A. & E. DESIGN SERVICES **STEVEN B. NEEF**

2157 FOURTH ST
LIVERMORE, CALIFORNIA 94550
(925) 449-3883 NEEF2@AOL.COM

RCE C-038548

JOB NUMBER : 2016-

VALID ONLY WITH ORIGINAL SIGNATURE

[redacted]

STRUCTURAL CALCULATIONS FOR :

MANCINI
c/o DOUG HARWOOD

FOR THE STRUCTURE AT: UNIT A
2ND AND "P" ST.
LIVERMORE, CA.

DESIGN PARAMETERS

183.888336

SCOPE: THESE CALCULATIONS CHECK THE PROPOSED RESIDENCE FOR
VERTICAL LOADS: DEAD PLUS LIVE,
LATERAL LOADS: WIND AND SEISMIC

REFERENCES: 2013 C.B.C. 2013 C.R.C. AND 2012 I.B.C.

SOILS: SOILS VALUES PER 2013 C.B.C. FOR CLASS 5 SOILS
BEARING PRESSURE 1500 PSF
THE OWNER ASSUMES ALL RESPONSIBILITY FOR THE DECISION NOT TO ACQUIRE A CURRENT SOILS REPORT AND AGREES THAT THIS IS TO HIS SOLE BENEFIT.

LATERAL LOADS: WIND V(ULT) = 110 MPH. EXPOSURE C RISK CATEGORY II
V(ASD) = 85 MPH. (NO SPECIAL INSPECTION REQUIRED)
SEISMIC DESIGN CATEGORY D IMPORTANCE FACTOR 1
LIGHT WEIGHT FRAMING R= 6.5
(NO SPECIAL INSPECTION PER 1705.11 EXCEPTION 3)

ASSUMPTIONS: WEIGHTS OF MATERIALS ARE CONSERVATIVE BY ABOUT 7%
INPUT TO COMPUTER ASSUMED ACCURATE TO ± 5%
COMPUTER SOFTWARE IS ACCURATE TO FROM -0% TO +5% (CONSERVATIVE)

UPLIFT FORCES OF LESS THAN 200 LBS ARE ASSUMED TO BE RESISTED BY ANCHOR BOLTS, SILL NAILING, ADJACENT WALLS, ETC. WITHOUT REQUIRING A HOLDOWN.

LIMITATIONS: THESE CALCULATIONS HAVE BEEN PREPARED IN ACCORDANCE WITH ACCEPTED ENGINEERING PRACTICE IN THE STATE OF CALIFORNIA AND NO OTHER WARRANTIES ARE MADE AS TO THE PROFESSIONAL ADVICE PROVIDED HEREIN.

A. & E. DESIGN SERVICES WILL ACCEPT NO RESPONSIBILITY FOR WORK PERFORMED BY OTHERS, WHICH HAS NOT BEEN CHECKED, STAMPED AND SIGNED BY US . IT IS THE RESPONSIBILITY OF THE ARCHITECT / DESIGNER TO INCORPORATE THE REQUIREMENTS OF THESE CALCULATIONS INTO THE CONSTRUCTION DOCUMENTS AND ACQUIRE THESE APPROVALS.

[redacted]

WEIGHTS OF MATERIALS

	MATERIAL		WEIGHT			
ROOF:	COMPOSITION ROOF #1		4.8	psf.	ROOF SLOPE (F):	6:12 WORST CASE
					ROOF DEAD LOAD	11 psf.
	RAFTERS		2.0	psf.	ROOF LIVE LOAD	18 psf.
	DECKING	1/2 in.	1.8	psf.	(20 psf. X (1.2-0.05 F)	for 4 < F < 12)
	MISCELLANEOUS		1.4	psf.	TOTAL (ROOF ONLY)	**29 psf.**
	SLOPE INCREASE		1.0	psf.		
CEILING:	CEILING	5/8 in.	2.9	psf.	CEILING DEAD LOAD	**6 psf.**
	CEILING JOISTS		1.8	psf.	CEILING LIVE LOAD	20 psf.
	INSULATION AND MISC.		0.8	psf.	(LIMITED STORAGE NON CONCURRENT)	F.S.
	FIRE SPRINKLERS		0.5	psf.	TOTAL DEAD LOAD	**17 psf.** 10%
					TOTAL LOAD	**35 psf.**
FLOOR:	JOISTS		3.7	psf.		
	DECKING	3/4 in.	2.7	psf.		
	CEILING	5/8 in.	2.9	psf.		
	FLOOR COVERING		2.7	psf.		
	INSULATION AND MISC.		1.5	psf.	FLOOR DEAD LOAD	14 psf. 7%
	FIRE SPRINKLERS		0.5	psf.	FLOOR LIVE LOAD	40 psf.
					TOTAL LOAD	**54 psf.**
EXT. WALLS:	STUDS	2 X 6 @ 16	1.8	psf.		
	STUCCO	7/8 in.	9.0	psf.		
	PLYWOOD	1/2 in.	1.8	psf.		
	GYPSUM 1)	1/2 in.	2.3	psf.		
	INSULATION AND MISC.		1.1	psf.		
					TOTAL LOAD	**16 psf.** 7%
INT. WALLS:	STUDS	2 X 4 @ 16	1.1	psf.		
	GYPSUM 2)	1/2 in.	4.6	psf.		
	MISCELLANEOUS		2.3	psf.		
					TOTAL LOAD	**8 psf.** 24%

GENERAL NOTES

1) ALL WORK SHALL COMPLY WITH THE 2012 IR.C. AS AMENDED BY THE 2013 C.B.C. THE 2012 U.M.C. AS AMENDED BY THE 2013 C.M.C. THE 2012 U.P.C. AS AMENDED BY THE 2013 C.P.C. THE 2008 N.E.C. AS AMENDED BY THE 2013 C.E.C. THE 2013 CALIFORNIA ENERGY CODE (2008 BUILDING ENERGY EFFICIENCY STANDARDS.) AND ALL APPLICABLE STATE COUNTY AND LOCAL CODES AND STANDARDS.
2) CONTRACTORS SHALL VERIFY ALL DIMENSIONS PRIOR TO THE FABRICATION OF ANY WORK. DO NOT SCALE PLANS. ANY ERRORS SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER IMMEDIATELY.
3) IN THE EVENT THAT CERTAIN FEATURES OF THE CONSTRUCTION ARE NOT SHOWN, THEN THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS WHICH ARE SHOWN OR CALLED FOR.
4) CONTRACTOR SHALL INSPECT ALL EXISTING CONDITIONS WHICH EFFECT THE WORK AND NOTIFY THE ENGINEER OF ANY CONDITIONS WHICH CONFLICT WITH THE WORK TO BE DONE.
5) THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR THE CONDUCT OF THE WORK INCLUDING ALL METHODS, PROCEDURES, SITE SAFETY, TEMPORARY BRACING AND SHORING, SCHEDULING OF INSPECTIONS AND OBTAINING NEEDED PERMITS.
6) IN THE EVENT OF A CONFLICT BETWEEN CODES THE MORE STRINGENT SHALL GOVERN.
7) CONTRACTOR SHALL REVIEW ALL DOCUMENTS COMPLETELY BEFORE PROCEEDING WITH THE CONSTRUCTION.
8) ALL MANUFACTURED MATERIALS, COMPONENTS, FASTENERS AND ASSEMBLIES SHALL BE HANDLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
9) PLANS CAN NOT BE MODIFIED BY ANYONE OTHER THAN THE DESIGNER AND LICENSED ENGINEER.
10) CONTRACTOR AND ALL SUBCONTRACTORS TO VERIFY THAT THEY ARE USING ONLY THE FINAL PERMITTED SET OF PLANS.

MATERIALS:

2 X RAFTERS AND JOISTS	DF #2	U.O.N.
4 X & 6 X BEAMS AND POSTS	DF #1	U.O.N. (UNDER FLOOR GIRDERS MAY BE DF #2)
TYPICAL 4 X 12 HEADERS	DF #2	U.O.N.
STUDS	STANDARD OR BETTER	
GLU-LAM BEAMS	24F	V4 STANDARD CAMBER FOR SIMPLE SPANS V8 FOR CANTILEVERS
	BEAMS TO BE CERTIFIED AND STAMPED BY INSPECTION AGENCY.	
CONCRETE (no special inspection)	2500 PSI. 4" SLUMP 3/4" MAX AGGREGATE SIZE PER A.S.T.M.C33	
	MIX WITH A MAX. OF 7-1/2 GALLONS OF CLEAN WATER PER SACK OF CEMENT.	
REBAR	#5 AND SMALLER GRADE 40 , #6 AND LARGER GRADE 60	PER ASTM A615
CONNECTORS	SIMPSON STRONG TIE OR EQUAL VALUES USED ARE FOR SINKER NAILS	
ANCHOR BOLTS	5/8" DIA X 12" BOLTS AT 48" oc. OR PER SHEARWALL SCHEDULE, AND 5" TO 12" FROM	
	ENDS OF MUD SILL AND 1-3/4" FROM EDGE. EMBED 7" INTO CONCRETE.	
	BOLTS IN SHEARWALLS OR BRACED WALL LINES SHALL BE INSTALLED WITH	
	SIMPSON BPS 5/8-3 PLATE WASHERS AND CUT WASHERS. (BP 5/8-3 OK WITHOUT CUT WASHER)	
NAILS 2 X MEMBERS	16d SINKERS U.O.N.	
1 X MEMBERS	8d SINKERS U.O.N.	
PLYWOOD	8d COMMON OR DEFORMED SHANK BOX. U.O.N. FLOORS TO BE GLUED.	
MUD SILLS & LEDGERS TO CONCRETE	PRESSURE TREATED DOUGLAS FIR.	
	NAILS AND BOLTS LESS THAN 5/8" DIA. INTO P.T. TO BE GALVANIZED.	

NAILING SHALL CONFORM TO THE FOLLOWING AND I.B.C. TABLE 2304.9.1 UNLESS A GREATER NUMBER OF NAILS IS CALLED FOR ON THE DRAWINGS.

JOISTS OR RAFTERS	TO BEARING (SILL OR GIRDER)	3)-8d TOENAILS EACH END
	TO PARALLEL MEMBERS	16d AT 12"
SOLE PLATE	TO JOIST OR BLOCKING	16d AT 16" OR PER SHEARWALL SCHEDULE
STUDS	TO BEARING	2)-16d END NAIL
	TO SOLE PLATE	2)-16d END NAIL (20d @ 3x plate) or 4)-8d TOENAILS
	TO PARALLEL STUDS	16d AT 24"
	TO CONTINUOUS HEADER	4) 8d TOENAILS
4 X 4 AND LARGER	TO BEARING	4) 8d TOENAILS
TOP PLATE	TO SECOND TOP PLATE	16d AT 16"
	LAP SPLICE	8) 16d
	AT INTERSECTION	2) 16d
BLOCKING BETWEEN JOISTS	TO TOP PLATES	3) 8d TOENAILS
	TO JOISTS	3) 8d TOENAILS EACH END
RIM JOISTS	TO TOP PLATES	8d AT 6"
CEILING JOISTS	TO TOP PLATES	3) 8d TOENAILS
	LAP AT PARTITION	3) 16d
	TO PARALLEL RAFTERS	3) 16d
3/8",1/2"AND 3/4" PLYWOOD	TO FRAMING	8d COMMON OR DEFORMED SHANK (MIN.)
1-1/8" PLYWOOD	TO FRAMING	10d COMMON OR 16d SINKER

A COPY OF THIS PAGE SHOULD BE ATTACHED TO THE PLANS

FRAMING NOTES

TYPICAL

1) ALL UNTREATED WOOD TO BE 1/2" MINIMUM FROM CONCRETE OR MASONRY. (RAISE PLYWOOD 1/2")
2) WHEREVER THE WOOD TENDS TO SPLIT, HOLES SHALL BE PREDRILLED. SPLIT MEMBERS SHALL BE REPLACED.
3) PROVIDE POSTS THE FULL WIDTH OF BEAMS AND PROVIDE SOLID POSTS AND/OR BLOCKING TO FOUNDATION.
4) WHERE TOP PLATES OR SOLE PLATE ARE CUT FOR PLUMBING, PROVIDE A 1-1/2" WIDE X .058" THICK STRAP EACH SIDE W/ 12)16d
5) PROVIDE DOUBLE JOISTS UNDER PARALLEL PARTITIONS EVEN IF NOT SHOWN ON PLANS.

PLYWOOD

6) CENTER PLYWOOD JOINTS OVER FRAMING MEMBERS WITH 1/16"± SPACE BETWEEN SHEETS.
7) DRIVE NAILS FLUSH WITH PLYWOOD SURFACE. PROVIDE 3/8" MIN. EDGE DISTANCE FOR NAILS AT PLYWOOD AND FRAMING MEMBERS.
8) EDGE NAIL PLYWOOD TO COLLECTORS WITH 2) ROWS OF 8d AT 6" WHERE TWO SHEETS MEET. 1) ROW OF 8d AT 4" IN FIELD OK.
9) LAY PLYWOOD SHEETS WITH FACE GRAIN PERPENDICULAR TO RAFTERS AND JOISTS WITH 24" MIN. SHEET SIZE.
10) ROOF DIAPHRAGM TO BE 1/2" CDX PLYWOOD WITH 8d AT 6" EDGE & 12" FIELD (UNBLOCKED) U.O.N. (1/2" O.S.B. OK)
11) FLOOR DIAPHRAGMS TO BE 3/4" CDX PLYWOOD. GLUED & NAILED W/ 8d AT 6 EDGE & 12" FIELD (UNBLOCKED) U.O.N. (3/4" O.S.B. OK)

BLOCKING

12) PROVIDE SOLID BLOCKING BETWEEN JOISTS UNDER PARTITION WALLS, OVER BEARING POINTS AND FIRE BLOCKING PER CBC. 717.2
13) SOLID BLOCK AT 8' o.c. BETWEEN 2 X 12 FLOOR JOISTS WITH SPANS OVER 10'. (WHERE CEILINGS DO NOT BRACE JOISTS.)

TRUSSES

14) WHEN ROOF TRUSSES SPAN OVER 30'-0", PROVIDE A STUD DIRECTLY BELOW THE TRUSS. ADD STUDS AS NEEDED.
15) PROVIDE 1/4" GAP BETWEEN TRUSSES AND NON BEARING PARTITIONS AND CONNECT WITH SIMPSON STC PLATE.
16) **TRUSS CALCULATIONS SHALL BE PROVIDED BY MANUFACTURER, REVIEWED BY THE ENGINEER, AND SUBMITTED TO THE BUILDING DEPT., FOR APPROVAL, PRIOR TO MANUFACTURE AND INSTALLATION. SEE "SUMMARY" FOR ROOF LOADS**

GLU LAMS

17) STANDARD CAMBER FOR GLU-LAMS IS A 3500 FT. MIN. RADIUS. (=1/8" @ 16' SPAN, =3/16" @ 20' SPAN)
18) AITC. CERTIFICATES FOR GLU-LAMS SHALL BE PROVIDED BY MANUFACTURER AND SUBMITTED TO THE BUILDING DEPT., FOR APPROVAL, PRIOR TO INSTALLATION.

ATTICS

19) ATTICS TO HAVE 22" X 30" ACCESS TO ALL AREAS OVER 30" HIGH. VENTS TO BE PROVIDED EQUAL TO THE AREA / 150 WITH HALF THE VENTS AT THE EAVES AND HALF THE VENTS AT LEAST 3'-0" ABOVE THE EAVES.

GENERAL

20) NOT ALL PORTIONS OF ANY GIVEN STRUCTURE ARE REQUIRED TO BE ENGINEERED. ANY PORTION NOT DETAILED ON THE PLANS SHOULD BE CONSTRUCTED PER THE CONVENTIONAL LIGHT FRAME CONSTRUCTION PROVISIONS OF 2013 C.B.C.
21) LUMBER TO HAVE 19% MAX. MOISTURE CONTENT AT TIME OF INSTALLATION.

FOUNDATION NOTES

CONCRETE

1) DO NOT LOAD CONCRETE UNTIL IT HAS SUFFICIENTLY CURED TO CARRY THE LOADS. (TYPICALLY 7 DAYS.)
2) ALL CONCRETE TO CONFORM WITH ACI 318-11
3) CONCRETE SLABS TO BE CURED BY BEING KEPT MOIST FOR SEVEN DAYS AFTER POURING OR BY SPRAYING WITH AN APPROVED CURING COMPOUND. ALL SLABS TO HAVE A MINIMUM OF #3 BARS AT 18" o.c. BOTH WAYS.
4) CONCRETE TO BE VIBRATED OR RODDED DURING PLACEMENT TO FILL ALL VOIDS.

REBAR

6) REBAR TO BE CLEAN OF MUD AND OIL AND SUPPORTED SO AS TO STAY IN POSITION DURING THE POUR. DO NOT WELD REBAR.
7) PROVIDE 3" CONCRETE COVER FROM REBAR TO SOIL, 2" AT BOTTOM OF SLABS ON GRADE. 1-1/2" COVER TO AIR.

GENERAL

8) PROVIDE EXPANSION STRIPS AT EDGES OF SLABS, U.N.O. AND KNIFE CUT CONTRACTION JOINTS AT APPROXIMATELY 10'-0" o.c. SOIL UNDER SLABS TO BE MOISTURE CONDITIONED PRIOR TO POUR TO MINIMIZE SWELL POTENTIAL.
9) FOOTINGS TO BEAR ON UNDISTURBED MATERIAL REGARDLESS OF ELEVATIONS SHOWN. ALL TRENCHES TO BE CLEAN, LEVEL AND TAMPED DOWN. TOP OF FOUNDATION TO BE LEVEL AND STEPPED AS NEEDED.
10) PROVIDE 8" FROM WOOD TO EARTH AND SLOPE GRADE AWAY FROM STRUCTURE AT 5 PERCENT WITHIN 10' OR TO SUITABLE DRAIN.

BOLTS

11) TYPICAL ANCHOR BOLTS TO BE 5/8" DIA. AT 48" o.c. WITH 2) MIN. PER PIECE, AND 5" TO 12" FROM THE ENDS OF ALL SILL PLATES, UNLESS A GREATER NUMBER OF BOLTS ARE CALLED FOR IN THE SHEAR WALL SCHEDULE. (W/ BPS 5/8-3 PLATE WASHERS & CUT WASHERS AT SHEARWALLS OR BRACED WALL LINES.)
LOCATE PLATE WASHERS WITHIN 1/2" OF EDGE OF MUD SILL TAKING PLYWOOD NAILING.

CRAWL SPACE

12) PROVIDE 18" MIN. CLEAR FROM GROUND TO FLOOR JOISTS AND 12" MIN. CLEAR TO GIRDERS. ALL UNDER FLOOR AREAS TO HAVE AN 18" X 24" MINIMUM ACCESS.
13) UNDER FLOOR SHALL BE VENTILATED BY OPENINGS IN THE EXTERIOR FOUNDATION WALLS. OPENINGS SHALL HAVE A MINIMUM AREA OF 1 SQ. FT FOR EACH 150 SQ. FT. OF UNDER FLOOR AREA AND BE COVERED WITH CORROSION RESISTANT WIRE MESH WITH OPENINGS OF 1/4" MAX. PER C.B.C. LOCATE VENTS NEAR CORNERS AND ON AT LEAST 2 OPPOSITE SIDES OF CRAWL AREA. DO NOT CUT HOLES IN GRADE BEAMS UNLESS APPROVED BY THE ENGINEER.

MUD SILLS

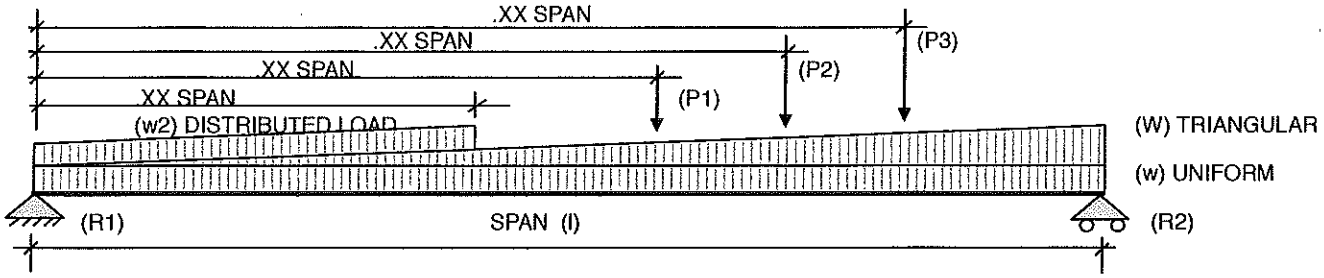
14) MUD SILLS TO BE PRESSURE TREATED DOUGLAS FIR. SPRAY ALL CUTS AND HOLES WITH COPPER GREEN TREATMENT OR EQUAL.
15) NAILS AND BOLTS INTO PRESSURE TREATED MATERIAL TO BE GALVANIZED. 5/8" DIA BOLTS AND LARGER DO NOT NEED TO BE GALV.
16) PIPES THROUGH CONCRETE TO BE SLEEVED OR WRAPPED. NO ALUMINUM SHALL BE IN CONTACT WITH CONCRETE.
17) WOOD TO BE 8" MIN. ABOVE GRADE. NON TREATED WOOD TO BE 1/2" MIN. FROM CONC. STUCCO SCREED TO BE 4" MIN. ABOVE GRADE.

VERTICAL LOAD CALCULATIONS

139.75278

2013 C.B.C. D + L + Lr

TYPICAL LOAD DIAGRAM



1) LOAD DURATION FACTOR FOR ROOF LIVE LOADS IS 1.25. WHERE LESS THAN 25% OF THE LOAD ON A BEAM IS ROOF LIVE LOAD A LOAD DURATION FACTOR OF 1.00 MUST BE USED AND THE ROOF LIVE LOAD MAY BE NEGLECTED.
2) CEILING LIVE LOADS DO NOT NEED TO BE APPLIED WITH ROOF LIVE LOADS.
3) REPETITIVE USE FACTOR IS 1.15 FOR MULTIPLE MEMBERS WITHIN 24" OF EACH OTHER AND FOR TRIPLE JOISTS.
4) DEFLECTION LIMITS USED HAVE BEEN DETERMINED THROUGH EXPERIENCE AND EXCEED THE REQUIREMENTS OF THE C.B.C.
5) LIVE LOAD REDUCTIONS MAY BE TAKEN PER C.B.C. TO A MAXIMUM OF 30% FOR FLOORS AND 40% FOR ROOFS
6) STANDARD CAMBER FOR GLU-LAMS IS 3500 FT. RADIUS PER WEYERHAEUSER CORPORATION.

ROOF SYSTEM

MEMBER SPACING = 24 in. MINIMUM NAILING: 8d AT 6" EDGE, AND 12" FIELD
LIVE LOADS REDUCED BY .06% FOR EACH SQUARE FOOT OVER 150 SF. TO A MAXIMUM OF 25% (40% FOR FLAT ROOFS)
USE 1/2" PLYWOOD OR O.S.B. WITH PANEL INDEX 24/16 (SEE LATERAL LOAD CALCULATIONS FOR ADDITIONAL NAILING)

TRUSSES AT 24" — 1

SPAN	22.0	ft.	(l)
UNIFORM LOAD	70	plf.	(w)
POINT LOAD @ .33 Span	0	lbs.	(P1)
POINT LOAD @ .90 Span	0	lbs.	(P2)
POINT LOAD @ .13 Span	0	lbs.	(P3)
DIST. LOAD TO .20 Span	0	plf.	(w2)
TRIANGULAR W 0 psf.	0	lbs.	(W)

SHEAR (V) = 770 lbs. --------- @ END
MOMENT (M) = 4235 ft.lbs. max ----------

REACTION LEFT (R1) =	770 lbs.
REACTION RIGHT (R2) =	770 lbs.

HIP MASTER TRUSS — 2

SPAN	22.0	ft.	(l)
UNIFORM LOAD	70	plf.	(w)
POINT LOAD @ .33 Span	0	lbs.	(P1)
POINT LOAD @ .90 Span	0	lbs.	(P2)
POINT LOAD @ .13 Span	0	lbs.	(P3)
DIST. LOAD TO .50 Span	105	plf.	(w2)
TRIANGULAR W 0 psf.	0	lbs.	(W)

SHEAR (V) = 1636 lbs. --------- @ END
MOMENT (M) = 7808 ft.lbs. max ----------

REACTION LEFT (R1) =	1636 lbs.
REACTION RIGHT (R2) =	1059 lbs.

GIRDER TRUSS OVER MASTER BATH — 3

SPAN	14.0	ft.	(l)
UNIFORM LOAD	70	plf.	(w)
POINT LOAD @ .50 Span	1600	lbs.	(P1)
POINT LOAD @ .90 Span	0	lbs.	(P2)
POINT LOAD @ .13 Span	0	lbs.	(P3)
DIST. LOAD TO .50 Span	420	plf.	(w2)
TRIANGULAR W 0 psf.	0	lbs.	(W)
SHEAR (V) =	3495	lbs. ---------	@ END
MOMENT (M) =	13103	ft.lbs. max	----------
REACTION LEFT (R1) =	3495	lbs.	
REACTION RIGHT (R2) =	2025	lbs.	

GIRDER TRUSS BACK BAY WINDOW — 4

SPAN	8.0	ft.	(l)
UNIFORM LOAD	440	plf.	(w)
POINT LOAD @ .50 Span	0	lbs.	(P1)
POINT LOAD @ .90 Span	0	lbs.	(P2)
POINT LOAD @ .13 Span	0	lbs.	(P3)
DIST. LOAD TO .50 Span	0	plf.	(w2)
TRIANGULAR W 0 psf.	0	lbs.	(W)
SHEAR (V) =	1760	lbs. ---------	@ END
MOMENT (M) =	3520	ft.lbs. max	----------
REACTION LEFT (R1) =	1760	lbs.	
REACTION RIGHT (R2) =	1760	lbs.	

BEAM OVER PORCHES — 5

SPAN	15.7	ft.	(l)	STRESS FACTORS	(Cx)	
UNIFORM LOAD 15 plf. +	230	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00
POINT LOAD @ .33 Span	0	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25
POINT LOAD @ .90 Span	0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.00
POINT LOAD @ .13 Span	0	lbs.	(P3)	SIZE FACTOR	(Cf)	1.00
DIST. LOAD TO .20 Span	0	plf.	(w2)		-	
TRIANGULAR W 0 psf.	0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA
SHEAR (V) =	1919	lbs. ---------	@ END	AREA REQUIRED =	28.79	in.²
MOMENT (M) =	7509	ft.lbs. max	----------	SECTION REQUIRED =	73.93	in.³
REACTION LEFT (R1) =	1919	lbs.		STANDARD CAMBER =		NA
REACTION RIGHT (R2) =	1919	lbs.				

1) 6 x 10

RWD. #1

Fv =	80	x (Cd) =	100	psi.
Fb=	975	x (Cx) =	1219	psi.
E =	1300000	psi.		
MINIMUM FACTOR OF SAFETY			**=1.04**	
------- A =	50.88	in.²	177%	(OK)
------- S =	78.43	in.³	106%	(OK)
------- I =	362.75	in.⁴	104%	(OK)
DEFLECT.=	0.70	in. = L /	268	

TYPICAL HEADER — 6

SPAN	3.2	ft.	(l)	STRESS FACTORS	(Cx)	
UNIFORM LOAD 6 plf. +	440	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00
POINT LOAD @ .33 Span	0	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25
POINT LOAD @ .90 Span	0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.00
POINT LOAD @ .13 Span	0	lbs.	(P3)	SIZE FACTOR	(Cf)	1.30
DIST. LOAD TO .20 Span	0	plf.	(w2)		-	
TRIANGULAR W 0 psf.	0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA
SHEAR (V) =	713	lbs. ---------	@ END	AREA REQUIRED =	9.01	in.²
MOMENT (M) =	571	ft.lbs. max	----------	SECTION REQUIRED =	4.82	in.³
REACTION LEFT (R1) =	713	lbs.		STANDARD CAMBER =		NA
REACTION RIGHT (R2) =	713	lbs.				

1) 4 x 6

DF #2

Fv =	95	x (Cd) =	119	psi.
Fb=	875	x (Cx) =	1422	psi.
E =	1600000	psi.		
MINIMUM FACTOR OF SAFETY			**=2.14**	
------- A =	19.25	in.²	214%	(OK)
------- S =	17.65	in.³	366%	(OK)
------- I =	48.53	in.⁴	1098%	(OK)
DEFLECT.=	0.01	in. = L /	2835	

FLOOR SYSTEM

MEMBER SPACING = 16 in. MINIMUM NAILING: 8d AT 6" EDGE, AND 12" FIELD (WITH GLUE)

LIVE LOADS REDUCED BY .08% FOR EACH SQUARE FOOT OVER 150 SF. TO A MAXIMUM OF 40%

USE 3/4" T. & G. PLYWOOD OR O.S.B. WITH PANEL INDEX 40/20 (SEE LATERAL LOAD CALCULATIONS FOR ADDITIONAL NAILING)

2ND FLOOR JOISTS AT 16" — 7

SPAN		15.7 ft. (l)	STRESS FACTORS	(Cx)		1) 2 x 12		
UNIFORM LOAD		72 plf. (w)	WET SERVICE FACTOR	(Cm)	1.00	DF #2		
POINT LOAD @ .33 Span		0 lbs. (P1)	LOAD DURATION FACT.	(Cd)	1.00	Fv =	95 x (Cd) =	95 psi.
POINT LOAD @ .90 Span		0 lbs. (P2)	REP. USE FACTOR	(Cr)	1.15	Fb=	875 x (Cx) =	1006 psi.
POINT LOAD @ .13 Span		0 lbs. (P3)	SIZE FACTOR	(Cf)	1.00	E =	1600000 psi.	
DIST. LOAD TO .20 Span		0 plf. (w2)			-	MINIMUM FACTOR OF SAFETY =1.20		
TRIANGULAR W 0 psf.		0 lbs. (W)	LIVE LOAD REDUCTION		- NA			
SHEAR (V) =	565 lbs. ---------	@ END	AREA REQUIRED =	8.92 in.²		------- A =	16.88 in.²	189% (OK)
MOMENT (M) =	2218 ft.lbs. max	----------	SECTION REQUIRED =	26.46 in.³		------- S =	31.64 in.³	120% (OK)
REACTION LEFT (R1) =	565 lbs.		STANDARD CAMBER =		NA	------- I =	177.98 in.⁴	142% (OK)
REACTION RIGHT (R2) =	565 lbs.					DEFLECT.=	0.35 in. = L/	545

BEAM UNDER WALL OVER LIVING ROOM — 8

SPAN		12.0 ft. (l)	STRESS FACTORS	(Cx)		1) 3 1/2 x 11 1/4		
UNIFORM LOAD 12 plf. +		520 plf. (w)	WET SERVICE FACTOR	(Cm)	1.00	PARALLAM PSL		
POINT LOAD @ .33 Span		0 lbs. (P1)	LOAD DURATION FACT.	(Cd)	1.25	Fv =	290 x (Cd) =	363 psi.
POINT LOAD @ .90 Span		0 lbs. (P2)	REP. USE FACTOR	(Cr)	1.00	Fb=	2900 x (Cx) =	3625 psi.
POINT LOAD @ .13 Span		0 lbs. (P3)	VOLUME FACTOR	(Cv)	1.00	E =	2000000 psi.	
DIST. LOAD TO .20 Span		0 plf. (w2)			-	MINIMUM FACTOR OF SAFETY =1.87		
TRIANGULAR W 0 psf.		0 lbs. (W)	LIVE LOAD REDUCTION		- NA			
SHEAR (V) =	3191 lbs. ---------	@ END	AREA REQUIRED =	13.20 in.²		------- A =	39.38 in.²	298% (OK)
MOMENT (M) =	9573 ft.lbs. max	----------	SECTION REQUIRED =	31.69 in.³		------- S =	73.83 in.³	233% (OK)
REACTION LEFT (R1) =	3191 lbs.		STANDARD CAMBER =		NA	------- I =	415.28 in.⁴	187% (OK)
REACTION RIGHT (R2) =	3191 lbs.					DEFLECT.=	0.30 in. = L/	482

BEAM UNDER WALL OVER KITCHEN — 9

SPAN		16.0 ft. (l)	STRESS FACTORS	(Cx)		1) 5 1/4 x 11 1/4		
UNIFORM LOAD 18 plf. +		345 plf. (w)	WET SERVICE FACTOR	(Cm)	1.00	PARALLAM PSL		
POINT LOAD @ .44 Span		998 lbs. (P1)	LOAD DURATION FACT.	(Cd)	1.25	Fv =	290 x (Cd) =	363 psi.
POINT LOAD @ .90 Span		0 lbs. (P2)	REP. USE FACTOR	(Cr)	1.00	Fb=	2900 x (Cx) =	3625 psi.
POINT LOAD @ .13 Span		0 lbs. (P3)	VOLUME FACTOR	(Cv)	1.00	E =	2000000 psi.	
DIST. LOAD TO .44 Span		175 plf. (w2)			-	MINIMUM FACTOR OF SAFETY =1.19		
TRIANGULAR W 0 psf.		0 lbs. (W)	LIVE LOAD REDUCTION		- NA			
SHEAR (V) =	4420 lbs. ---------	@ END	AREA REQUIRED =	18.29 in.²		------- A =	59.06 in.²	323% (OK)
MOMENT (M) =	18154 ft.lbs. max	----------	SECTION REQUIRED =	60.09 in.³		------- S =	110.74 in.³	184% (OK)
REACTION LEFT (R1) =	4420 lbs.		STANDARD CAMBER =		NA	------- I =	622.92 in.⁴	119% (OK)
REACTION RIGHT (R2) =	3606 lbs.					DEFLECT.=	0.63 in. = L/	306

CHECK SUPPORT FOR BEAM UNDER WALL OVER KITCHEN

POST LOAD =	4420 lbs.	EFFECTIVE LENGTH le=	9.0 ft.	1) 4 x 6	NOMINAL
LOAD FROM 2ND BEAM =	3191 lbs.	COL. STABILITY FACT. Cp=	0.287	DF #2 POST	
MISC. LOAD =	0 lbs.	ALLOWABLE STRESS Fc'=	467 psi.	GOOD FOR 8981 lbs. (OK)	
TOTAL LOAD ON POST =	7611 lbs.			FACTOR OF SAFETY = 1.18	
FOUNDATION		CLASS 5 SOIL	1000 psf.	36 in. X 36 in.	
MISC LOAD =	0 lbs.	INCREASE FOR WIDTH	0%	FOOTING	
FOOTING WEIGHT =	150 lbs.	INCREASE FOR DEPTH	0%	GOOD FOR 9000 lbs. (OK)	
TOTAL LOAD ON FOUND. =	7761 lbs.	ALLOWABLE BEARING PRESS.	1000 psf.	FACTOR OF SAFETY = 1.16	

2ND FLOOR JOISTS AT 16" WITH ROOF LOAD — 10

SPAN		12.5	ft.	(l)	STRESS FACTORS	(Cx)		1) 2 x 12	
UNIFORM LOAD		72	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00	DF #2	
POINT LOAD @ .13 Span		441	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25		
POINT LOAD @ .90 Span		0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.15	Fv = 95 x (Cd) =	119 psi.
POINT LOAD @ .13 Span		0	lbs.	(P3)	SIZE FACTOR	(Cf)	1.00	Fb= 875 x (Cx) =	1258 psi.
DIST. LOAD TO .20 Span		0	plf.	(w2)			-	E = 1600000	psi.
TRIANGULAR W 0 psf.		0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	MINIMUM FACTOR OF SAFETY	=1.60
SHEAR (V) =	834 lbs. --------- @ END				AREA REQUIRED =	10.53	in.²	------- A = 16.88 in.²	160% (OK)
MOMENT (M) =	2030 ft.lbs. max ----------				SECTION REQUIRED =	19.36	in.³	------- S = 31.64 in.³	163% (OK)
REACTION LEFT (R1) =	834 lbs.				STANDARD CAMBER =		NA	------- I = 177.98 in.⁴	310% (OK)
REACTION RIGHT (R2) =	507 lbs.							DEFLECT.= 0.16 in.	= L / 931

2ND FLOOR JOISTS WITH GIRDER TRUSS LOAD — 11

SPAN		12.5	ft.	(l)	STRESS FACTORS	(Cx)		3) 2 x 12	
UNIFORM LOAD	15 plf. +	72	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00		
POINT LOAD @ .15 Span		2158	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25	DF #2	
POINT LOAD @ .90 Span		0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.15	Fv = 95 x (Cd) =	119 psi.
POINT LOAD @ .13 Span		0	lbs.	(P3)	SIZE FACTOR	(Cf)	1.00	Fb= 875 x (Cx) =	1258 psi.
DIST. LOAD TO .20 Span		0	plf.	(w2)			-	E = 1600000	psi.
TRIANGULAR W 0 psf.		0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	MINIMUM FACTOR OF SAFETY	=1.69
SHEAR (V) =	2371 lbs. --------- @ END				AREA REQUIRED =	29.95	in.²	------- A = 50.63 in.²	169% (OK)
MOMENT (M) =	5214 ft.lbs. max ----------				SECTION REQUIRED =	49.75	in.³	------- S = 94.92 in.³	191% (OK)
REACTION LEFT (R1) =	2371 lbs.				STANDARD CAMBER =		NA	------- I = 533.94 in.⁴	479% (OK)
REACTION RIGHT (R2) =	877 lbs.							DEFLECT.= 0.10 in.	= L / 1439

DOUBLE FLOOR JOISTS WITH ROOF LOADS — 12

SPAN		12.5	ft.	(l)	STRESS FACTORS	(Cx)		3) 2 x 12	
UNIFORM LOAD	15 plf. +	370	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00		
POINT LOAD @ .15 Span		0	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25	DF #2	
POINT LOAD @ .90 Span		0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.15	Fv = 95 x (Cd) =	119 psi.
POINT LOAD @ .13 Span		0	lbs.	(P3)	SIZE FACTOR	(Cf)	1.00	Fb= 875 x (Cx) =	1258 psi.
DIST. LOAD TO .20 Span		0	plf.	(w2)			-	E = 1600000	psi.
TRIANGULAR W 0 psf.		0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	MINIMUM FACTOR OF SAFETY	=1.32
SHEAR (V) =	2407 lbs. --------- @ END				AREA REQUIRED =	30.41	in.²	------- A = 50.63 in.²	166% (OK)
MOMENT (M) =	7523 ft.lbs. max ----------				SECTION REQUIRED =	71.77	in.³	------- S = 94.92 in.³	132% (OK)
REACTION LEFT (R1) =	2407 lbs.				STANDARD CAMBER =		NA	------- I = 533.94 in.⁴	202% (OK)
REACTION RIGHT (R2) =	2407 lbs.							DEFLECT.= 0.25 in.	= L / 606

CANTILEVER FLOOR JOISTS — 13

MAIN SPAN LENGTH	7.0	ft.	STRESS FACTORS	(Cx)		1) 2 x 12	SPAN
CANTILEVER LENGTH	3.6	ft.	SIZE FACTOR	(Cf)	1.00	1) 2 x 12	CANT.
W MAIN SPAN MAX.	72	plf.	LOAD DURATION FACTOR (Cd)		1.25	DF #2	
W MAIN SPAN MIN.	15	plf.	REP. USE FACTOR	(Cr)	1.15	Fv = 95 x (Cd) =	119 psi.
W CANTILEVER MAX.	72	plf.				Fb = 875 x (Cx) =	1258 psi.
W CANTILEVER MIN.	15	plf.				E = 1600000	psi.
POINT LOAD @ END max.	649	lbs.	R1 R2			MINIMUM FACTOR OF SAFETY =	=1.48
POINT LOAD @ END min	404	lbs.	THIS PROGRAM CHECKS ALL LOADING CASES ON BOTH SPANS AND GIVES THE SOLUTION FOR WORST CASE.				
SHEAR (MAIN SPAN)	647	lbs	AREA REQUIRED =	8.17	sq. in.	------- A = 16.88	sq. in. (OK)
SHEAR (CANT)	904	lbs --------	AREA REQUIRED =	11.42	sq. in.	------- A = 16.88	sq. in. (OK)
MOMENT (MAIN SPAN)	-330	ft. lbs. ----	SECTION REQUIRED =	-2.52	cu. in.	------- S = 31.64	cu. in. (OK)
MOMENT (CANT)	2756	ft. lbs.	SECTION REQUIRED =	26.30	cu. in.	------- S = 31.64	cu. in. (OK)
					SPAN -	I = 177.98	in.^4
					CANT.-	I = 177.98	in.^4

REACTIONS						
SIMPLE END	CANTILEVER END	DEFLECTION (CANT. END,TOTAL LOAD) =	0.18	= L / 240	CHECK
R1 MAX= 30 lbs	R2 MAX= 1551 lbs	DEFLECTION (CANT. END, LIVE LOAD) =	0.08	= L / 535	(OK)
R1 MID = -146 lbs	R2 MID = 928 lbs	DEFLECTION (MAIN SPAN,TOTAL LOAD)=	-0.04	= L / -2085	(OK)
R1 MIN = -344 lbs	R2 MIN = 272 lbs				

ADD DOUBLE JOISTS AT POINT LOADS FROM HEADER TO REDUCE DEFLECTION

HEADER UNDER CANTILEVER

14

SPAN		8.2	ft.	(l)	STRESS FACTORS	(Cx)		1) 3 1/2 x 11 7/8
UNIFORM LOAD	12 plf. +	1184	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00	
POINT LOAD @	.44 Span	0	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.00	PARALLAM PSL
POINT LOAD @	.90 Span	0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.00	Fv = 290 x (Cd) = 290 psi.
POINT LOAD @	.13 Span	0	lbs.	(P3)	VOLUME FACTOR	(Cv)	1.00	Fb= 2900 x (Cx) = 2900 psi.
DIST. LOAD TO	.44 Span	0	plf.	(w2)		-		E = 2000000 psi.
TRIANGULAR W	0 psf.	0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	MINIMUM FACTOR OF SAFETY =1.64
SHEAR (V) =		4904	lbs.	--------- @ END	AREA REQUIRED =		25.36 in.^{2}	------- A = 41.56 in.^{2} 164% (OK)
MOMENT (M) =		10052	ft.lbs.	max ----------	SECTION REQUIRED =		41.60 in.^{3}	------- S = 82.26 in.^{3} 198% (OK)
REACTION LEFT	(R1) =	4904	lbs.		STANDARD CAMBER =		NA	------- I = 488.41 in.^{4} 239% (OK)
REACTION RIGHT	(R2) =	4904	lbs.					DEFLECT.= 0.12 in. = L / 790

TRIPLE JOIST AT BACK OF CANTILEVER

15

SPAN		12.0	ft.	(l)	STRESS FACTORS	(Cx)		3) 2 x 12
UNIFORM LOAD	15 plf. +	254	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00	
POINT LOAD @	.44 Span	0	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.00	DF #2
POINT LOAD @	.90 Span	0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.15	Fv = 95 x (Cd) = 95 psi.
POINT LOAD @	.13 Span	0	lbs.	(P3)	SIZE FACTOR	(Cf)	1.00	Fb= 875 x (Cx) = 1006 psi.
DIST. LOAD TO	.44 Span	0	plf.	(w2)		-		E = 1600000 psi.
TRIANGULAR W	0 psf.	0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	MINIMUM FACTOR OF SAFETY =1.64
SHEAR (V) =		1616	lbs.	--------- @ END	AREA REQUIRED =		25.51 in.^{2}	------- A = 50.63 in.^{2} 198% (OK)
MOMENT (M) =		4848	ft.lbs.	max ----------	SECTION REQUIRED =		57.81 in.^{3}	------- S = 94.92 in.^{3} 164% (OK)
REACTION LEFT	(R1) =	1616	lbs.		STANDARD CAMBER =		NA	------- I = 533.94 in.^{4} 255% (OK)
REACTION RIGHT	(R2) =	1616	lbs.					DEFLECT.= 0.15 in. = L / 979

LATERAL LOAD CALCULATIONS

14.398448

WIND LOAD — 2013 C.B.C. ASCE 7-10

Basic Parameters

Risk Category	II	Table 1.5-1	MAXIMUM ROOF HEIGHT =	**20.7** ft.
Basic Wind Speed, V	110 mph	Figure 26.5-1A	ROOF SLOPE =	**26.6** degrees
Wind Directionality Factor, K_d	0.85	Table 26.6-1	NUMBER OF FLOORS =	**2**
Exposure Category	C	Section 26.7		
Topographic Factor, K_{zt}	1.00	Section 26.8		
Gust Effect Factor, G or G_f	0.836	Section 26.9		
Enclosure Classification	Enclosed	Section 26.10		
Internal Pressure Coefficient, GC_{pi}	+/- 0.18	Table 26.11-1		
Terrain Exposure Constant, a	9.5	Table 26.9-1		
Terrain Exposure Constant, z_g	900 ft	Table 26.9-1		

LRFD WIND PRESSURES — **WALL** 26.8 psf. **ROOF** 13.1 psf. — "load & resistance factor design"

MINIMUM OF 16 PSF AND 8 PSF RESPECTIVELY

ASD WIND PRESSURES — **WALL** 16.1 psf. **ROOF** 7.9 psf. — "allowable stress design"

ASD FACTOR = 0.6 FOR USE WITH WOOD SHEARWALLS

SEISMIC COEFFICIENT — 2013 C.B.C. ASCE 7-10 — **DESIGN CATEGORY** D

2013 CBC. STATIC FORCE PROCEDURE — IRREGULAR STRUCTURE

LATITUDE = 37.67863

LONGITUDE = -121.77613

SITE CLASS D

FROM U.S.G.S. WEB SITE	**Ss = 1.524**	Fa =	1.00	Sms =	1.52	Sds =	1.02
	S1 = 0.6	Fv =	1.50	Sm1 =	0.90	Sd1 =	0.60

I = 1

R = 6.5

Cs= Sds x I / R = **0.156** | Cs NOT LESS THAN 0.05 | Cs NEED NOT EXCEED 0.476

p = 1.3 NON REDUNDANT

F = 1 REDISTRIBUTION REQUIRED SEE BELOW — **2 STORY**

LRFD COEFFICIENT — **Qe = p F Cs = 0.203** x W — "load & resistance factor design"

ASD COEFFICIENT — **.7 Qe = 0.142** x W — "allowable stress design"

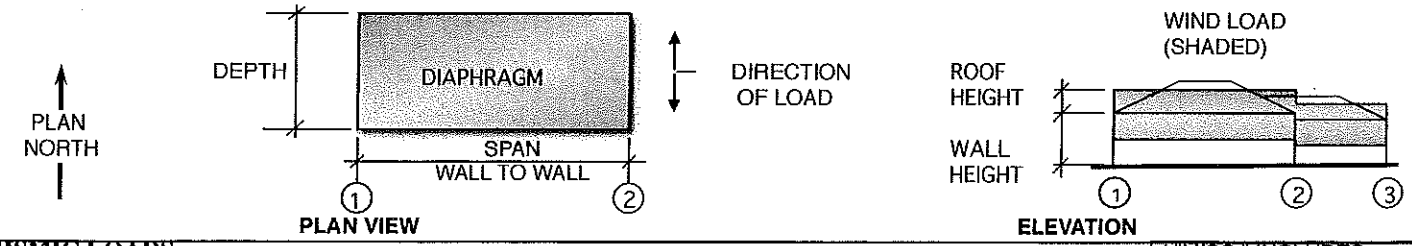
ASD FACTOR = 0.7 FOR USE WITH WOOD SHEARWALLS

CT = 0.02 x= 0.75 H = 20.7 t = 0.194

WEIGHTS OF MATERIALS USED IN SEISMIC CALCS.

ROOF DEAD LOAD	(WR)	**17 psf.**	MISC. DEAD LOAD AT ROOF (eaves, interior walls, etc)	(MISC-R)	**90 plf.**
FLOOR DEAD LOAD	(WF)	**14 psf.**	MISC. DEAD LOAD AT FLOOR (interior walls, etc.)	(MISC-F)	**90 plf.**
EXTERIOR WALL DEAD LOAD	(WW)	**16 psf.**			
INTERIOR WALL DEAD LOAD		**8 psf.**			

EXPLANATION OF PAGE L2



SEISMIC LOADS

("MISC." INCLUDES INTERIOR WALLS, EAVES, FIXTURES ETC.)

ROOF LEVEL — Ws (NORTH/SOUTH) = [(DEPTH*WR) + (HEIGHT * WW) + MISC-R] * COEF.
(ROOF) (WALL) (MISC.)

FLOOR LEVEL — Ws (NORTH/SOUTH) = [(DEPTH*WF) + (HEIGHT*2*WW) + MISC-F] * COEF.
(FLOOR) (WALL) (MISC.)

WIND LOAD

ROOF LEVEL — WALL HEIGHT /2 * WALL WIND PRESSURE + ROOF HEIGHT * APPROPRIATE ROOF WIND PRESSURE

FLOOR LEVEL — (LOWER WALL HEIGHT / 2 + UPPER WALL HEIGHT / 2 +1') * WIND PRESSURE

BUILDING DEFINITION TABLE

2ND LEVEL NORTH SOUTH	SPAN WALL TO WALL	DEPTH OF DIAPH. FOR LOAD	DEPTH OF DIAPH. FOR STRESS	WEIGHT OF DIAPH.	AVERAGE PERP. WALL WEIGHT	WALL HEIGHT	GABLE HEIGHT ABOVE PLATE	ROOF HEIGHT SLOPED	
1 TO 2	17 ft.	27 ft.	27 ft.	17 psf.	16 psf.	8 ft.	4 ft.	4 ft.	
2 TO 3	12 ft.	27 ft.	27 ft.	17 psf.	16 psf.	8 ft.		7 ft.	
3 TO 4	12 ft.	27 ft.	27 ft.	17 psf.	16 psf.	8 ft.		7 ft.	
4 TO 5	17 ft.	27 ft.	27 ft.	17 psf.	16 psf.	8 ft.	4 ft.	4 ft.	
EAST WEST									
A TO C	27 ft.	28 ft.	28 ft.	17 psf.	16 psf.	8 ft.	3 ft.	3 ft.	
1ST LEVEL NORTH SOUTH	SPAN WALL TO WALL	DEPTH OF DIAPH. FOR LOAD	DEPTH OF DIAPH. FOR STRESS	WEIGHT OF DIAPH.	AVERAGE PERP. WALL WEIGHT	WALL HEIGHT	GABLE HEIGHT ABOVE PLATE	ROOF HEIGHT SLOPED	
TO 1	6 ft.	30 ft.	30 ft.	17 psf.	16 psf.	9 ft.		3 ft.	
1 TO 2	17 ft.	36 ft.	36 ft.	14 psf.	16 psf.	9 ft.			
2 TO 3	12 ft.	30 ft.	30 ft.	14 psf.	16 psf.	9 ft.			
3 TO 4	12 ft.	30 ft.	30 ft.	14 psf.	16 psf.	9 ft.			
4 TO 5	17 ft.	36 ft.	36 ft.	14 psf.	16 psf.	9 ft.		3 ft.	
EAST WEST									
TO A	6 ft.	22 ft.	22 ft.	17 psf.	16 psf.	9 ft.		3 ft.	
A TO B	6 ft.	18 ft.	18 ft.	14 psf.	16 psf.	9 ft.			
B TO C	24 ft.	34 ft.	34 ft.	14 psf.	16 psf.	9 ft.			

LATERAL LOADS

2ND LEVEL NORTH SOUTH	WIND LOAD ON WALL	WIND LOAD ON ROOF	TOTAL WIND LOAD	LEVEL FOR REDIST.	VERTICAL REDIST. V / Cvx V	MAXIMUM DESIGN WIND LOAD	SEISMIC LOAD
1 TO 2	129 plf.	31 plf.	160 plf.	2 OF 2	1.122	176 plf.	123 plf.
2 TO 3	64 plf.	55 plf.	119 plf.	2 OF 2	1.122	135 plf.	112 plf.
3 TO 4	64 plf.	55 plf.	119 plf.	2 OF 2	1.122	135 plf.	112 plf.
4 TO 5	129 plf.	31 plf.	160 plf.	2 OF 2	1.122	176 plf.	123 plf.
EAST WEST							
A TO C	113 plf.	24 plf.	136 plf.	2 OF 2	1.122	152 plf.	123 plf.
A TO C	113 plf.	24 plf.	136 plf.	2 OF 2	1.122	152 plf.	123 plf.
1ST LEVEL NORTH SOUTH	WIND LOAD ON WALL	WIND LOAD ON ROOF	TOTAL WIND LOAD	LEVEL FOR REDIST.	VERTICAL REDIST. V / Cvx V	MAXIMUM DESIGN WIND LOAD	SEISMIC LOAD
TO 1	72 plf.	24 plf.	96 plf.	1 OF 1	1.000	112 plf.	110 plf.
1 TO 2	137 plf.		137 plf.	1 OF 2	0.792	153 plf.	102 plf.
2 TO 3	137 plf.		137 plf.	1 OF 2	0.792	153 plf.	91 plf.
3 TO 4	137 plf.		137 plf.	1 OF 2	0.792	153 plf.	91 plf.
4 TO 5	137 plf.	24 plf.	160 plf.	1 OF 2	0.792	176 plf.	102 plf.
EAST WEST							
TO A	72 plf.	24 plf.	96 plf.	1 OF 1	1.000	112 plf.	90 plf.
A TO B	137 plf.		137 plf.	1 OF 2	0.792	153 plf.	71 plf.
B TO C	137 plf.		137 plf.	1 OF 2	0.792	153 plf.	98 plf.

CHECK DIAPHRAGM (WORST CASE ON EACH LEVEL IN EACH DIRECTION)

WORST CASES	SPAN	DEPTH	SHEAR	SPAN	DEPTH	CHORD TENSION	
(NS) 2ND LEVEL =	17 ft.	27 ft.	55 plf.	17 ft.	27 ft.	236 lbs.	
(EW) 2ND LEVEL =	27 ft.	28 ft.	73 plf.	27 ft.	28 ft.	495 lbs.	
(NS) 1ST LEVEL =	17 ft.	36 ft.	42 plf.	17 ft.	36 ft.	177 lbs.	
(EW) 1ST LEVEL =	24 ft.	34 ft.	54 plf.	24 ft.	34 ft.	323 lbs.	
ROOF TYPICAL	USE 1/2" (15/32") CDX PLYWOOD WITH 8d @ 6",6",12" o.c.				UNBLOCKED	180 plf.	(OK)
FLOOR TYPICAL	USE 3/4" CDX PLYWOOD WITH 8d @ 6",6",10" o.c.				UNBLOCKED	180 plf.	(OK)
BLOCKING	NAIL FRIEZE BLOCKING WITH SIMPSON A35, LS50 OR RBC @ 24" o.c.					283 plf.	(OK)
TOP PLATE TYPICAL	SPLICE W/ 10) 16d SINKER NAILS EACH SIDE					1570 lbs.	(OK)
	WHERE TOP PLATES CAN NOT BE SPLICED BY OVERLAPPING, USE LSTA36					1705 lbs.	
TOP PLATE SPECIAL	SPLICE WITH MSTI36 W/ 48) 16d @ LINES NA ONLY					3410 lbs.	(OK)

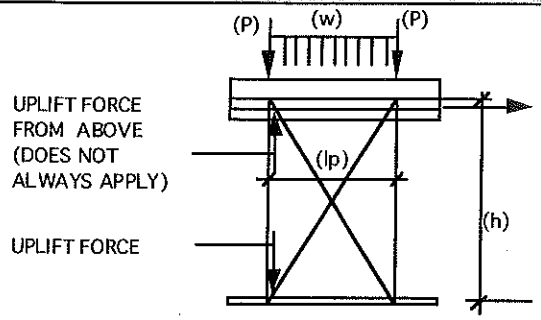
2ND LEVEL SHEARWALL DEFINITION TABLE

LINE #	PANEL NUMBER L1	L2	L3	L4	L5	L6	L7	SUM(L)	TYPE OF WALL
	LENGTH OF SHEARWALL								
1	3.5 ft.	3.5 ft.						7.0 ft.	WALL PIER
2	14.0 ft.							14.0 ft.	SHEARWALL
3	22.0 ft.							22.0 ft.	SHEARWALL
4	14.0 ft.							14.0 ft.	SHEARWALL
5	3.5 ft.	3.5 ft.						7.0 ft.	WALL PIER
A	4.0 ft.	4.0 ft.						8.0 ft.	SHEARWALL
C	12.0 ft.	6.0 ft.						18.0 ft.	SHEARWALL

1ST LEVEL SHEARWALL DEFINITION TABLE

LINE #	PANEL NUMBER L1	L2	L3	L4	L5	L6	L7	SUM(L)	TYPE OF WALL
	LENGTH OF SHEARWALL								
1	7.5 ft.	10.0 ft.						17.5 ft.	SHEARWALL
2	13.0 ft.	12.0 ft.						25.0 ft.	SHEARWALL
3	24.0 ft.							24.0 ft.	SHEARWALL
4	13.0 ft.	12.0 ft.						25.0 ft.	SHEARWALL
5	7.5 ft.	10.0 ft.						17.5 ft.	SHEARWALL
A	5.0 ft.	5.0 ft.						10.0 ft.	SHEARWALL
B	1.8 ft.	1.8 ft.						3.5 ft.	STEEL SW.
C	5.0 ft.	10.0 ft.						15.0 ft.	SHEARWALL

SHEAR WALL DESIGN METHOD



(P) & (w) = (.6 + .14Sds) DEAD LOAD

SHEAR (V) = (W) x TRIBUTARY WIDTH + WALL WEIGHT X COEF.

% Vp TO THIS PANEL = (lp) / Σ(l)

v = V x %Vp / lp

MOMENT = v x lp x (h)

2/3 RESISTING MOMENT = [(w) x (lp) ^2 / 2 + (P) x (lp)]X2/3

UPLIFT FORCE = (MOMENT-2/3 RESISTING MOMENT) /[(lp)-5"]
+ UPLIFT FROM ABOVE WHERE APPLICABLE

CHECK SHEAR WALLS (2ND LEVEL)

LINE #	CONTROLS	3RD LVL. WIND LOAD	3RD LVL. SEISMIC LOAD	TRIBUTARY WIDTH	2ND LEVEL WIND LOAD	2ND LEVEL SEISMIC LOAD	MAXIMUM DESIGN LOAD	TOTAL LENGTH OF WALL	UNIT SHEAR (v)	USE SHEAR WALL TYPE
1	W			9 ft.	1497 lbs.	1169 lbs.	1500 lbs.	7 ft.	214 plf.	4
2	W			15 ft.	2310 lbs.	1971 lbs.	1500 lbs.	14 ft.	107 plf.	4
3	S			12 ft.	1625 lbs.	1749 lbs.	1749 lbs.	22 ft.	79 plf.	4
4	W			15 ft.	2310 lbs.	1971 lbs.	2310 lbs.	14 ft.	165 plf.	4
5	W			9 ft.	1497 lbs.	1169 lbs.	1497 lbs.	7 ft.	214 plf.	4
A	W			14 ft.	2055 lbs.	1804 lbs.	2055 lbs.	8 ft.	257 plf.	4
C	W			14 ft.	2055 lbs.	1987 lbs.	2055 lbs.	18 ft.	137 plf.	4

TOTAL BASE SHEAR N/S = 9240 lbs. TOTAL RESISTANCE = 16640 OVERALL FACTOR OF SAFETY N/S = 1.80

TOTAL BASE SHEAR E/W = 4110 lbs. TOTAL RESISTANCE = 6760 OVERALL FACTOR OF SAFETY E/W= 1.64

CHECK SHEAR WALLS (1ST LEVEL)

LINE #	CONTROLS	2ND LVL. WIND LOAD	2ND LVL. SEISMIC LOAD	TRIBUTARY WIDTH	1ST LEVEL WIND LOAD	1ST LEVEL SEISMIC LOAD	MAXIMUM DESIGN LOAD	TOTAL LENGTH OF WALL	UNIT SHEAR (v)	USE SHEAR WALL TYPE
1	W	1497 lbs.	1169 lbs.	15 ft.	1971 lbs.	1883 lbs.	3468 lbs.	18 ft.	222 plf.	4
2	W	2310 lbs.	1971 lbs.	15 ft.	2215 lbs.	1925 lbs.	4525 lbs.	25 ft.	188 plf.	4
3	W	1625 lbs.	1749 lbs.	12 ft.	1833 lbs.	1589 lbs.	3458 lbs.	24 ft.	144 plf.	4
4	W	2310 lbs.	1971 lbs.	15 ft.	2415 lbs.	1925 lbs.	4725 lbs.	25 ft.	196 plf.	4
5	W	1497 lbs.	1169 lbs.	9 ft.	1499 lbs.	1222 lbs.	2996 lbs.	18 ft.	192 plf.	4
A	W	2055 lbs.	1804 lbs.	9 ft.	1130 lbs.	956 lbs.	3185 lbs.	10 ft.	319 plf.	5
B	W			15 ft.	2291 lbs.	1464 lbs.	2291 lbs.	4 ft.	655 plf.	21
C	W	2055 lbs.	1987 lbs.	12 ft.	1833 lbs.	1486 lbs.	3888 lbs.	15 ft.	311 plf.	5

TOTAL BASE SHEAR N/S = 19173 lbs. TOTAL RESISTANCE = 28340 OVERALL FACTOR OF SAFETY N/S = 1.48

TOTAL BASE SHEAR E/W = 9365 lbs. TOTAL RESISTANCE = 14840 OVERALL FACTOR OF SAFETY E/W= 1.58

CHECK OVERTURNING (2ND LEVEL)

LINE #	LENGTH OF SHORTEST PANEL	SHEAR AT SHORTEST PANEL	OVER-TURNING MOMENT	(.6-.14Sds)D (w)	(.6-.14Sds)D AT ENDS (P)	DEAD LOAD RESISTING MOMENT	UNBAL. MOMENT	UPLIFT FORCE	USE HOLDOWN TYPE
1	3.5 ft.	750 lbs.	6000'#	82	225	1290'#	4710'#	1591 lbs.	MSTC40
2	14.0 ft.	1500 lbs.	12000'#	82	225	11184'#	816'#	61 lbs.	(OK)
3	22.0 ft.	1749 lbs.	13990'#	82	225	24784'#	-10794'#	-503 lbs.	(OK)
4	14.0 ft.	2310 lbs.	18479'#	82	225	11184'#	7295'#	542 lbs.	MSTC40
5	3.5 ft.	749 lbs.	5989'#	82	225	1290'#	4699'#	1588 lbs.	MSTC40
A	4.0 ft.	1027 lbs.	8220'#	82	225	1557'#	6663'#	1926 lbs.	MSTC40
C	6.0 ft.	822 lbs.	6576'#	121	332	4169'#	2407'#	441 lbs.	MSTC40

MINIMUM FACTOR OF SAFETY = 1.60 AVERAGE FACTOR OF SAFETY = 2.34

CHECK OVERTURNING (1ST LEVEL)

LINE #	LENGTH OF SHORTEST PANEL	SHEAR AT SHORTEST PANEL	OVER-TURNING MOMENT	(.6-.14Sds)D (w)	(.6-.14Sds)D AT ENDS (P)	DEAD LOAD RESISTING MOMENT	UNBAL. MOMENT	UPLIFT FORCE	USE HOLDOWN TYPE
1	7.5 ft.	1665 lbs.	14982'#	155	425	7540'#	7441'#	1069 lbs.	HDU2
2	12.0 ft.	2255 lbs.	20297'#	129	355	13550'#	6747'#	589 lbs.	HDU2
3	24.0 ft.	3458 lbs.	31123'#	155	425	54755'#	-23632'#	-1007 lbs.	(OK)
4	12.0 ft.	2355 lbs.	21196'#	129	355	13550'#	7646'#	667 lbs.	HDU2
5	7.5 ft.	1438 lbs.	12944'#	155	425	7540'#	5403'#	776 lbs.	HDU2
A	5.0 ft.	1593 lbs.	14334'#	123	337	3219'#	11115'#	2492 lbs.	HDU2
B	1.8 ft.	1146 lbs.	10311'#	89	245	566'#	9745'#	8054 lbs.	S.W.
C	5.0 ft.	1555 lbs.	13997'#	140	386	3687'#	10310'#	2312 lbs.	HDU2

MINIMUM FACTOR OF SAFETY = 1.41 AVERAGE FACTOR OF SAFETY = 2.25

CHECK COLLECTORS (2ND LEVEL)

LINE #	TOTAL SHEAR IN LINE	PERCENT SHEAR IN COLLECT.	INCREASE FOR IRREGULAR	TENSION IN COLLECT.	USE	MEMBER SPLICE	TENSION STRAP
1	1500 lbs.	30%	1.25	563 lbs.	TOP PLATES		
2	1500 lbs.	50%	1.25	938 lbs.	TOP PLATES	A35 @ 24"	
3	1749 lbs.		1.25		TOP PLATES		
4	2310 lbs.	50%	1.25	1444 lbs.	TOP PLATES	A35 @ 24"	
5	1497 lbs.	30%	1.25	562 lbs.	TOP PLATES		
A	2055 lbs.	50%	1.25	1284 lbs.	TOP PLATES	LSTA36	
C	2466 lbs.	30%	1.25	925 lbs.	TOP PLATES	LSTA36	

MINIMUM FACTOR OF SAFETY = 1.18 AVERAGE FACTOR OF SAFETY = 2.04

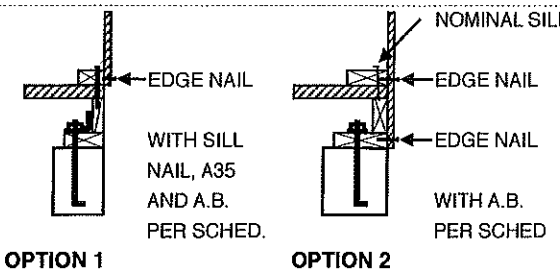
CHECK COLLECTORS (1ST LEVEL)

LINE #	TOTAL SHEAR IN LINE	PERCENT SHEAR IN COLLECT.	INCREASE FOR IRREGULAR	TENSION IN COLLECT.	USE	MEMBER SPLICE	TENSION STRAP
1	3884 lbs.	30%	1.25	1457 lbs.	TOP PLATES		
2	4698 lbs.	25%	1.25	1468 lbs.	TOP PLATES		
3	3458 lbs.		1.25		TOP PLATES		
4	4906 lbs.	25%	1.25	1533 lbs.	TOP PLATES		
5	3356 lbs.	30%	1.25	1258 lbs.	TOP PLATES		
A	3185 lbs.	30%	1.25	1195 lbs.	TOP PLATES		
B	2291 lbs.	40%	1.25	1146 lbs.	TOP PLATES		
C	4666 lbs.	25%	1.25	1458 lbs.	TOP PLATES		

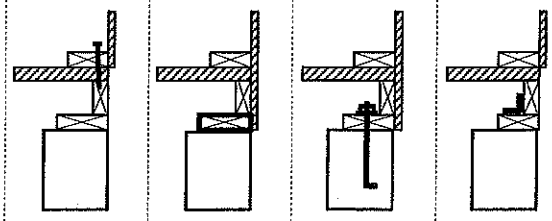
MINIMUM FACTOR OF SAFETY = 1.11 AVERAGE FACTOR OF SAFETY = 1.27

SHEAR WALL SCHEDULE

	SHEAR WALL MATERIAL **	EDGE NAILING	FIELD NAILING	16d SINKER SILL NAIL	MUD SILL	5/8" DIA. A. BOLTS	PLTP4 A35 OR LS50	GOOD FOR
FULL STRESS SHEAR WALLS FOR H/W< 2:1								
4	1/2" CDX PLYWOOD W/8d AT 6" o.c.	12 in.		7 in.	2 X	48 in.	24 in.	260 plf.
5	1/2" CDX PLYWOOD W/8d AT 4" o.c.	12 in.		5 in.	2 X	40 in.	16 in.	350 plf.



OPTION 1 OPTION 2



		SIMPSON STRONG-WALL	TYPE	HOLDOWN	5/8" A.B.	GOOD FOR
21	RF	SIMPSON STEEL STRONG WALL SSW21 X 10 RF	RAISED FLOOR	1"	-	889 plf.
ON CONCRETE						
21		SIMPSON STEEL STRONG WALL SSW21 X 10	ON CONCRETE	1"	-	1740 plf.

** - THESE PLYWOOD SHEAR WALL VALUES ARE BASED ON DOUGLAS FIR STUDS AND SILLS AND COMMON NAILS OR GALVANIZED BOX NAILS. IF HEM FIR OR NON GALVANIZED SINKER NAILS ARE USED, THE PLYWOOD NAILING SHOULD BE INCREASED BY 20% (ie. 6" o.c. BECOMES 4-3/4" o.c.)

- 1/2" O.S.B. MAY BE USED INSTEAD OF CDX PLYWOOD WITH THE SAME NAILING. (15/32" OK)

HEIGHTS SHOWN FOR STRONG WALLS ARE MAXIMUMS. SHORTER WALLS ARE STRONGER.

2ND LEVEL HOLDOWNS

TYPE	SIMPSON PRODUCT	VALUES BASED ON 9 GAUGE "SINKER NAILS"		-GF
MSTC40	MSTC40 OR CMST 14 x 48" WITH (28)16d SINKERS TO DBL. STUD ABOVE & BELOW		18" CLEAR SPAN	2695 lbs.

1ST LEVEL HOLDOWNS

	TYPE	SIMPSON PRODUCT	VALUES BASED ON 9 GAUGE "SINKER NAILS"	END DIST.	-GF
1	HDU2	HDU2 W/ (6)SDS 1/4 X 3" BOLTS TO DBL. STUD AND SB5/8 X 24 EMBED. 18"		5"	3075 lbs.

COLLECTOR STRAPS

	TYPE	OPTION	SIMPSON PRODUCT	VALUES BASED ON 9 GAUGE "SINKER NAILS"	GF
1	LSTA36	CS16	LSTA36 OR CS16 X 12'-0" WITH 12) 8d TO S.W. AND 12)8d TO BLOCKING		1705 lbs.
ALTERNATES			(MAY BE SUBSTITUTED FOR COLLECTORS WITH SAME NUMBER IN LEFT COLUMN)		
1	HDU2		HDU2 W/ (6)SDS 1/4 X 3" BOLTS TO DBL. 2X AND 5/8" THREDED ROD		3075 lbs.

SHEAR TRANSFER NOTES

1) ALL SHEARWALLS MUST RUN UP TO THE ROOF OR FLOOR DIAPHRAGM WHICH LOADS THEM. THIS MEANS THAT ALL UPPER LEVEL INTERIOR SHEARWALLS MUST RUN UP THROUGH THE ATTIC TO THE ROOF.
2) ALL SHEARWALLS ARE TO BE EDGE NAILED TO THE TOP PLATES EVEN IF THE PLYWOOD IS CONTINUOUS AT THIS LOCATION
3) IN EXISTING CONCRETE, 5/8" DIA. A.B.'S MAY BE REPLACED WITH SIMPSON 5/8" DIA. TITEN HD ANCHORS. OR APPROVED EQUAL EMBEDDED 4-1/8" IN CONCRETE. (PER ICC-ES-ESR 2713)
4) A35'S ARE NOT REQUIRED AT THE FOUNDATION LEVEL BLOCKING IF THE PLYWOOD IS CONTINUOUS TO THE MUD SILL.
5) FRIEZE BLOCKS MAY BE DRILLED FOR VENTING WITH 2" DIAMETER HOLES AT 6" o.c. OR EVERY FOURTH BLOCK MAY BE REPLACED WITH A SCREEN VENT. ALL BLOCKS TO BE CONNECTED TO TOP PLATES PER SHEAR TRANSFER DETAILS.
6) 1/2" CDX ROOF PLYWOOD MUST BE EDGE NAILED TO THE FRIEZE BLOCK WITH 8d AT 6" MIN. U.N.O.
7) SPACING OF NAILS, BOLTS AND A35'S MAY BE AVERAGED OVER SEVERAL SPACES. NAILING REQUIREMENTS DO NOT APPLY TO AREAS UNDER WINDOWS, ETC. WHICH ARE NOT CONSIDERED SHEARWALLS.
8) BLOCK ALL EDGES OF PLYWOOD SHEAR WALL PANELS AND EDGE NAIL WITH COMMON OR GALVANIZED BOX NAILS.
9) PROVIDE 1/2" SPACE BETWEEN PLYWOOD SHEARWALL AND CONCRETE AT MUD SILL. ALL NAILS INTO PRESSURE TREATED MATERIAL TO BE GALVANIZED.
10) ORIENTED STRAND BOARD MAY BE USED FOR ROOF, FLOOR AND WALL PANELS INSTEAD OF PLYWOOD. (WITH SAME OR GREATER PANEL INDEX.) (STRUCT 1 RATED O.S.B. IS EQUAL TO STRUCT 1 RATED PLYWOOD)
11) INSTALL **5/8" DIA. ANCHOR BOLTS WITH SIMPSON BPS 5/8-3** BEARING PLATE WASHERS WITH CUT WASHERS.
12) INSTALL PLYWOOD ROOF AND FLOOR SHEATHING WITH FACE GRAIN ACROSS THE SUPPORTING MEMBERS. ALLOW 1/16" SPACE BETWEEN SHEETS FOR EXPANSION.
13) HOLDOWN HARDWARE TO BE SECURED IN PLACE PRIOR TO THE CONCRETE POUR.

HDU HOLDOWNS

14) INSTALL HDU'S WITH SIMPSON SDS 1/4 X 3 SELF TAPING LAG SCREWS TO DOUBLE STUDS. USE SIMPSON BOLT SPECIFIED.
15) HOLDOWN SHOULD BE INSTALLED WITH 1/8" MIN. SPACE TO SILL TO ALLOW FOR BOLT PRETENSIONING. (24" MAX)
16) AT PONY WALLS, BOLT SHOULD BE EXTENDED WITH THREADED RODS WITH AN APPROVED COUPLING NUT SO HOLDOWN CAN BE INSTALLED ON WALL ABOVE.
17) PROVIDE 3" CLEAR FROM SOIL TO HOLDOWN BOLTS. (DEEPEN FOOTING WHERE NECESSARY)

STRAPS

18) STRAPS SHOULD BE INSTALLED OVER THE PLYWOOD. PLYWOOD SHOULD NOT BE NOTCHED AROUND THE STRAP.
19) STRAPS MAY BE INSTALLED TO DOUBLE STUDS WITH 16d SINKER NAILS ONLY. THE TWO STUDS SHOULD BE NAILED TOGETHER WITH (12)16d NAILS. DOUBLE STUDS MUST BE ALIGNED WITH STRAP SO THAT NAILS ARE 3/8" MIN. FROM EDGE OF STUD OR PRE-DRILL HOLES AND ANGLE NAILS TO PREVENT SPLITTING.
20) CS-16 STRAPS MAY BE SUBSTITUTED FOR LSTA STRAPS OF THE SAME LENGTH.

5) BOLTS NOT USED TO RESIST UPLIFT MAY BE INSTALLED USING SIMPSON SET22 WITH A MINIMUM EMBEDMENT OF 4"

DOWELS

6) EPOXY USED FOR MINOR USES MAY BE SIMPSON SET22 OR EQUAL INSTALLED WITHOUT SPECIAL INSPECTION PER ESR 2508.

A COPY OF THIS PAGE SHOULD BE ATTACHED TO THE PLANS

BEAMS WITH OVERTURNING FORCES FROM SHEAR WALLS 17.572192

2013 C.B.C. LOAD CASE (12-13)

(1.2+.2XSds) D + .5 L + (W or OMEGA E)
1.40 D + .5 L + (W or OMEGA E) (WITHOUT ROOF LIVE LOAD)
(.9-.2* Sds) D + (W or OMEGA E)
Sds = 1.02 0.70 D + (W or OMEGA E)

1) LOAD DURATION FACTOR IS 1.33 FOR SHORT TERM LOADS DUE TO SEIMIC FORCES.
2) LOADS HAVE BEEN APPLIED AS DOWNWORD FORCES FOR SHEAR AND MOMENT AS THIS IS THE CONTROLLING CONDITION.

BEAM UNDER WALL OVER KITCHEN 9

SPAN	16.0	ft.	(l)	STRESS FACTORS	(Cx)		
UNIFORM LOAD 18 plf. +	345	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00	
POINT LOAD @ .44 Span	998	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25	
POINT LOAD @ .90 Span	0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.00	
POINT LOAD @ .13 Span	0	lbs.	(P3)	VOLUME FACTOR	(Cv)	1.00	
DIST. LOAD TO .44 Span	175	plf.	(w2)		-		
TRIANGULAR W 0 psf.	0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	

1) 5 1/4 x 11 1/4
PARALLAM PSL
Fv = 290 x (Cd) = 363 psi.
Fb= 2900 x (Cx) = 3625 psi.
E = 2000000 psi.
MINIMUM FACTOR OF SAFETY =1.19

CHECK WITH SEISMIC LOADING FROM WALL LINE C

	DEAD LOAD	LIVE LOAD	SEISMIC LOAD	TOTAL LOAD		
UNIFORM LOAD 18 plf. +	205	140		345	plf.	(w)
POINT LOAD @ .44 Span	599	399	0	998	lbs.	(P1)
POINT LOAD @ .50 Span	0	0	2459	2459	lbs.	(P2)
POINT LOAD @ .13 Span	0	0	0	0	lbs.	(P3)
DIST. LOAD TO .44 Span	70	105		175	plf.	(w2)
TRIANGULAR W .00 Span	0	0		0	lbs.	(W)

Fv = 290 x (Cd) = 387 psi.
Fb= 2900 x (Cx) = 6572 psi.
E = 2000000 psi.
MINIMUM FACTOR OF SAFETY =1.12

SHEAR (V) =	5699 lbs.	--------- AREA REQUIRED =	22.11	in.²	------- A = 59.06 in.2 501% (OK)
MOMENT (M) =	28425 ft.lbs. max	SECTION REQUIRED =	51.91	in.³	------- S = 110.74 in.3 1200% (OK)
					------- I = 622.92 in.4 112% (OK)

	1.2+.2Sds	+ .5 LL	+ Em			
REACTION LEFT (R1) =	3510	959	1230	5699	lbs.	
REACTION RIGHT (R2) =	3018	728	1230	4976	lbs.	
	x.9 -.2Sds		+ Em			
UPLIFT LEFT (R1) =	2038		1230	809	lbs.	NEGATIVE
UPLIFT RIGHT (R2) =	1752		1230	523	lbs.	IS UPWARD
		MAX UPLIFT =		0		

DEFLECT.= 0.96 in. = L / 201

STRESS FACTORS	(Cx)	
WET SERVICE FACTOR	(Cm)	1.00
LOAD DURATION FACT.	(Cd)	1.33
ULTIMATE LOAD FACT.	(Cu)	1.70
VOLUME FACTOR	(Cv)	1.00

BEAM UNDER WALL OVER LIVING ROOM 8

SPAN	12.0	ft.	(l)	STRESS FACTORS	(Cx)		
UNIFORM LOAD 12 plf. +	520	plf.	(w)	WET SERVICE FACTOR	(Cm)	1.00	
POINT LOAD @ .33 Span	0	lbs.	(P1)	LOAD DURATION FACT.	(Cd)	1.25	
POINT LOAD @ .90 Span	0	lbs.	(P2)	REP. USE FACTOR	(Cr)	1.00	
POINT LOAD @ .13 Span	0	lbs.	(P3)	VOLUME FACTOR	(Cv)	1.00	
DIST. LOAD TO .20 Span	0	plf.	(w2)		-		
TRIANGULAR W 0 psf.	0	lbs.	(W)	LIVE LOAD REDUCTION	-	NA	

1) 3 1/2 x 11 1/4
PARALLAM PSL
Fv = 290 x (Cd) = 363 psi.
Fb= 2900 x (Cx) = 3625 psi.
E = 2000000 psi.
MINIMUM FACTOR OF SAFETY =1.87

CHECK WITH SEISMIC LOADING FROM WALL LINE C

	DEAD LOAD	LIVE LOAD	SEISMIC LOAD	TOTAL LOAD		
UNIFORM LOAD 12 plf. +	280	240		520	plf.	(w)
POINT LOAD @ .75 Span	0	0	2459	2459	lbs.	(P1)
POINT LOAD @ .90 Span	0	0	0	0	lbs.	(P2)
POINT LOAD @ .13 Span	0	0	0	0	lbs.	(P3)
DIST. LOAD TO .20 Span	0	0		0	plf.	(w2)
TRIANGULAR W .00 Span	0	0		0	lbs.	(W)

Fv = 290 x (Cd) = 387 psi.
Fb= 2900 x (Cx) = 6572 psi.
E = 2000000 psi.
MINIMUM FACTOR OF SAFETY =1.92

SHEAR (V) =	5021 lbs.	--------- AREA REQUIRED =	19.48	in.²	------- A = 39.38 in.2 379% (OK)
MOMENT (M) =	15064 ft.lbs. max	SECTION REQUIRED =	27.51	in.³	------- S = 73.83 in.3 1510% (OK)
					------- I = 415.28 in.4 192% (OK)

	1.2+.2Sds	+ .5 LL	+ Em			
REACTION LEFT (R1) =	2457	720	615	3792	lbs.	
REACTION RIGHT (R2) =	2457	720	1844	5021	lbs.	
	x.9 -.2Sds		+ Em			
UPLIFT LEFT (R1) =	1427		615	812	lbs.	NEGATIVE
UPLIFT RIGHT (R2) =	1427		1844	-418	lbs.	IS UPWARD
		MAX UPLIFT =		-418		

DEFLECT.= 0.42 in. = L / 346

STRESS FACTORS	(Cx)	
WET SERVICE FACTOR	(Cm)	1.00
LOAD DURATION FACT.	(Cd)	1.33
ULTIMATE LOAD FACT.	(Cu)	1.70
VOLUME FACTOR	(Cv)	1.00

SUMMARY — 2013 C.B.C. — 17111.9342

GRAVITY LOADS

ROOF:		FLOOR:	
ROOF LIVE LOAD	18 psf.	FLOOR LIVE LOAD	40 psf.
CEILING LIVE LOAD	20 psf	FLOOR DEAD LOAD	14 psf.
(NON CONCURRENT WITH ROOF LIVE LOAD)		TOTAL FLOOR LOAD	54 psf.
ROOF DEAD LOAD	11 psf.		
TOTAL ROOF LOAD	29 psf.		
CEILING DEAD LOAD	6 psf.	LIVE LOAD AT DECKS	60 psf.
TOTAL DEAD LOAD	17 psf.		
TOTAL ROOF/CEILING LOAD	35 psf.		
OTHER	0 psf.		

FOUNDATION DESIGN BASED ON SOILS VALUES PER 2013 C.B.C. FOR CLASS 5 SOILS
BEARING PRESSURE 1500 PSF

WIND LOADS

WIND SPEED	110	mph.	
EXPOSURE FACTOR	C	A.S.D. WALL PRESSURE =	16.08 psf.
RISK CATEGORY	2	A.S.D. ROOF PRESSURE =	7.86 psf.

SEISMIC LOADS

Ss= 1.52 Sms= 1.52 Sds= 1.02
S1= 0.60 Sm1= 0.90 Sd1= 0.60

SITE CLASS		D	
OCCUPANCY CATEGORY		II	
DESIGN CATEGORY		D	
IMPORTANCE FACTOR	(I)	1	FOR SEISMIC
REDUNDANCE FACTOR	(p)	1.3	
REDISTRUBUTION FACTOR	(F)	1	
BASIC SEISMIC FORCE RESISTING SYSTEM		SHEAR WALLS	
DESIGN BASE SHEAR		16573	
RESPONSE FACTOR	(R)	6.5	
SEISMIC COEFICIENT (A.S.D.)		**0.142**	
ANALYSIS PROCEDURE		STATIC FORCE PROCEDURE	SIMPLIFIED METHOD
SPECIAL LOADS		0 NA	IRREGULAR STRUCTURE

A COPY OF THIS PAGE SHOULD BE ATTACHED TO THE PLANS