1 for nailing shedule							

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	3.67	0.00	0.00	0.00	0.00	0.00
Panel height(ft) =	8	0.0	0.0	0.0	0.0	0.0
Uplift due to lateral load(lb) =	3639	0	0	0	0	0
Dead load on the panel (lb) =	248	0	0	0	0	0
Roof tributary(ft)	3	0.0	0.0	0.0	0.0	0.0
Floor tributary(ft)	0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	16	0	0	0	0	0
Uplift of this floor(lb) =	391	0	0	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	3391	0	0	0	0	0
>>> **Hold-down Type**	STHD14					

SHEAR WALL LINE # 2

PANEL DESIGN:

Section a-	Tributary width(ft)	=	23.0		Seismic(plf)	=	139.3	Wind(plf)	=	158.2
Section b-	Tributary width(ft)	=	46.0		Seismic(plf)	=	179.5	Wind(plf)	=	203.4
Seismic load above this floor(lb)		=	0		Wind load above this floor(lb)				=	0
Total seismic load =	139.3*23/2+179.5*46/2+0	=	5730lbs							
Total wind load =	158.2*23/2+203.4*46/2+0	=	6498lbs	←	controls					
Total panel length =	11.5 ft									
Shear =	6498/11.5	=	565.0lb/ft							
>>> **Panel type used**	3/8" CDX Plywood, Mark-	13	see sheet SD1 for nailing shedule							

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	11.5	0.00	0.0	0.0	0.0	0.0
Panel height(ft) =	8	0.0	0.0	0	0	0
Uplift due to lateral load(lb) =	4520	0	0	0	0	0
Dead load on the panel (lb) =	308	0	0	0	0	0
Roof tributary(ft)	0	0.0	0.0	0.0	0.0	0.0
Floor tributary(ft)	0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	10	0	0	0	0	0
Uplift of this floor(lb) =	4212	0	0	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	4212	0	0	0	0	0
>>> **Hold-down Type**	STHD14					

SHEAR WALL LINE # 3

PANEL DESIGN:

Section a-	Tributary width(ft)	=	21.0		Seismic(plf)	=	133.7	Wind(plf)	=	146.9
Section b-	Tributary width(ft)	=	0.0		Seismic(plf)	=	0	Wind(plf)	=	0
Seismic load above this floor(lb)		=	0		Wind load above this floor(lb)				=	0
Total seismic load =	133.7*21/2+0	=	1404lbs							
Total wind load =	146.9.2*21/2+0	=	1542lbs	←	controls					
Total panel length =	8.0 ft									
Shear =	1542/8.0	=	192.8lb/ft							
>>> **Panel type used**	3/8" CDX Plywood, Mark-	10	see sheet SD1 for nailing shedule							

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	4.00	4.0	0.0	0.0	0.0	0.0
Panel height(ft) =	8.0	8.0	0.0	0	0	0
Uplift due to lateral load(lb) =	1542	1542	0	0	0	0
Dead load on the panel (lb) =	248	248.0	0	0	0	0
Roof tributary(ft)	3.0	3.0	0.0	0.0	0.0	0.0
Floor tributary(ft)	0.0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	16	16	0	0	0	0
Uplift of this floor(lb) =	1295	1295	0	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	1295	1295	0	0	0	0
>>> **Hold-down Type**	STHD14					

SHEAR WALL LINE # 4

PANEL DESIGN:

Section a-	Tributary width(ft)	=	21.0		Seismic(plf)	=	133.7	Wind(plf)	=	146.9
Section b-	Tributary width(ft)	=	0.0		Seismic(plf)	=	179.5	Wind(plf)	=	0
Seismic load above this floor(lb)		=	0				Wind load above this floor(lb)		=	0
Total seismic load =	133.7*21/2+0	=	1404 lbs							
Total wind load =	146.9.2*21/2+0	=	1542 lbs	←	controls					
Total panel length =	7 ft									
Shear =	1542/7.0	=	220.4 lb/ft							

>>> **Panel type used** 3/8" CDX Plywood, Mark- 10 see sheet SD1 for nailing shedule

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	7.0	0.00	0.0	0.0	0.0	0.0
Panel height(ft) =	8.0	0.0	0.0	0	0	0
Uplift due to lateral load(lb) =	1763	0	0	0	0	0
Dead load on the panel (lb) =	434	0	0	0	0	0
Roof tributary(ft)	3.0	0.0	0.0	0.0	0.0	0.0
Floor tributary(ft)	0.0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	16	0	0	0	0	0
Uplift of this floor(lb) =	1329	0	0	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	1329	0	0	0	0	0
>>> **Hold-down Type**	STHD14					

SHEAR WALL LINE # 5

PANEL DESIGN:

Section a-	Tributary width(ft)	=	46.0		Seismic(plf)	=	179.5	Wind(plf)	=	203.4
Section b-	Tributary width(ft)	=	0.0		Seismic(plf)	=	0	Wind(plf)	=	0
Seismic load above this floor(lb)		=	0				Wind load above this floor(lb)		=	0
Total seismic load =	179.5*46/2+0	=	4129 lbs							
Total wind load =	203.4*46/2+0	=	4678 lbs	←	controls					
Total panel length =	18.0 ft									
Shear =	4678/18.0	=	259.9 lb/ft							

>>> **Panel type used** 3/8" CDX Plywood, Mark- 10 see sheet SD1 for nailing shedule

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	4.00	9.00	5.0	0.0	0.0	0.0
Panel height(ft) =	8.0	8.0	8.0	0	0	0
Uplift due to lateral load(lb) =	2079	2079	2079	0	0	0
Dead load on the panel (lb) =	248	730	310	0	0	0
Roof tributary(ft)	3.0	6.0	3.0	0.0	0.0	0.0
Floor tributary(ft)	0.0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	16	16	16	0	0	0
Uplift of this floor(lb) =	1831	1350	1769	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	1831	1350	1769	0	0	0
>>> **Hold-down Type**	STHD14	STHD14	STHD14			

SHEAR WALL LINE # 6

PANEL DESIGN:

Section a-	Tributary width(ft)	=	27.0		Seismic(plf)	=	275.1	Wind(plf)	=	158.2
Section b-	Tributary width(ft)	=	0.0		Seismic(plf)	=	0	Wind(plf)	=	0
Seismic load above this floor(lb)		=	0				Wind load above this floor(lb)		=	0
Total seismic load =	275.1*27/2+0	=	3714 lbs	←	controls					
Total wind load =	158.2*27/2+0	=	2136 lbs							
Total panel length =	16.0 ft									
Shear =	3714/16.0	=	232.1 lb/ft							

>>> **Panel type used** 3/8" CDX Plywood, Mark- 10 see sheet SD1 for nailing shedule

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	4.00	8.00	4.0	0.0	0.0	0.0
Panel height(ft) =	8.0	8.0	8.0	0	0	0
Uplift due to lateral load(lb) =	1857	1857	1857	0	0	0
Dead load on the panel (lb) =	333	1521	761	0	0	0
Roof tributary(ft)	3.0	15.5	15.5	0.0	0.0	0.0
Floor tributary(ft)	0.0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	16	16	16	0	0	0
Uplift of this floor(lb) =	1524	336	1096	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	1524	336	1096	0	0	0
>>> **Hold-down Type**	STHD14	STHD14	STHD14			

SHEAR WALL LINE # 7

PANEL DESIGN:

Section a-	Tributary width(ft)	=	27.0		Seismic(plf)	=	275.1	Wind(plf)	=	158.2
Section b-	Tributary width(ft)	=	0.0		Seismic(plf)	=	0	Wind(plf)	=	0
Seismic load above this floor(lb)		=	0				Wind load above this floor(lb)		=	0
Total seismic load =	275.1*27/2+0	=	3714 lbs	←	controls					
Total wind load =	158.2*27/2+0	=	2136 lbs							
Total panel length =	16.0 ft									
Shear =	3714/16.0	=	232.1 lb/ft							

>>> **Panel type used** 3/8" CDX Plywood, Mark- 

see sheet SD1 for nailing shedule

OVERTURNING ANALYSIS:

	Panel # 1	Panel # 2	Panel # 3	Panel # 4	Panel # 5	Panel # 6
Panel length(ft) =	8.00	8.0	0.0	0.0	0.0	0.0
Panel height(ft) =	8.0	8.0	0.0	0	0	0
Uplift due to lateral load(lb) =	1857	1857	0	0	0	0
Dead load on the panel (lb) =	1521	1521	0	0	0	0
Roof tributary(ft)	15.5	15.5	0.0	0.0	0.0	0.0
Floor tributary(ft)	0.0	0.0	0.0	0.0	0.0	0.0
Wall weight(psf)	16	16	0	0	0	0
Uplift of this floor(lb) =	336	336	0	0	0	0
Uplift from upper floor(lb) =	0	0	0	0	0	0
Total hold-down force(lb)=	336	336	0	0	0	0
>>> **Hold-down Type**	STHD14	STHD14				

CONTINUOUS FOOTING DESIGN

Allowable Soil Bearing pressure = 1000 psf

CONTINUOUS FOOTING at Front of Rear of House

Loading on Continuous Footing:

Roof load	=	35 psf x (27'/2 +2') = 542.5 plf
Wall Load	=	16 psf x 8' = 128 plf
Floor Load	=	
Total Load	=	670.5 plf

Required Width of Footing = 670.5/1000
= 0.671'

Use: 12" wide x 12" deep w/1-#4 rebars at top and bottom

FOUNDATION DESIGN

Allowalblw Soil Bearing Pressure = 1000 psf

Allowable Point Load at Continuous Footing:

Pmax = Pa * S * W/144

12" x 12" footing, Pmax = 1000 x 39.5 x 12" / 144
= 3292 LBS