11/7/2016

STRUCTURAL CALCULATIONS
For Permit

THE 27 ELM
REDMOND, OR

Axiom Job Number: A16-101

Prepared for:
THINK ARCHITECTURE
1529 Columbia Park Trail
Suite B312
Richland, WA 99352
208.850.7180

Prepared by:
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121 N 9th St, Suite 401
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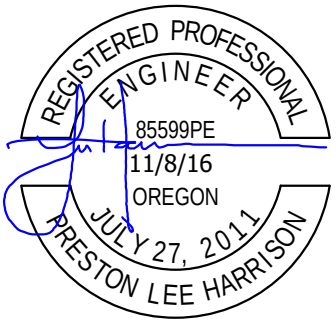

EXPIRATION DATE: 6/30/17

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STRUCTURAL DESIGN CRITERIA

THE 27 ELM
REDMOND, OR

AXIOM JOB NUMBER: A16-101

CODE CRITERIA:

BUILDING CODE ..... 2015 INTERNATIONAL BUILDING CODE
BUILDING DEPARTMENT ..... CITY OF REDMOND
WIND CRITERIA ..... 110 MPH; EXPOSURE "C"
..... BUILDING RISK CATEGORY = II
SEISMIC ZONE..... SDC = C
..... SITE CLASS = D
..... R = 6.5
..... I_E = 1.0
..... S_S = 0.39, S_1 = 0.20
..... S_{DS} = 0.39, S_{D1} = 0.27
SNOW ..... 25 PSF

SOILS CRITERIA:

ALLOWABLE BEARING PRESSURE ..... 3000 PSF
MINIMUM FOOTING WIDTH ..... CONTINUOUS: 16" MIN.,
FROST DEPTH ..... 18" MIN.

STRUCTURAL DESIGN CRITERIA

THE 27 ELM
REDMOND, OR

AXIOM JOB NUMBER: A16-101

ASSEMBLY WEIGHTS

ROOF LOADS						**COMMENTS**
		GRAVITY:		**SEISMIC:**		
ROOFING		2	PSF	2	PSF	
INSULATION		3	PSF	3	PSF	
SHEATHING		1.5	PSF	1.5	PSF	
CEILING		1.5	PSF	1.5	PSF	
MEP		3	PSF	3	PSF	
MISC		2	PSF	2	PSF	
FRAMING		3	PSF	3	PSF	
	ROOF DL	16.0	PSF	16.0	PSF	SL = 25 PSF

FLOOR LOADS						**COMMENTS**
		GRAVITY:		**SEISMIC:**		
FLOORING		6	PSF	6	PSF	
PARTITION		10	PSF	10	PSF	
SHEATHING		1.5	PSF	1.5	PSF	
CEILING		1.5	PSF	1.5	PSF	
MEP		3	PSF	3	PSF	
MISC		2	PSF	2	PSF	
FRAMING		3	PSF	3	PSF	
	ROOF DL	27.0	PSF	27.0	PSF	

WALL LOADS

	GRAVITY & SEISMIC:	
SIDING	2.3	PSF
½" PLYWOOD SHEATHING	1.5	PSF
FRAMING – 2X6 @ 16" O.C.	1.7	PSF
½ " GWB	2.2	PSF
	10.0	PSF

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Project	The Grove Townhomes	Job #	Page of
Client	Think Architecture	By	Date
Subject	Snow Drift Loads	Checked	Date

Snow Drifting

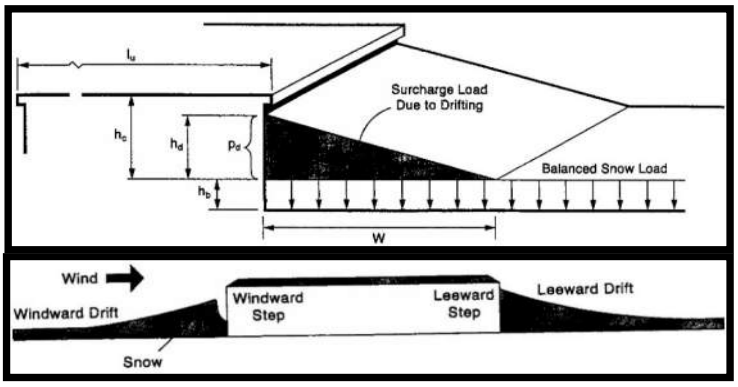
Per IBC 2012 and ASCE 7-10

Site: Townhome drifts
Structure: Units A and B
Roof Designation: Roof steps

p_g (psf):	25.00	Ground Snow Load per IBC Figure 1608.2, Table 1608.2, or Building Official
p_f or p_s (psf):	25.00	p_f per ASCE Section 7.3 or p_s per ASCE Section 7.4
γ (pcf):	17.25	= Minimum of $0.13p_g + 14$ or 30 pcf: per ASCE Eq. 7.7-1
h_b (ft):	1.45	= (p_f or p_s)/γ: per ASCE Section 7.7.1

Cause of Snow Drift: Lower Roof of a Structure per ASCE 7.7.1

Not Applicable 17.00 Do not fill in the blank
0.75



ASCE Figure 7-8
Configuration of Snow Drifts on Lower Roofs

ASCE Figure 7-7
Drifts Formed at Windward and Leeward Steps

L_l (ft):	17.00	lower roof length	L_u (ft):	17.00	upper roof length
h_{proj} (ft):	6.00		h_c (ft):	4.55	
h_c/h_b:	3.14	**=> 0.2; Snow Drift Calc Required per ASCE 7.7.1**			

Windward Snow Drift Loading per ASCE Section 7.7.1

h_d (ft):	0.79	< hc	$h_{d\ use}$ (ft):	0.79
p_d (psf):	**13.69**			
W (ft):	**3.17**	**< Ll**		

Leeward Snow Drift Loading per ASCE Section 7.7.1

h_d (ft):	1.56	< hc	$h_{d\ use}$ (ft):	1.56
p_d (psf):	**26.88**			
W (ft):	**6.23**	**< Ll**		

U **83.8 plf** drift line load in addition to 25 psf uniform load

WIND LOADING ANALYSIS - Main Wind-Force Resisting System

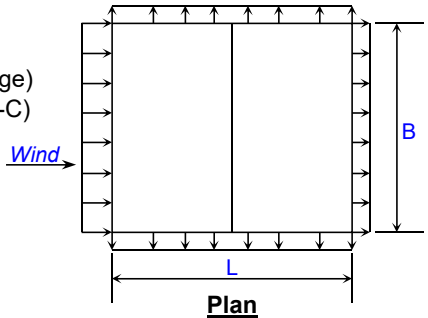
Per ASCE 7-10 Code for Enclosed or Partially Enclosed Buildings

Using Method 2: Analytical Procedure (Section 27) for Buildings of Any Height

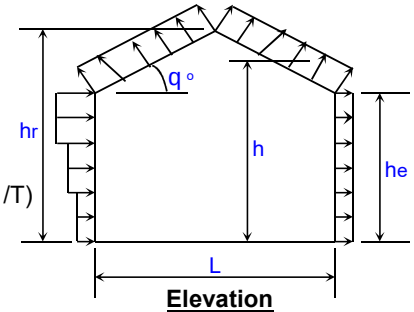
Job Name:	The Grove Townhomes	Subject:			
Job Number:	A16-101	Originator:		Checker:	

Input Data:

Wind Direction =	Normal	(Normal or Parallel to building ridge)
Wind Speed, V =	110	mph (Wind Map, Figure 26.5-1A-C)
Bldg. Classification =	II	(Table 1.4-1 Risk Cat.)
Exposure Category =	C	(Sect. 26.7)
Ridge Height, hr =	26.00	ft. (hr >= he)
Eave Height, he =	20.00	ft. (he <= hr)
Building Width =	20.00	ft. (Normal to Building Ridge)
Building Length =	47.00	ft. (Parallel to Building Ridge)
Roof Type =	Monoslope	(Gable or Monoslope)
Topo. Factor, Kzt =	1.00	(Sect. 26.8 & Table 26.8-1)
Direct. Factor, Kd =	0.85	(Table 26.6-1)
Enclosed? (Y/N)	Y	(Sect. 6.2 & Figure 6-5)
Hurricane Region?	N	
Damping Ratio, b =	0.050	(Suggested Range = 0.010-0.070)
Period Coef., Ct =	0.0350	(Suggested Range = 0.020-0.035)
		(Assume: T = Ct*h^(3/4) , and f = 1/T)



Plan



Elevation

L = 20 ft.
B = 47 ft.

Resulting Parameters and Coefficients:

Roof Angle, q =	16.70	deg.		
Mean Roof Ht., h =	23.00	ft. (h = (hr+he)/2, for roof angle >10 deg.)		
Windward Wall Cp =	0.80	(Fig. 27.4-1)		
Leeward Wall Cp =	-0.50	(Fig. 27.4-1)		
Side Walls Cp =	-0.70	(Fig. 27.4-1)		
Windward Roof Cp =	-0.90		(Fig. 27.4-1)	(Condition #1)
Windward Roof Cp =	-0.18		(Fig. 27.4-1)	(Condition #2)
Leeward Roof Cp =	-0.60		(Fig. 27.4-1)	
			(Fig. 27.4-1)	
+GCpi Coef. =	0.18	(Table 26.11- (positive internal pressure)		
-GCpi Coef. =	-0.18	(Table 26.11- (negative internal pressure)		

If z <= 15 then: Kz = 2.01*(15/zg)^(2/a) , If z > 15 then: Kz = 2.01*(z/zg)^(2/a) (Table 27.3-1)

a =	9.50	zg =	900 (Table 26.9-1)
Kh =	0.93	(Kh = Kz evaluated at z = h)	

Velocity Pressure: qz = 0.00256*Kz*Kzt*Kd*V^2*I (Eq. 27.3-1)

qh =	24.46	psf	qh = 0.00256*Kh*Kzt*Kd*V^2 (qz evaluated at z = h)	
Ratio h/L =	1.150	freq., f =	2.720 hz.	(f >= 1, Rigid structure)
Gust Factor, G =	0.850	(Sect. 26.9)		

Design Net External Wind Pressures (Sect. 27.4):

p = qz*G*Cp - qi*(+/-GCpi) for windward wall (psf), where: qi =qh (Eq. 27.4-1)

p = qh*G*Cp - qi*(+/-GCpi) for leeward wall, sidewalls, and roof (psf), where: qi = qh (Eq. 27.4-1)

Normal to Ridge Wind Load Tabulation for MWFRS - Buildings of Any Height						
Surface	z (ft.)	Kz	qz (psf)	Cp	p = Net Design Press. (psf) (w/ +GCpi)	p = Net Design Press. (psf) (w/ -GCpi)
Windward Wall	0	0.85	22.35	0.80	10.80	19.60
	15.00	0.85	22.35	0.80	10.80	19.60
	20.00	0.90	23.75	0.80	11.75	20.55
	25.00	0.95	24.89	0.80	12.52	21.33
For z = hr:	26.00	0.95	25.09	0.80	12.66	21.47
For z = he:	20.00	0.90	23.75	0.80	11.75	20.55
For z = h:	23.00	0.93	24.46	0.80	12.23	21.03
Leeward Wall	All	-	-	-0.50	-14.80	-5.99
Side Walls	All	-	-	-0.70	-18.95	-10.15
Roof (windward) cond. 1	-	-	-	-0.90	-23.07	-14.27
Roof (windward) cond. 2	-	-	-	-0.18	-8.14	0.66
	-	-	-			
Roof (leeward)	-	-	-	-0.60	-16.87	-8.07
	-	-	-			

Notes: 1. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.
2. Per Code Section 27.1.5, the minimum wind load for MWFRS shall not be less than 16 psf.

Determination of Gust Effect Factor, G:

Is Building Flexible? No f >=1 Hz.

1: Simplified Method for Rigid Building

G = 0.850

Parameters Used in Both Item #2 and Item #3 Calculations (from Table 26.9-1):

a^ =	0.105	
b^ =	1.00	
a(bar) =	0.154	
b(bar) =	0.65	
c =	0.20	
ℓ =	500	ft.
e(bar) =	0.200	
z(min) =	15	ft.

Calculated Parameters Used in Both Rigid and/or Flexible Building Calculations:

z(bar) =	15.00	= 0.6*h , but not < z(min) , ft. Table 26.9-1
Iz(bar) =	0.228	= c*(33/z(bar))^(1/6) , Eq. 26.9-7
Lz(bar) =	427.06	= ℓ*(z(bar)/33)^(e(bar)) , Eq. 26.9-9
gq =	3.4	(3.4, per Sect. 26.9.4)
gv =	3.4	(3.4, per Sect. 26.9.4)
gr =	4.422	= (2*(LN(3600*f)))^(1/2)+0.577/(2*LN(3600*f))^(1/2) , Eq. 26.9-11
Q =	0.912	= (1/(1+0.63*((B+h)/Lz(bar))^0.63))^(1/2) , Eq. 26.9-8

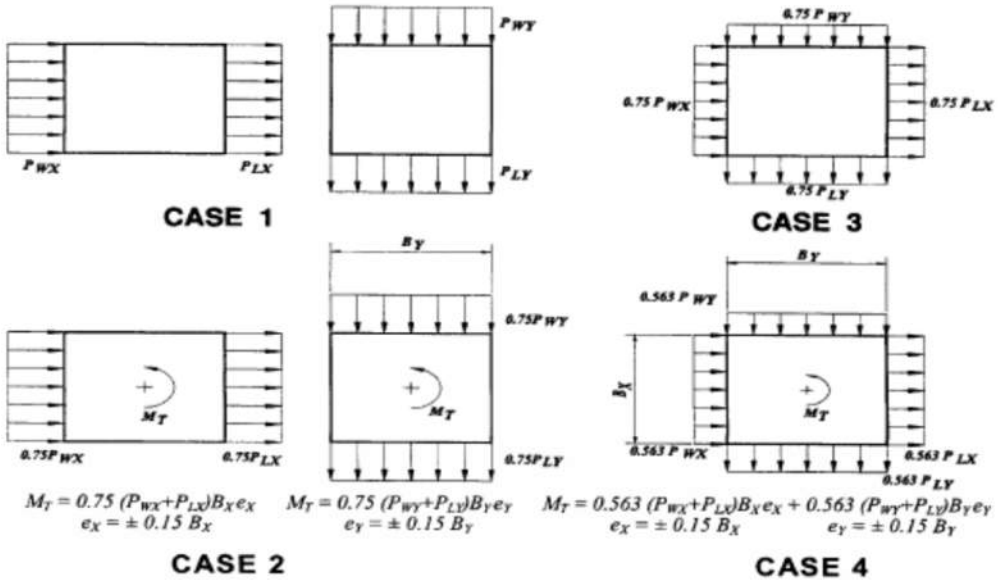
2: Calculation of G for Rigid Building

G = 0.879 = 0.925*((1+1.7*gq*Iz(bar)*Q)/(1+1.7*gv*Iz(bar))) , Eq. 26.9-6

3: Calculation of Gf for Flexible Building

b =	0.050	Damping Ratio
Ct =	0.035	Period Coefficient
T =	0.368	= Ct*h^(3/4) , sec. (Approximate fundamental period)
f =	2.720	= 1/T , Hz. (Natural Frequency)
V(fps) =	N.A.	= V(mph)*(88/60) , ft./sec.
V(bar,zbar) =	N.A.	= b(bar)*(z(bar)/33)^(a(bar))*V*(88/60) , ft./sec. , Eq. 26.9-16
N1 =	N.A.	= f*Lz(bar)/(V(bar,zbar)) , Eq. 26.9-14
Rn =	N.A.	= 7.47*N1/(1+10.3*N1)^(5/3) , Eq. 26.9-13
hh =	N.A.	= 4.6*f*h/(V(bar,zbar))
Rh =	N.A.	= (1/nh)-1/(2*nh^2)*(1-e^(-2*nh)) for nh>0, or = 1 for nh=0 ,Eq. 26.9-15a, b
hb =	N.A.	= 4.6*f*B/(V(bar,zbar))
RB =	N.A.	= (1/hb)-1/(2*hb^2)*(1-e^(-2*hb)) for hb>0, or = 1 for hb=0,Eq. 26.9-15a, b
hd =	N.A.	= 15.4*f*L/(V(bar,zbar))
RL =	N.A.	= (1/hd)-1/(2*hd^2)*(1-e^(-2*hd)) for hd>0, or = 1 for hd=0 ,Eq. 26.9-15a, b
R =	N.A.	= ((1/b)*Rn*Rh*RB*(0.53+0.47*RL))^(1/2) , Eq. 26.9-12
Gf =	N.A.	= 0.925*(1+1.7*Iz(bar)*(gq^2*Q^2+gr^2*R^2)^(1/2))/(1+1.7*gv*Iz(bar)) ,
Use: G =	0.850	Eq. 26.9-10

Figure 6-9 - Design Wind Load Cases of MWFRS for Buildings of All Heights



Case 1: Full design wind pressure acting on the projected area perpendicular to each principal axis of the structure, considered separately along each principal axis.

Case 2: Three quarters of the design wind pressure acting on the projected area perpendicular to each principal axis of the structure in conjunction with a torsional moment as shown, considered separately for each principal axis.

Case 3: Wind pressure as defined in Case 1, but considered to act simultaneously at 75% of the specified value.

Case 4: Wind pressure as defined in Case 2, but considered to act simultaneously at 75% of the specified value.

Notes: 1. Design wind pressures for windward (Pw) and leeward (PL) faces shall be determined in accordance with the provisions of Section 27.4.1 and 27.4.2 as applicable for buildings of all heights.

2. Above diagrams show plan views of building.

3. Notation:

P_{wx}, P_{wy} = Windward face pressure acting in the X, Y principal axis, respectively.

P_{Lx}, P_{Ly} = Leeward face pressure acting in the X, Y principal axis, respectively.

e (e_x, e_y) = Eccentricity for the X, Y principal axis of the structure, respectively.

M_T = Torsional moment per unit height acting about a vertical axis of the building.

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Subject	Wind Trib Story Forces	Checked		Date	

Axiom Innovative Engineering Solutions Design Spreadsheet

P (PSF)
22

*VALUES TAKEN FROM ASCE7-10 WIND LOADING CALC SHEET

The A Units are sandwiched between the B Units and are not fully exposed to wind in the E/W direction. Only some segments of A Units receive the full wind force.

A UNITS

Roof Diaphragm						
	N/S	3,080	lbs	Width	20.00	ft
				Height	7.00	ft
	E/W	3,619	lbs	Width	23.50	ft
				Height	7.00	ft
2nd Floor Diaphragm						
	N/S	4,730	lbs	Width	20.00	ft
				Height	10.75	ft
	E/W	5,203	lbs	Width	22.00	ft
				Height	10.75	ft

TOTAL		
N/S=	7,810	LB
E/W=	8,822	LB

DIAPHRAGM FORCES			
LEVEL	N/S	E/W	
ROOF	154.00	154.00	plf
2nd	236.50	236.50	plf

B UNITS

Roof Diaphragm						
	N/S	3,080	lbs	Width	20.00	ft
				Height	7.00	ft
	E/W	4,774	lbs	Width	31.00	ft
				Height	7.00	ft
2nd Floor Diaphragm						
	N/S	4,730	lbs	Width	20.00	ft
				Height	10.75	ft
	E/W	7,332	lbs	Width	31.00	ft
				Height	10.75	ft

TOTAL		
N/S=	7,810	LB
E/W=	12,106	LB

DIAPHRAGM FORCES			
LEVEL	N/S	E/W	
ROOF	154.00	154.00	plf
2nd	236.50	236.50	plf

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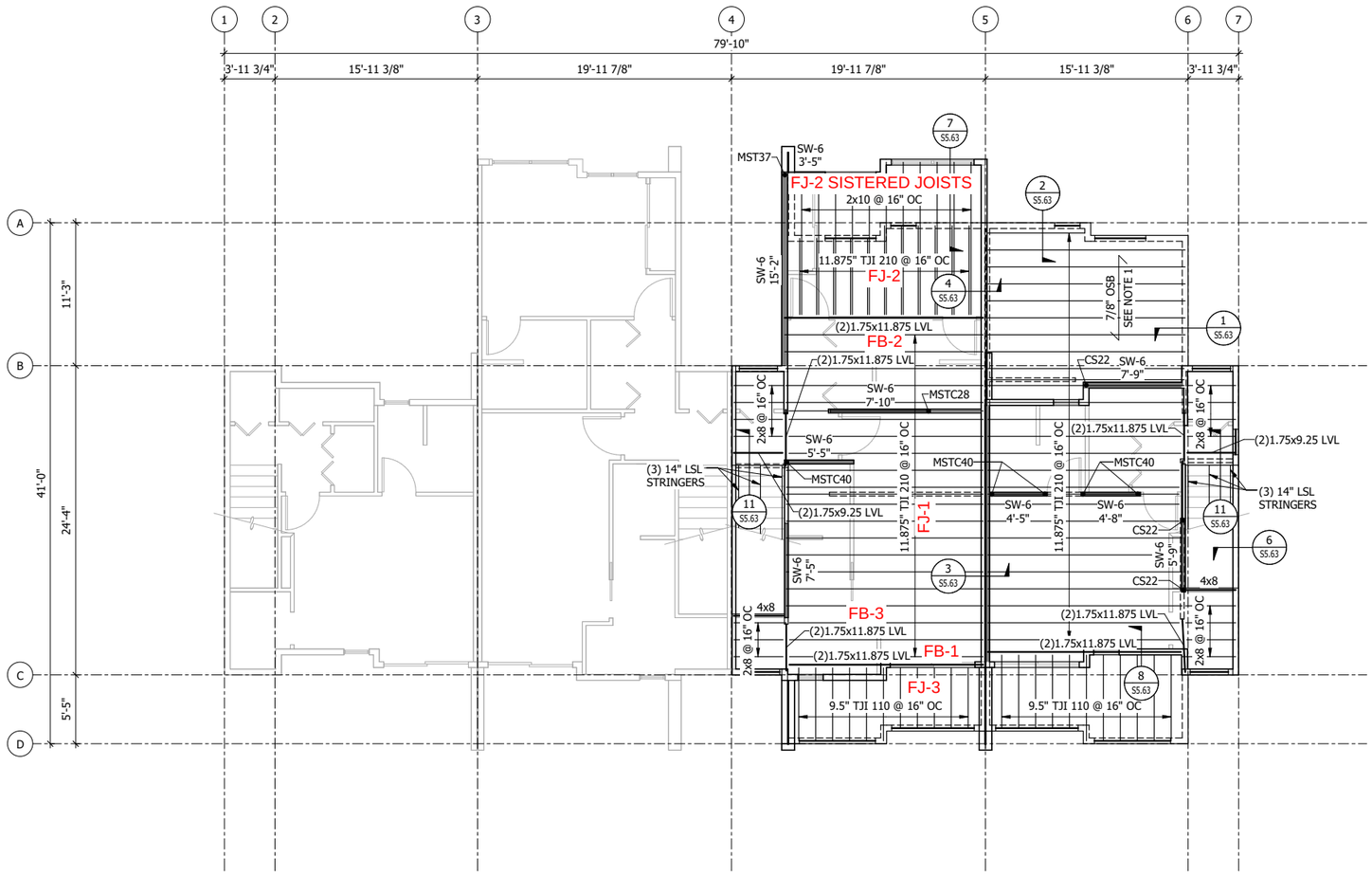
Axiom Innovative Engineering Solutions Design Spreadsheet

	FLOOR	ROOF	WALLS
	FT^2	FT^2	FT
Roof		920	
2nd floor	820		165
1st Floor			165

DL FLOOR	17	PSF		
DL ROOF	16	PSF	Cs=	0.040 for wood shear walls
DL WALL	12	PSF		

	FLOOR (LB)	WALL (LB)	ROOF (LB)	TOTAL	BASE SHEAR N/S	BASE SHEAR E/W	
Roof Diaphragm		1,980	14,720	16,700	668	668	
Floor Diaphragm	13,940	1,980		15,920	637	637	
				TOTAL=	**1,304**	**LB**	**N/S**
				TOTAL=	**1,304**	**LB**	**E/W**



1 LEVEL 2 FRAMING PLAN
SCALE: 3/16" = 1'-0"

TRUE

GENERAL NOTES

A. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS SHALL BE VERIFIED BY THE CONTRACTOR WITH THE LATEST ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.

B. CONTRACTOR SHALL FIELD VERIFY EXISTING STRUCTURAL CONDITIONS. IF ANY DISCREPANCY OCCURS BETWEEN EXISTING CONDITIONS AND PROPOSED ALTERATIONS, CONTRACTOR SHALL CONTACT ARCHITECT AND STRUCTURAL ENGINEER BEFORE PERFORMING ALTERATION WORK.

C. FOR GENERAL NOTES: S0.00 SERIES SHEETS
CONCRETE TYPICAL DETAILS: S5.00 SERIES SHEETS
WOOD TYPICAL DETAILS: S5.60 SERIES SHEETS

FLOOR FRAMING NOTES

1. TYPICAL FLOOR FRAMING CONSISTS OF 7/8" APA RATED T&G SHEATHING (INDEX 60/32), LAID FACE GRAIN PERPENDICULAR OVER JOISTS PER: HANG JOISTS WITH ITS TOP FLANGE HANGERS AT FLUSH BEAMS WHERE OCCUR TYPICAL, UNO.

2. NAIL FLOOR SHEATHING TO FRAMING WITH 8D NAILS (0.131"Ø x 2.5" LONG) @ 6" OC AT ALL PANELS EDGES AND 8D NAILS @ 12" OC AT INTERMEDIATE FRAMING MEMBERS. (UNBLOCKED) SEE 7/S5.61 . GLUE SHEATHING TO JOISTS WITH AFG-01 ADHESIVE.

3. POSTS INDICATED ARE ABOVE THIS LEVEL. ALL POSTS NOT SPECIFIED SHALL BE (2) 2x UNO SOLID SAWN MEMBERS OF EQUIVALENT SIZE MAY BE SUBSTITUTED FOR BUILT-UP MEMBERS (SUCH AS A 6x6 FOR (3) 2x4). SEE 2/S5.62

4. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL FLOOR BEAMS AND POSTS ABOVE FOR SOLID BEARING. (FILL JOIST SPACE AS WELL). SEE 2/S5.62

5. FRAME EXTERIOR WALLS WITH 2x6 STUDS SPACED 16" OC. FRAME INTERIOR WALLS WITH 2x4 STUDS SPACED 16" OC, UNO.

6. ALL HEADERS NOT LABELED ON PLAN SHALL BE (2)2x8 FOR EXTERIOR BEARING WALLS BELOW THIS LEVEL ONLY. SEE 1/S5.62 FOR HEADER DETAILS.

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NEW DEVELOPMENT
THE 27 ELM
A HUNTER RENAISSANCE DEVELOPMENT
REDMOND OREGON

PRELIMINARY
PRELIMINARY
NOT FOR CONSTRUCTION PURPOSES

FLOOR FRAMING PLAN
Sheet Title

As Indicated
Scale

1602
Project Number

NOVEMBER 8, 2016
Date

File Name

Revisions

S1.02

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GENERAL NOTES

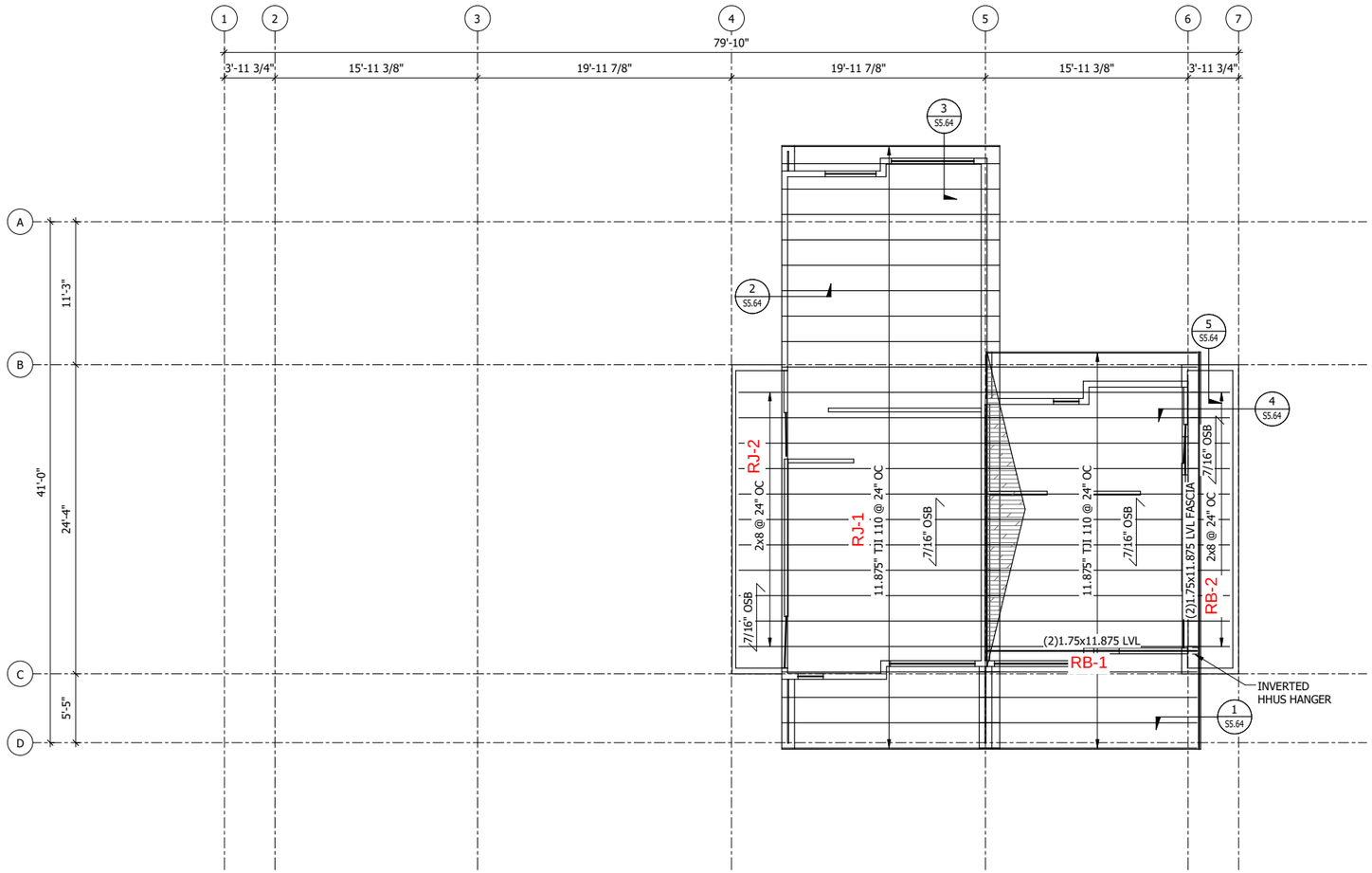
A. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS SHALL BE VERIFIED BY THE CONTRACTOR WITH THE LATEST ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.

B. CONTRACTOR SHALL FIELD VERIFY EXISTING STRUCTURAL CONDITIONS. IF ANY DISCREPANCY OCCURS BETWEEN EXISTING CONDITIONS AND PROPOSED ALTERATIONS, CONTRACTOR SHALL CONTACT ARCHITECT AND STRUCTURAL ENGINEER BEFORE PERFORMING ALTERATION WORK.

C. FOR GENERAL NOTES: S0.00 SERIES SHEETS
CONCRETE TYPICAL DETAILS: S5.00 SERIES SHEETS
WOOD TYPICAL DETAILS: S5.60 SERIES SHEETS

ROOF FRAMING NOTES

1. TYPICAL ROOF FRAMING CONSISTS OF 17/16" APA RATED SHEATHING (INDEX 24/16), LAID FACE GRAIN PERPENDICULAR WOOD I-JOISTS @ 24" OC, STAGGER JOINTS. SEE 7/S5.61
2. NAIL ROOF SHEATHING TO FRAMING WITH 8d NAILS (0.131" Ø x 2.5" LONG) @ 6" OC AT ALL PANELS EDGES AND 8d NAILS @ 12" OC AT INTERMEDIATE FRAMING MEMBERS. (UNBLOCKED). SEE 7/S5.61
3. PROVIDE FULL HEIGHT BLOCKING BETWEEN EACH JOIST AT SUPPORTS PER 1/S5.64 . PROVIDE AN H1 CLIP AT EVERY JOIST MEMBER TO TOP PLATE.
4. ALL HEADERS NOT LABELED ON PLAN SHALL BE (2)2x8 FOR EXTERIOR BEARING WALLS BELOW THIS LEVEL ONLY. SEE 1/S5.62 FOR HEADER DETAILS.
5. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL ROOF BEAMS FOR SOLID BEARING. SEE 2/S5.62 .
6. FOR TOP PLATE SPLICE SEE 2/S5.61 .



1 ROOF FRAMING PLAN
SCALE: 3/16" = 1'-0"

TRUE

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1529 Columbia Park Trail
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NEW DEVELOPMENT
THE 27 ELM
A HUNTER RENAISSANCE DEVELOPMENT
REDMOND
OREGON

PRELIMINARY
PRELIMINARY
NOT FOR CONSTRUCTION PURPOSES

ROOF FRAMING PLAN
Sheet Title

As Indicated
Scale

1602
Project Number

NOVEMBER 8, 2016
Date

File Name

Revisions

S1.03

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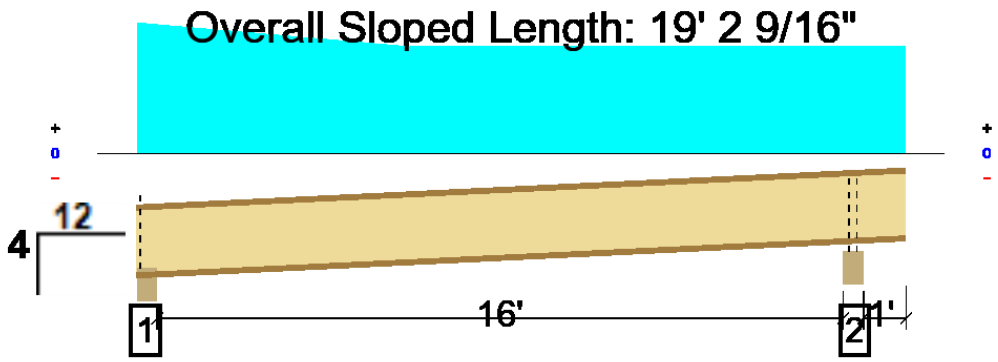

All locations are measured from the outside face of left support (or left cantilever end).All dimensions are horizontal.;Drawing is Conceptual

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	788 @ 4 1/2"	1581 (3.50")	Passed (50%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	738 @ 5 1/2"	1794	Passed (41%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	2839 @ 8' 4 11/16"	3634	Passed (78%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.378 @ 8' 5 3/4"	0.573	Passed (L/547)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.618 @ 8' 5 15/16"	0.860	Passed (L/334)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch: 4/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Bracing (Lu): All compression edges (top and bottom) must be braced at 2' 11 1/16" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability.

Supports	Bearing			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Beveled Plate - SPF	5.50"	5.50"	1.75"	286	340	502	1128	Blocking
2 - Beveled Plate - SPF	5.50"	5.50"	3.50"	318	377	481	1176	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Loads	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 17' 11"	24"	16.0	20.0	25.0	Roof
2 - Tapered (PLF)	0 to 6' 4"	N/A	-	-	27.0 to 0.0	See Snow Drift Calculation

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The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

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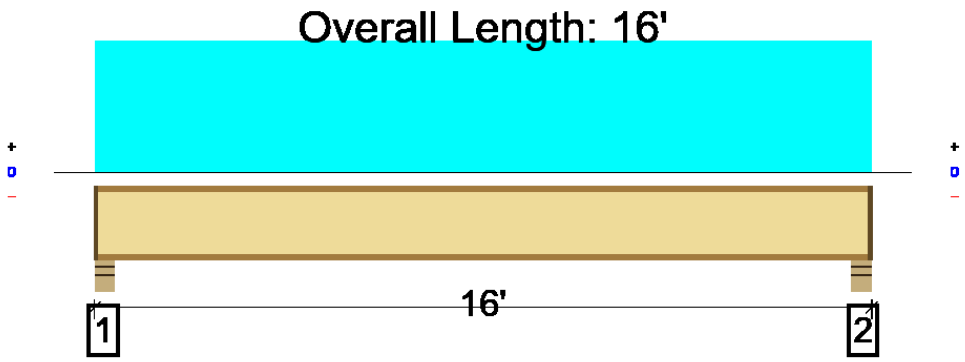

All locations are measured from the outside face of left support (or left cantilever end).All dimensions are horizontal.;Drawing is Conceptual

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	705 @ 4 1/2"	1460 (3.50")	Passed (48%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	674 @ 5 1/2"	1655	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2597 @ 8'	3795	Passed (68%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.189 @ 8'	0.381	Passed (L/968)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.317 @ 8'	0.762	Passed (L/578)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	57	50	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Bracing (Lu): All compression edges (top and bottom) must be braced at 3' 11 1/2" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 7/8", 1" Panel (32" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 5/8" Gypsum ceiling.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	5.50"	4.25"	1.75"	288	427	715	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	1.75"	288	427	715	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 16'	16"	27.0	40.0	Residential - Living Areas

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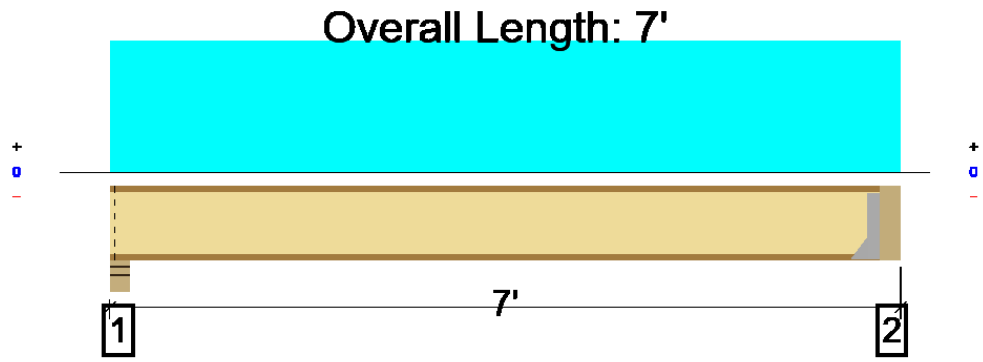
SUSTAINABLE FORESTRY INITIATIVE



All locations are measured from the outside face of left support (or left cantilever end).All dimensions are horizontal.;Drawing is Conceptual

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	345 @ 6' 6 1/2"	1005 (1.75")	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	345 @ 6' 6 1/2"	1655	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	532 @ 3' 5 1/2"	3795	Passed (14%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.011 @ 3' 5 1/2"	0.154	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.021 @ 3' 5 1/2"	0.308	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
TJ-Pro™ Rating	72	50	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Bracing (Lu): All compression edges (top and bottom) must be braced at 6' 6 1/2" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 7/8", 1" Panel (32" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 5/8" Gypsum ceiling.

Supports	Bearing			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Stud wall - SPF	5.50"	5.50"	1.75"	203	184	115	502	Blocking
2 - Hanger on 11 7/8" SPF beam	5.50"	Hanger[1]	1.75" / - [2]	208	189	118	515	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Connector: Simpson Strong-Tie Connectors						
Support	Model	Seat Length	Top Nails	Face Nails	Member Nails	Accessories
2 - Face Mount Hanger	IUS2.06/11.88	2.00"	N/A	10-10d x 1-1/2	N/A	

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 7'	16"	27.0	40.0	-	Residential - Living Areas
2 - Uniform (PSF)	0 to 7'	16"	17.0	-	25.0	Roof

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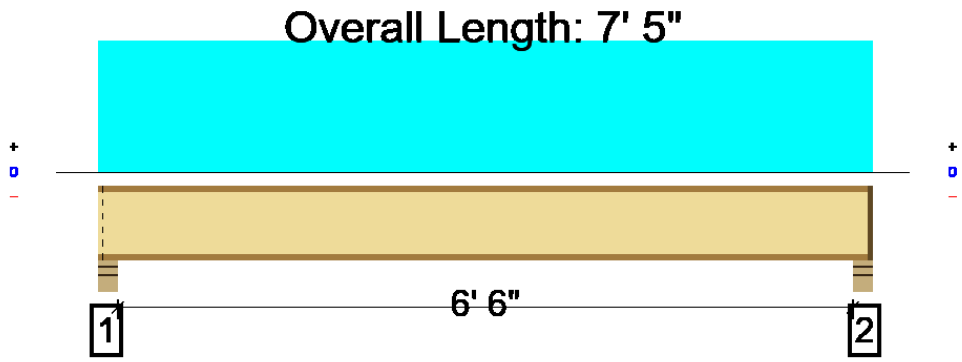
Forte Software Operator	Job Notes
Samuel Brown Axiom PLLC (208) 639-4520 sbrown@axiompllc.com	



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	415 @ 4 1/2"	1375 (3.50")	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	364 @ 5 1/2"	1220	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	622 @ 3' 8 1/2"	2500	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.018 @ 3' 8 1/2"	0.167	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.038 @ 3' 8 1/2"	0.333	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	71	50	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Bracing (Lu): All compression edges (top and bottom) must be braced at 5' 5 13/16" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 7/8", 1" Panel (32" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 5/8" Gypsum ceiling.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	5.50"	5.50"	1.75"	218	198	416	Blocking
2 - Stud wall - SPF	5.50"	4.25"	1.75"	218	198	416	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 7' 5"	16"	44.0	40.0	Residential - Living Areas

Member Notes

Deck Joists

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Forte Software Operator	Job Notes
Samuel Brown Axiom PLLC (208) 639-4520 sbrown@axiompllc.com	

Wood Beam

File = C:\Egnyte\Shared\AXIOMP~1\2016PR~1\A16-10~1\ENGINE~1\Enercalc\GROVET~1.EC6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : RB-1

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

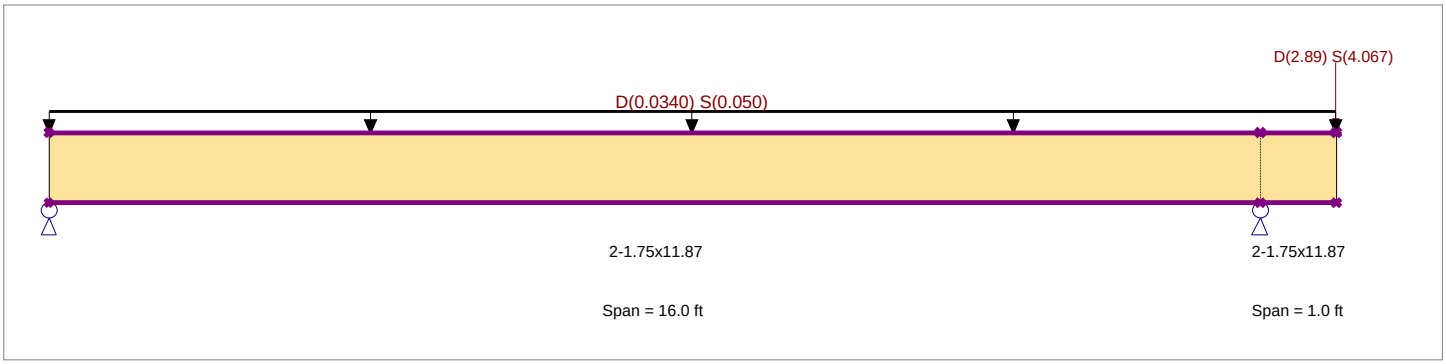
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb - Tension	2,600.0 psi
Fb - Compr	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Loads on all spans...
Uniform Load on ALL spans : D = 0.0170, S = 0.0250 ksf, Tributary Width = 2.0 ft
Load for Span Number 2
Point Load : D = 2.890, S = 4.067 k @ 1.0 ft, (RIM JOIST)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.341 : 1	Maximum Shear Stress Ratio	=	0.766 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb : Actual	=	1,021.02 psi	fv : Actual	=	251.11 psi
FB : Allowable	=	2,990.00 psi	Fv : Allowable	=	327.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	16.000 ft	Location of maximum on span	=	16.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.027 in	Ratio =	878 >=360
Max Upward Transient Deflection	-0.052 in	Ratio =	3713 >=360
Max Downward Total Deflection	0.047 in	Ratio =	508 >=180
Max Upward Total Deflection	-0.090 in	Ratio =	2121 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.181	0.407	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	2340.00	2.89	104.31	256.50
Length = 1.0 ft	2	0.181	0.407	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	2340.00	2.89	104.31	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.163	0.366	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	2600.00	2.89	104.31	285.00
Length = 1.0 ft	2	0.163	0.366	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	2600.00	2.89	104.31	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.130	0.293	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	3250.00	2.89	104.31	356.25
Length = 1.0 ft	2	0.130	0.293	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	3250.00	2.89	104.31	356.25

Wood Beam

Description : RB-1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.341	0.766	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.00	1,021.02	2990.00	6.96	251.11	327.75
Length = 1.0 ft	2	0.341	0.766	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.00	1,021.02	2990.00	6.96	251.11	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.130	0.293	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	3250.00	2.89	104.31	356.25
Length = 1.0 ft	2	0.130	0.293	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	3250.00	2.89	104.31	356.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.292	0.654	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.98	871.78	2990.00	5.94	214.41	327.75
Length = 1.0 ft	2	0.292	0.654	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.98	871.78	2990.00	5.94	214.41	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.102	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	4160.00	2.89	104.31	456.00
Length = 1.0 ft	2	0.102	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	4160.00	2.89	104.31	456.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.102	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	4160.00	2.89	104.31	456.00
Length = 1.0 ft	2	0.102	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	4160.00	2.89	104.31	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.102	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	4160.00	2.89	104.31	456.00
Length = 1.0 ft	2	0.102	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	424.07	4160.00	2.89	104.31	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.210	0.470	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.98	871.78	4160.00	5.94	214.41	456.00
Length = 1.0 ft	2	0.210	0.470	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.98	871.78	4160.00	5.94	214.41	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.210	0.470	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.98	871.78	4160.00	5.94	214.41	456.00
Length = 1.0 ft	2	0.210	0.470	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.98	871.78	4160.00	5.94	214.41	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.061	0.137	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.74	254.44	4160.00	1.73	62.59	456.00
Length = 1.0 ft	2	0.061	0.137	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.74	254.44	4160.00	1.73	62.59	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.061	0.137	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.74	254.44	4160.00	1.73	62.59	456.00
Length = 1.0 ft	2	0.061	0.137	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.74	254.44	4160.00	1.73	62.59	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0905	10.994
+D+S+H	2	0.0471	1.000		0.0000	10.994

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	0.235	8.150	
Overall MINimum	0.054	2.027	
+D+H	0.090	3.378	
+D+L+H	0.090	3.378	
+D+Lr+H	0.090	3.378	
+D+S+H	0.235	8.150	
+D+0.750Lr+0.750L+H	0.090	3.378	
+D+0.750L+0.750S+H	0.199	6.957	
+D+0.60W+H	0.090	3.378	
+D+0.70E+H	0.090	3.378	
+D+0.750Lr+0.750L+0.450W+H	0.090	3.378	
+D+0.750L+0.750S+0.450W+H	0.199	6.957	
+D+0.750L+0.750S+0.5250E+H	0.199	6.957	
+0.60D+0.60W+0.60H	0.054	2.027	
+0.60D+0.70E+0.60H	0.054	2.027	
D Only	0.090	3.378	
Lr Only			
L Only			
S Only	0.144	4.773	
W Only			
E Only			
H Only			

Wood Beam

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ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : RJ-2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

Wood Species : Douglas Fir - Larch
Wood Grade : No.2

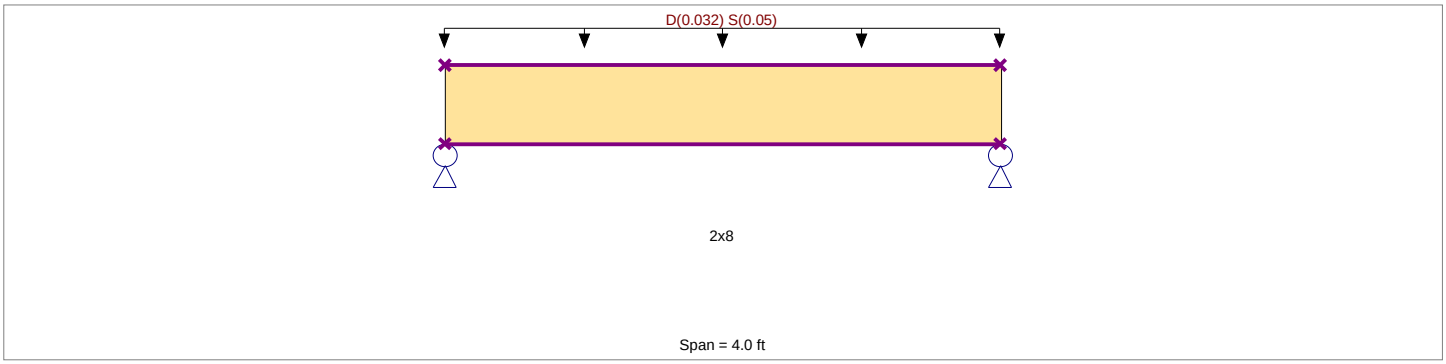
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb - Tension	900.0 psi
Fb - Compr	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.20 pcf

Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0160, S = 0.0250 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.108 : 1	Maximum Shear Stress Ratio	=	0.079 : 1
Section used for this span		2x8	Section used for this span		2x8
fb : Actual	=	154.07 psi	fv : Actual	=	16.31 psi
FB : Allowable	=	1,428.30 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.000 ft	Location of maximum on span	=	3.401 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.004 in	Ratio =	12628	>=360
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360
Max Downward Total Deflection	0.006 in	Ratio =	7485	>=180
Max Upward Total Deflection	0.000 in	Ratio =	0	<180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.056	0.041	0.90							0.07	62.75	1117.80	0.05	6.64	162.00
+D+L+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.051	0.037	1.00							0.07	62.75	1242.00	0.05	6.64	180.00
+D+Lr+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.040	0.030	1.25							0.07	62.75	1552.50	0.05	6.64	225.00
+D+S+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.108	0.079	1.15							0.17	154.07	1428.30	0.12	16.31	207.00
+D+0.750Lr+0.750L+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.040	0.030	1.25							0.07	62.75	1552.50	0.05	6.64	225.00
+D+0.750L+0.750S+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

Description : RJ-2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 4.0 ft	1	0.092	0.067	1.15	1.200	1.00	1.15	1.00	1.00	1.00	0.14	131.24	1428.30	0.10	13.89	207.00
+D+0.60W+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.032	0.023	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.07	62.75	1987.20	0.05	6.64	288.00
+D+0.70E+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.032	0.023	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.07	62.75	1987.20	0.05	6.64	288.00
+D+0.750Lr+0.750L+0.450W+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.032	0.023	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.07	62.75	1987.20	0.05	6.64	288.00
+D+0.750L+0.750S+0.450W+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.066	0.048	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.14	131.24	1987.20	0.10	13.89	288.00
+D+0.750L+0.750S+0.5250E+H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.066	0.048	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.14	131.24	1987.20	0.10	13.89	288.00
+0.60D+0.60W+0.60H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.019	0.014	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.04	37.65	1987.20	0.03	3.98	288.00
+0.60D+0.70E+0.60H					1.200	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.019	0.014	1.60	1.200	1.00	1.15	1.00	1.00	1.00	0.04	37.65	1987.20	0.03	3.98	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0064	2.015		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.169	0.169
Overall MINimum	0.041	0.041
+D+H	0.069	0.069
+D+L+H	0.069	0.069
+D+Lr+H	0.069	0.069
+D+S+H	0.169	0.169
+D+0.750Lr+0.750L+H	0.069	0.069
+D+0.750L+0.750S+H	0.144	0.144
+D+0.60W+H	0.069	0.069
+D+0.70E+H	0.069	0.069
+D+0.750Lr+0.750L+0.450W+H	0.069	0.069
+D+0.750L+0.750S+0.450W+H	0.144	0.144
+D+0.750L+0.750S+0.5250E+H	0.144	0.144
+0.60D+0.60W+0.60H	0.041	0.041
+0.60D+0.70E+0.60H	0.041	0.041
D Only	0.069	0.069
Lr Only		
L Only		
S Only	0.100	0.100
W Only		
E Only		
H Only		

Wood Beam

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Lic. # : KW-06009264
Licensee : LH Engineering

Description : Typ Exterior Header

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

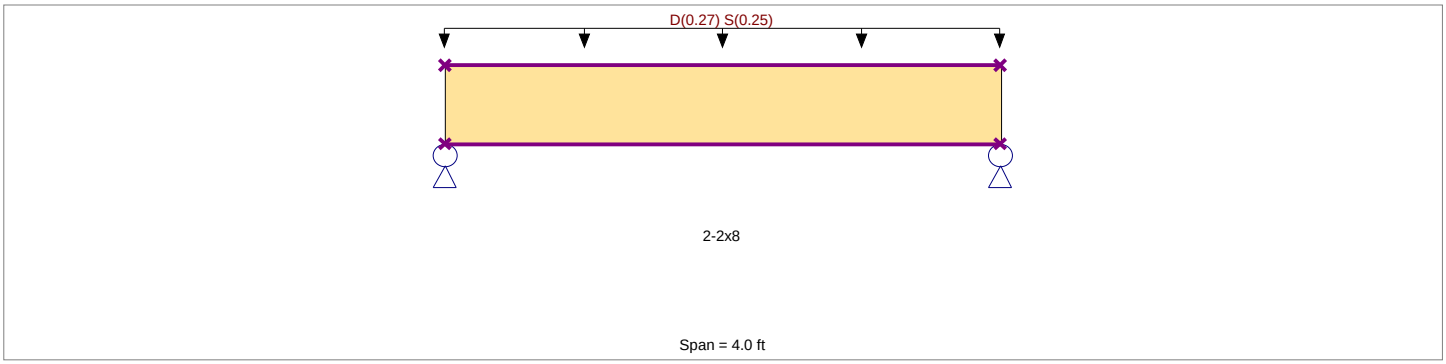
Wood Species : Douglas Fir - Larch
Wood Grade : No.2

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

Fb - Tension	900.0 psi
Fb - Compr	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.20 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0270, S = 0.0250 ksf, Tributary Width = 10.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.386 : 1	Maximum Shear Stress Ratio	=	0.245 : 1
Section used for this span		2-2x8	Section used for this span		2-2x8
fb : Actual	=	479.17 psi	fv : Actual	=	50.71 psi
FB : Allowable	=	1,242.00 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.000 ft	Location of maximum on span	=	3.401 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.010 in	Ratio =	5051 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.020 in	Ratio =	2406 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.258	0.164	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	972.00	0.38	26.55	162.00
+D+L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.232	0.148	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	1080.00	0.38	26.55	180.00
+D+Lr+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.186	0.118	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	1350.00	0.38	26.55	225.00
+D+S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.386	0.245	1.15	1.200	1.00	1.00	1.00	1.00	1.00	1.05	479.17	1242.00	0.74	50.71	207.00
+D+0.750Lr+0.750L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.186	0.118	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	1350.00	0.38	26.55	225.00
+D+0.750L+0.750S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

Description : Typ Exterior Header

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 4.0 ft	1	0.340	0.216	1.15	1.200	1.00	1.00	1.00	1.00	1.00	0.92	422.09	1242.00	0.65	44.67	207.00
+D+0.60W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.145	0.092	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	1728.00	0.38	26.55	288.00
+D+0.70E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.145	0.092	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	1728.00	0.38	26.55	288.00
+D+0.750Lr+0.750L+0.450W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.145	0.092	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.55	250.87	1728.00	0.38	26.55	288.00
+D+0.750L+0.750S+0.450W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.244	0.155	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.92	422.09	1728.00	0.65	44.67	288.00
+D+0.750L+0.750S+0.5250E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.244	0.155	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.92	422.09	1728.00	0.65	44.67	288.00
+0.60D+0.60W+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.087	0.055	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.33	150.52	1728.00	0.23	15.93	288.00
+0.60D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.087	0.055	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.33	150.52	1728.00	0.23	15.93	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0199	2.015		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.049	1.049
Overall MINimum	0.330	0.330
+D+H	0.549	0.549
+D+L+H	0.549	0.549
+D+Lr+H	0.549	0.549
+D+S+H	1.049	1.049
+D+0.750Lr+0.750L+H	0.549	0.549
+D+0.750L+0.750S+H	0.924	0.924
+D+0.60W+H	0.549	0.549
+D+0.70E+H	0.549	0.549
+D+0.750Lr+0.750L+0.450W+H	0.549	0.549
+D+0.750L+0.750S+0.450W+H	0.924	0.924
+D+0.750L+0.750S+0.5250E+H	0.924	0.924
+0.60D+0.60W+0.60H	0.330	0.330
+0.60D+0.70E+0.60H	0.330	0.330
D Only	0.549	0.549
Lr Only		
L Only		
S Only	0.500	0.500
W Only		
E Only		
H Only		

Wood Beam

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Lic. # : KW-06009264
Licensee : LH Engineering

Description : RB-2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

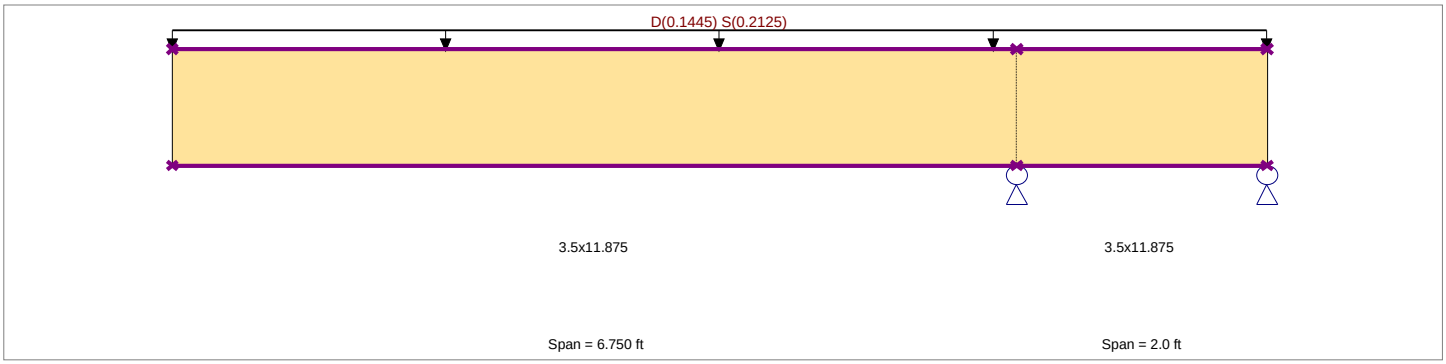
Wood Species : Trus Joist
Wood Grade : TimberStrand LSL 1.55E

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

Fb - Tension	2,325.0 psi
Fb - Compr	2,325.0 psi
Fc - Prll	2,170.0 psi
Fc - Perp	900.0 psi
Fv	310.0 psi
Ft	1,070.0 psi

E : Modulus of Elasticity

Ebend- xx	1,550.0 ksi
Eminbend - xx	787.82 ksi
Density	44.990 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Loads on all spans...
Uniform Load on ALL spans : D = 0.0170, S = 0.0250 ksf, Tributary Width = 8.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.460 : 1	Maximum Shear Stress Ratio	=	0.427 : 1
Section used for this span		3.5x11.875	Section used for this span		3.5x11.875
fb : Actual	=	1,229.59 psi	fv : Actual	=	152.32 psi
FB : Allowable	=	2,673.75 psi	Fv : Allowable	=	356.50 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	6.750 ft	Location of maximum on span	=	6.750 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.175 in	Ratio =	924	>=360
Max Upward Transient Deflection	-0.003 in	Ratio =	8640	>=360
Max Downward Total Deflection	0.305 in	Ratio =	530	>=180
Max Upward Total Deflection	-0.005 in	Ratio =	4962	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.250	0.232	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2092.50	1.80	64.84	279.00
Length = 2.0 ft	2	0.250	0.232	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2092.50	1.80	64.84	279.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.225	0.209	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2325.00	1.80	64.84	310.00
Length = 2.0 ft	2	0.225	0.209	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2325.00	1.80	64.84	310.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.180	0.167	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2906.25	1.80	64.84	387.50
Length = 2.0 ft	2	0.180	0.167	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2906.25	1.80	64.84	387.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

File = C:\Egnyte\Shared\AXIOMP~1\2016PR~1\A16-10~1\ENGINE~1\Enercalc\GROVET~1.EC6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264 **Licensee : LH Engineering**

Description : RB-2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 6.750 ft	1	0.460	0.427	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.43	1,229.59	2673.75	4.22	152.32	356.50
Length = 2.0 ft	2	0.460	0.427	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.43	1,229.59	2673.75	4.22	152.32	356.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.180	0.167	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2906.25	1.80	64.84	387.50
Length = 2.0 ft	2	0.180	0.167	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	2906.25	1.80	64.84	387.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.394	0.366	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.22	1,053.03	2673.75	3.61	130.45	356.50
Length = 2.0 ft	2	0.394	0.366	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.22	1,053.03	2673.75	3.61	130.45	356.50
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.141	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	3720.00	1.80	64.84	496.00
Length = 2.0 ft	2	0.141	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	3720.00	1.80	64.84	496.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.141	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	3720.00	1.80	64.84	496.00
Length = 2.0 ft	2	0.141	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	3720.00	1.80	64.84	496.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.141	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	3720.00	1.80	64.84	496.00
Length = 2.0 ft	2	0.141	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.59	523.38	3720.00	1.80	64.84	496.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.283	0.263	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.22	1,053.03	3720.00	3.61	130.45	496.00
Length = 2.0 ft	2	0.283	0.263	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.22	1,053.03	3720.00	3.61	130.45	496.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.283	0.263	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.22	1,053.03	3720.00	3.61	130.45	496.00
Length = 2.0 ft	2	0.283	0.263	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.22	1,053.03	3720.00	3.61	130.45	496.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.084	0.078	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.15	314.03	3720.00	1.08	38.90	496.00
Length = 2.0 ft	2	0.084	0.078	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.15	314.03	3720.00	1.08	38.90	496.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.750 ft	1	0.084	0.078	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.15	314.03	3720.00	1.08	38.90	496.00
Length = 2.0 ft	2	0.084	0.078	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.15	314.03	3720.00	1.08	38.90	496.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3046	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S+H	-0.0048	0.849

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		7.082	-3.844
Overall MINimum		1.809	-0.982
+D+H		3.014	-1.636
+D+L+H		3.014	-1.636
+D+Lr+H		3.014	-1.636
+D+S+H		7.082	-3.844
+D+0.750Lr+0.750L+H		3.014	-1.636
+D+0.750L+0.750S+H		6.065	-3.292
+D+0.60W+H		3.014	-1.636
+D+0.70E+H		3.014	-1.636
+D+0.750Lr+0.750L+0.450W+H		3.014	-1.636
+D+0.750L+0.750S+0.450W+H		6.065	-3.292
+D+0.750L+0.750S+0.5250E+H		6.065	-3.292
+0.60D+0.60W+0.60H		1.809	-0.982
+0.60D+0.70E+0.60H		1.809	-0.982
D Only		3.014	-1.636
Lr Only			
L Only			
S Only		4.067	-2.208
W Only			
E Only			
H Only			

Wood Beam

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ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : Typ Interior Header

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

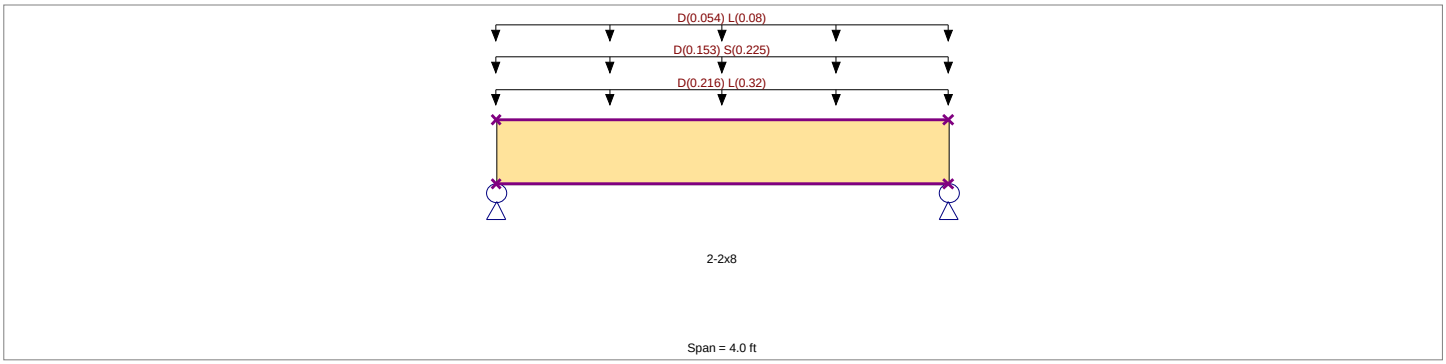
Wood Species : Douglas Fir - Larch
Wood Grade : No.2

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

Fb - Tension	900.0 psi
Fb - Compr	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.20 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0270, L = 0.040 ksf, Tributary Width = 8.0 ft, (Floor)
Uniform Load : D = 0.0170, S = 0.0250 ksf, Tributary Width = 9.0 ft, (Roof)
Uniform Load : D = 0.0270, L = 0.040 ksf, Tributary Width = 2.0 ft, (Stairs)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.700 : 1	Maximum Shear Stress Ratio	=	0.444 : 1
Section used for this span		2-2x8	Section used for this span		2-2x8
fb : Actual	=	755.87 psi	fv : Actual	=	80.00 psi
FB : Allowable	=	1,080.00 psi	Fv : Allowable	=	180.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	2.000 ft	Location of maximum on span	=	3.401 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.015 in	Ratio =	3157 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.034 in	Ratio =	1408 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.402	0.255	0.90							0.86	390.59	972.00	0.60	41.34	162.00
+D+L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.700	0.444	1.00							1.66	755.87	1080.00	1.16	80.00	180.00
+D+Lr+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.289	0.184	1.25							0.86	390.59	1350.00	0.60	41.34	225.00
+D+S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.480	0.305	1.15							1.31	596.06	1242.00	0.91	63.09	207.00
+D+0.750Lr+0.750L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

Description : Typ Interior Header

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 4.0 ft	1	0.492	0.313	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.46	664.55	1350.00	1.02	70.34	225.00
+D+0.750L+0.750S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.659	0.419	1.15	1.200	1.00	1.00	1.00	1.00	1.00	1.79	818.65	1242.00	1.26	86.65	207.00
+D+0.60W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.226	0.144	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.86	390.59	1728.00	0.60	41.34	288.00
+D+0.70E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.226	0.144	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.86	390.59	1728.00	0.60	41.34	288.00
+D+0.750Lr+0.750L+0.450W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.385	0.244	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.46	664.55	1728.00	1.02	70.34	288.00
+D+0.750L+0.750S+0.450W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.474	0.301	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.79	818.65	1728.00	1.26	86.65	288.00
+D+0.750L+0.750S+0.5250E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.474	0.301	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.79	818.65	1728.00	1.26	86.65	288.00
+0.60D+0.60W+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.136	0.086	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.51	234.35	1728.00	0.36	24.80	288.00
+0.60D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.136	0.086	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.51	234.35	1728.00	0.36	24.80	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.0341	2.015		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.793	1.793
Overall MINimum	0.450	0.450
+D+H	0.855	0.855
+D+L+H	1.655	1.655
+D+Lr+H	0.855	0.855
+D+S+H	1.305	1.305
+D+0.750Lr+0.750L+H	1.455	1.455
+D+0.750L+0.750S+H	1.793	1.793
+D+0.60W+H	0.855	0.855
+D+0.70E+H	0.855	0.855
+D+0.750Lr+0.750L+0.450W+H	1.455	1.455
+D+0.750L+0.750S+0.450W+H	1.793	1.793
+D+0.750L+0.750S+0.5250E+H	1.793	1.793
+0.60D+0.60W+0.60H	0.513	0.513
+0.60D+0.70E+0.60H	0.513	0.513
D Only	0.855	0.855
Lr Only		
L Only	0.800	0.800
S Only	0.450	0.450
W Only		
E Only		
H Only		

Wood Beam

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ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : FB-1

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

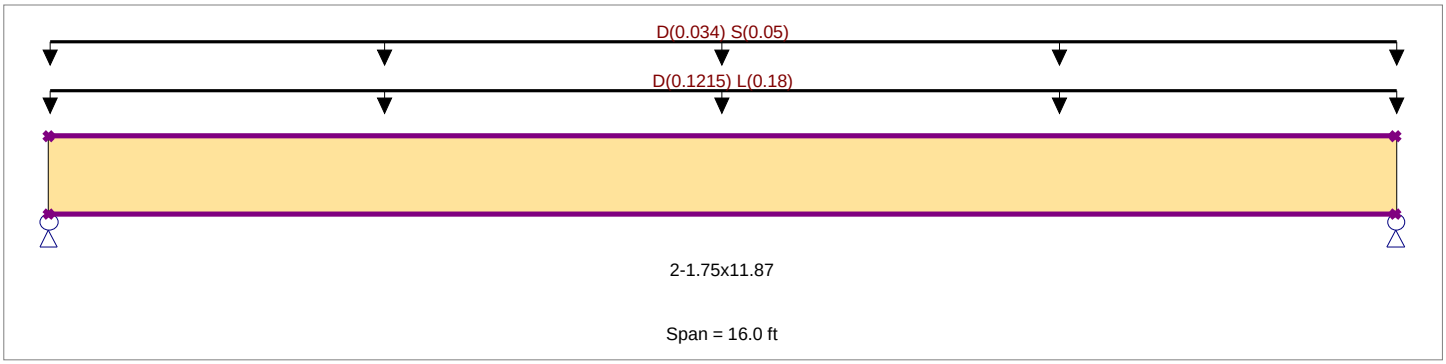
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb - Tension	2,600.0 psi
Fb - Compr	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0270, L = 0.040 ksf, Tributary Width = 4.50 ft, (Floor)
Uniform Load : D = 0.0170, S = 0.0250 ksf, Tributary Width = 2.0 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.624 : 1	Maximum Shear Stress Ratio	=	0.311 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb : Actual	=	1,622.76 psi	fv : Actual	=	88.64 psi
FB : Allowable	=	2,600.00 psi	Fv : Allowable	=	285.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.066 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.288 in	Ratio =	667 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.556 in	Ratio =	345 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.334	0.167	0.90	1.000	1.00	1.00	1.00	1.00	1.00	5.36	782.49	2340.00	1.18	42.74	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.624	0.311	1.00	1.000	1.00	1.00	1.00	1.00	1.00	11.12	1,622.76	2600.00	2.46	88.64	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.241	0.120	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.36	782.49	3250.00	1.18	42.74	356.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.340	0.169	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.96	1,015.90	2990.00	1.54	55.49	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.435	0.217	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.68	1,412.69	3250.00	2.14	77.17	356.25

Wood Beam

Description : FB-1

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.531	0.265	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.88	1,587.75	2990.00	2.40	86.73	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.188	0.094	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.36	782.49	4160.00	1.18	42.74	456.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.188	0.094	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.36	782.49	4160.00	1.18	42.74	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.340	0.169	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.68	1,412.69	4160.00	2.14	77.17	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.382	0.190	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.88	1,587.75	4160.00	2.40	86.73	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.382	0.190	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.88	1,587.75	4160.00	2.40	86.73	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.113	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.22	469.49	4160.00	0.71	25.65	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.113	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.22	469.49	4160.00	0.71	25.65	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5556	8.058		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.781	2.781
Overall MINimum	0.400	0.400
+D+H	1.341	1.341
+D+L+H	2.781	2.781
+D+Lr+H	1.341	1.341
+D+S+H	1.741	1.741
+D+0.750Lr+0.750L+H	2.421	2.421
+D+0.750L+0.750S+H	2.721	2.721
+D+0.60W+H	1.341	1.341
+D+0.70E+H	1.341	1.341
+D+0.750Lr+0.750L+0.450W+H	2.421	2.421
+D+0.750L+0.750S+0.450W+H	2.721	2.721
+D+0.750L+0.750S+0.5250E+H	2.721	2.721
+0.60D+0.60W+0.60H	0.805	0.805
+0.60D+0.70E+0.60H	0.805	0.805
D Only	1.341	1.341
Lr Only		
L Only	1.440	1.440
S Only	0.400	0.400
W Only		
E Only		
H Only		

Wood Beam

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Lic. # : KW-06009264
Licensee : LH Engineering

Description : FB-2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

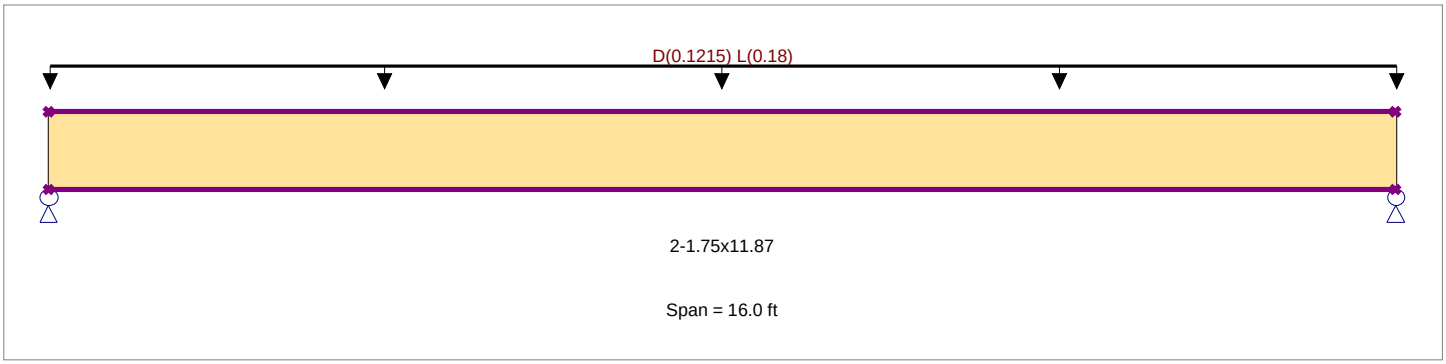
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb - Tension	2,600.0 psi
Fb - Compr	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0270, L = 0.040 ksf, Tributary Width = 4.50 ft, (Floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.563 : 1	Maximum Shear Stress Ratio	=	0.281 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb : Actual	=	1,464.04 psi	fv : Actual	=	79.97 psi
FB : Allowable	=	2,600.00 psi	Fv : Allowable	=	285.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.066 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.288 in	Ratio =	667 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.501 in	Ratio =	383 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.267	0.133	0.90							4.28	623.77	2340.00	0.94	34.07	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.563	0.281	1.00							10.04	1,464.04	2600.00	2.22	79.97	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.192	0.096	1.25							4.28	623.77	3250.00	0.94	34.07	356.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.209	0.104	1.15							4.28	623.77	2990.00	0.94	34.07	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.386	0.192	1.25							8.60	1,253.98	3250.00	1.90	68.50	356.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

Description : FB-2

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 16.0 ft	1	0.419	0.209	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.60	1,253.98	2990.00	1.90	68.50	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.150	0.075	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.28	623.77	4160.00	0.94	34.07	456.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.150	0.075	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.28	623.77	4160.00	0.94	34.07	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.301	0.150	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.60	1,253.98	4160.00	1.90	68.50	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.301	0.150	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.60	1,253.98	4160.00	1.90	68.50	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.301	0.150	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.60	1,253.98	4160.00	1.90	68.50	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.090	0.045	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.57	374.26	4160.00	0.57	20.44	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.090	0.045	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.57	374.26	4160.00	0.57	20.44	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5013	8.058		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.509	2.509
Overall MINimum	0.641	0.641
+D+H	1.069	1.069
+D+L+H	2.509	2.509
+D+Lr+H	1.069	1.069
+D+S+H	1.069	1.069
+D+0.750Lr+0.750L+H	2.149	2.149
+D+0.750L+0.750S+H	2.149	2.149
+D+0.60W+H	1.069	1.069
+D+0.70E+H	1.069	1.069
+D+0.750Lr+0.750L+0.450W+H	2.149	2.149
+D+0.750L+0.750S+0.450W+H	2.149	2.149
+D+0.750L+0.750S+0.5250E+H	2.149	2.149
+0.60D+0.60W+0.60H	0.641	0.641
+0.60D+0.70E+0.60H	0.641	0.641
D Only	1.069	1.069
Lr Only		
L Only	1.440	1.440
S Only		
W Only		
E Only		
H Only		

Wood Beam

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Lic. # : KW-06009264
Licensee : LH Engineering

Description : FB-3

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

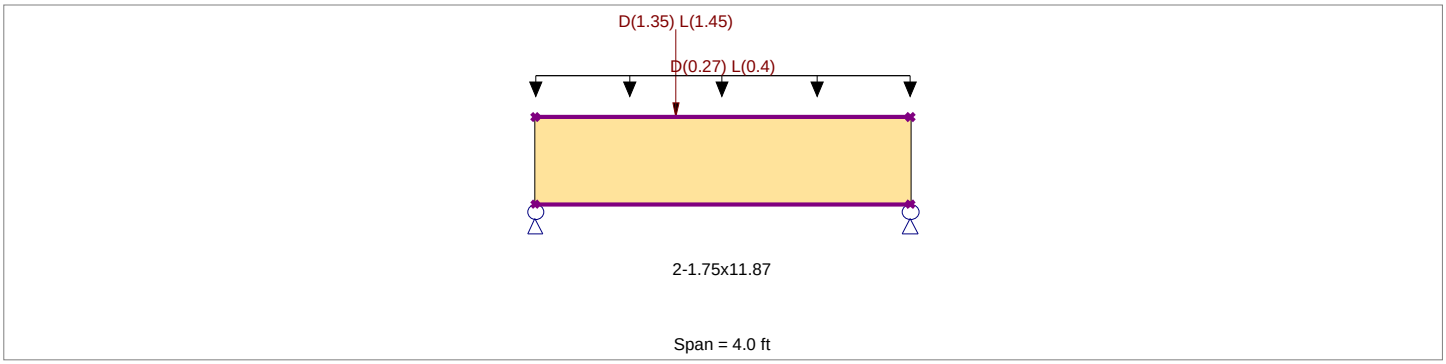
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb - Tension	2,600.0 psi
Fb - Compr	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0270, L = 0.040 ksf, Tributary Width = 10.0 ft, (Floor)
Point Load : D = 1.350, L = 1.450 k @ 1.50 ft, (FB-1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.219 : 1	Maximum Shear Stress Ratio	=	0.310 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb : Actual	=	569.14 psi	fv : Actual	=	88.31 psi
FB : Allowable	=	2,600.00 psi	Fv : Allowable	=	285.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	1.504 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.006 in	Ratio =	8246 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.011 in	Ratio =	4495 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.112	0.159	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.79	261.60	2340.00	1.13	40.86	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.219	0.310	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.90	569.14	2600.00	2.45	88.31	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.080	0.115	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.79	261.60	3250.00	1.13	40.86	356.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.087	0.125	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.79	261.60	2990.00	1.13	40.86	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.151	0.215	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.37	492.25	3250.00	2.12	76.45	356.25

Wood Beam

Description : FB-3

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.165	0.233	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.37	492.25	2990.00	2.12	76.45	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.063	0.090	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.79	261.60	4160.00	1.13	40.86	456.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.063	0.090	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.79	261.60	4160.00	1.13	40.86	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.118	0.168	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.37	492.25	4160.00	2.12	76.45	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.118	0.168	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.37	492.25	4160.00	2.12	76.45	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.118	0.168	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.37	492.25	4160.00	2.12	76.45	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.038	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.08	156.96	4160.00	0.68	24.51	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.038	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.08	156.96	4160.00	0.68	24.51	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0107	1.927		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.114	2.414
Overall MINimum	0.845	0.642
+D+H	1.408	1.070
+D+L+H	3.114	2.414
+D+Lr+H	1.408	1.070
+D+S+H	1.408	1.070
+D+0.750Lr+0.750L+H	2.688	2.078
+D+0.750L+0.750S+H	2.688	2.078
+D+0.60W+H	1.408	1.070
+D+0.70E+H	1.408	1.070
+D+0.750Lr+0.750L+0.450W+H	2.688	2.078
+D+0.750L+0.750S+0.450W+H	2.688	2.078
+D+0.750L+0.750S+0.5250E+H	2.688	2.078
+0.60D+0.60W+0.60H	0.845	0.642
+0.60D+0.70E+0.60H	0.845	0.642
D Only	1.408	1.070
Lr Only		
L Only	1.706	1.344
S Only		
W Only		
E Only		
H Only		

Wood Column

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Lic. # : KW-06009264
Licensee : LH Engineering

Description : C-1 (supporting RB-1)

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 12.0 ft
(Used for non-slender calculations)

Wood Species : Douglas Fir - Larch
Wood Grade : No.2

Fb - Tension	900.0 psi	Fv	180.0 psi
Fb - Compr	900.0 psi	Ft	575.0 psi
Fc - Prll	1,350.0 psi	Density	31.20 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Wood Section Name : **2-2x6**
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	**3.0**	in
Exact Depth	**5.50**	in
Area	16.50	in^2
Ix	41.594	in^4
Iy	12.375	in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.30
Cf or Cv for Compression	1.10
Cf or Cv for Tension	1.30
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 42.90 lbs * Dead Load Factor
AXIAL LOADS . . .
RB-1: Axial Load at 12.0 ft, D = 3.380, S = 4.770 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.2908** : 1
Load Combination +D+S+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 0.0 ft
At maximum location values are . . .
Applied Axial 8.193 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 1,707.75 psi

PASS Maximum Shear Stress Ratio = **0.0** : 1
Load Combination +0.60D+0.70E+0.60H
Location of max.above base 12.0 ft
Applied Design Shear 0.0 psi
Allowable Shear 288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Wood Beam

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ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : FJ-2 sistered joists

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

Wood Species : Douglas Fir - Larch
Wood Grade : No.2

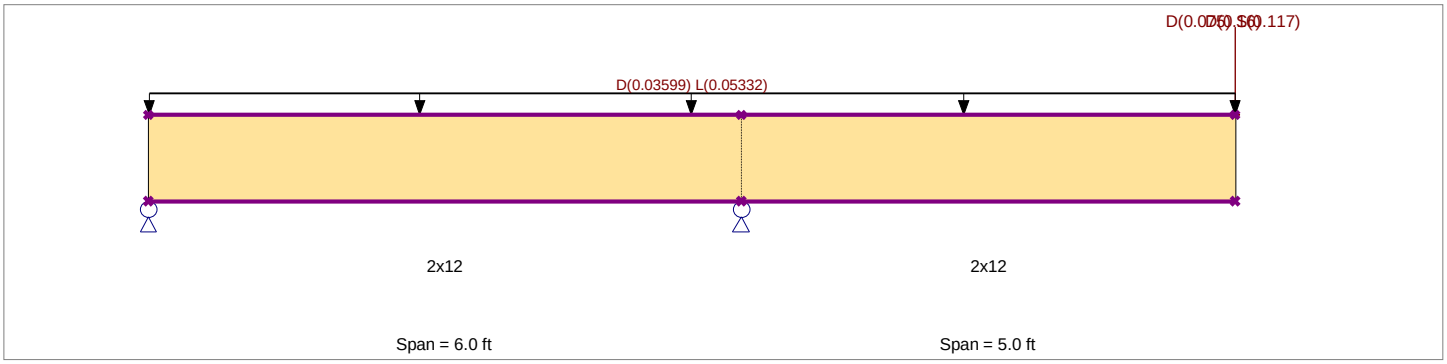
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb - Tension	900.0 psi
Fb - Compr	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.20 pcf

Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Loads on all spans...
Uniform Load on ALL spans : D = 0.0270, L = 0.040 ksf, Tributary Width = 1.333 ft
Load for Span Number 2
Point Load : D = 0.0750, S = 0.1170 k @ 5.0 ft, (Roof)
Point Load : D = 0.160 k @ 5.0 ft, (Wall)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.856 : 1	Maximum Shear Stress Ratio	=	0.303 : 1
Section used for this span		2x12	Section used for this span		2x12
fb : Actual	=	886.36 psi	fv : Actual	=	54.59 psi
FB : Allowable	=	1,035.00 psi	Fv : Allowable	=	180.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	6.000 ft	Location of maximum on span	=	6.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.065 in	Ratio =	1846 >=360
Max Upward Transient Deflection	-0.008 in	Ratio =	8719 >=360
Max Downward Total Deflection	0.255 in	Ratio =	468 >=180
Max Upward Total Deflection	-0.029 in	Ratio =	2490 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.680	0.218	0.90	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	931.50	0.40	35.26	162.00
Length = 5.0 ft	2	0.680	0.218	0.90	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	931.50	0.40	35.26	162.00
+D+L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.856	0.303	1.00	1.000	1.00	1.15	1.00	1.00	1.00	2.34	886.36	1035.00	0.61	54.59	180.00
Length = 5.0 ft	2	0.856	0.303	1.00	1.000	1.00	1.15	1.00	1.00	1.00	2.34	886.36	1035.00	0.61	54.59	180.00

Wood Beam

File = C:\Egnyte\Shared\AXIOMP~1\2016PR~1\A16-10~1\ENGINE~1\Enercalc\GROVET~1.EC6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264 — **Licensee : LH Engineering**

Description : FJ-2 sistered joists

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+Lr+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.490	0.157	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	1293.75	0.40	35.26	225.00
Length = 5.0 ft	2	0.490	0.157	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	1293.75	0.40	35.26	225.00
+D+S+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.719	0.221	1.15	1.000	1.00	1.15	1.00	1.00	1.00	2.26	855.45	1190.25	0.51	45.66	207.00
Length = 5.0 ft	2	0.719	0.221	1.15	1.000	1.00	1.15	1.00	1.00	1.00	2.26	855.45	1190.25	0.51	45.66	207.00
+D+0.750Lr+0.750L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.636	0.221	1.25	1.000	1.00	1.15	1.00	1.00	1.00	2.17	823.17	1293.75	0.56	49.76	225.00
Length = 5.0 ft	2	0.636	0.221	1.25	1.000	1.00	1.15	1.00	1.00	1.00	2.17	823.17	1293.75	0.56	49.76	225.00
+D+0.750L+0.750S+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.831	0.278	1.15	1.000	1.00	1.15	1.00	1.00	1.00	2.61	989.57	1190.25	0.65	57.56	207.00
Length = 5.0 ft	2	0.831	0.278	1.15	1.000	1.00	1.15	1.00	1.00	1.00	2.61	989.57	1190.25	0.65	57.56	207.00
+D+0.60W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.383	0.122	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	1656.00	0.40	35.26	288.00
Length = 5.0 ft	2	0.383	0.122	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	1656.00	0.40	35.26	288.00
+D+0.70E+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.383	0.122	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	1656.00	0.40	35.26	288.00
Length = 5.0 ft	2	0.383	0.122	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.67	633.59	1656.00	0.40	35.26	288.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.497	0.173	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.17	823.17	1656.00	0.56	49.76	288.00
Length = 5.0 ft	2	0.497	0.173	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.17	823.17	1656.00	0.56	49.76	288.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.598	0.200	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.61	989.57	1656.00	0.65	57.56	288.00
Length = 5.0 ft	2	0.598	0.200	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.61	989.57	1656.00	0.65	57.56	288.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.598	0.200	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.61	989.57	1656.00	0.65	57.56	288.00
Length = 5.0 ft	2	0.598	0.200	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.61	989.57	1656.00	0.65	57.56	288.00
+0.60D+0.60W+0.60H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.230	0.073	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.00	380.15	1656.00	0.24	21.16	288.00
Length = 5.0 ft	2	0.230	0.073	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.00	380.15	1656.00	0.24	21.16	288.00
+0.60D+0.70E+0.60H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.230	0.073	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.00	380.15	1656.00	0.24	21.16	288.00
Length = 5.0 ft	2	0.230	0.073	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.00	380.15	1656.00	0.24	21.16	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+0.750L+0.750S+0.5250E+H	-0.0289	3.620
+D+0.750L+0.750S+0.5250E+H	2	0.2555	5.000		0.0000	3.620

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.257	1.395	
Overall MINimum	0.049	0.215	
+D+H	-0.159	0.831	
+D+L+H	-0.111	1.368	
+D+Lr+H	-0.159	0.831	
+D+S+H	-0.257	1.045	
+D+0.750Lr+0.750L+H	-0.123	1.234	
+D+0.750L+0.750S+H	-0.196	1.395	
+D+0.60W+H	-0.159	0.831	
+D+0.70E+H	-0.159	0.831	
+D+0.750Lr+0.750L+0.450W+H	-0.123	1.234	
+D+0.750L+0.750S+0.450W+H	-0.196	1.395	
+D+0.750L+0.750S+0.5250E+H	-0.196	1.395	
+0.60D+0.60W+0.60H	-0.096	0.498	
+0.60D+0.70E+0.60H	-0.096	0.498	
D Only	-0.159	0.831	
Lr Only			
L Only	0.049	0.538	
S Only	-0.098	0.215	

Wood Beam

Description : FJ-2 sistered joists

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
W Only			
E Only			
H Only			

Wood Beam

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ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : FJ-2 sistered joists (with OT force)

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

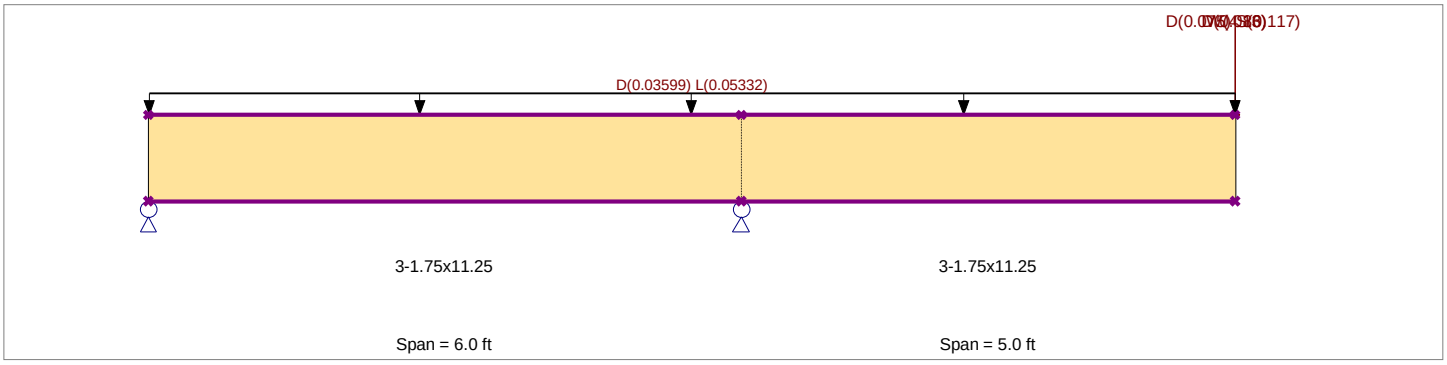
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb - Tension	2,600.0 psi
Fb - Compr	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf

Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Loads on all spans...
Uniform Load on ALL spans : D = 0.0270, L = 0.040 ksf, Tributary Width = 1.333 ft
Load for Span Number 2
Point Load : D = 0.0750, S = 0.1170 k @ 5.0 ft, (Roof)
Point Load : D = 0.0160 k @ 5.0 ft, (Wall)
Point Load : W = 4.830 k @ 5.0 ft, (Strap)

higher deflection due to ultimate wind load only. Maximum total deflection is acceptable.

Design N.G.

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.354 : 1	Maximum Shear Stress Ratio	=	0.179 : 1
Section used for this span		3-1.75x11.25	Section used for this span		3-1.75x11.25
fb : Actual	=	1,691.52 psi	fv : Actual	=	81.42 psi
FB : Allowable	=	4,784.00 psi	Fv : Allowable	=	456.00 psi
Load Combination		+D+0.60W+H	Load Combination		+D+0.60W+H
Location of maximum on span	=	6.000 ft	Location of maximum on span	=	6.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.645 in	Ratio =	184 <360
Max Upward Transient Deflection	-0.082 in	Ratio =	877 >=360
Max Downward Total Deflection	0.412 in	Ratio =	290 >=180
Max Upward Total Deflection	-0.052 in	Ratio =	1391 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.045	0.030	0.90	1.000	1.00	1.15	1.00	1.00	1.00	1.12	121.39	2691.00	0.31	7.82	256.50
Length = 5.0 ft	2	0.045	0.030	0.90	1.000	1.00	1.15	1.00	1.00	1.00	1.12	121.39	2691.00	0.31	7.82	256.50
+D+L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.065	0.047	1.00	1.000	1.00	1.15	1.00	1.00	1.00	1.79	193.61	2990.00	0.53	13.35	285.00

Wood Beam

Lic. # : KW-06009264 — **Licensee : LH Engineering**

Description : FJ-2 sistered joists (with OT force)

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.0 ft	2	0.065	0.047	1.00	1.000	1.00	1.15	1.00	1.00	1.00	1.79	193.61	2990.00	0.53	13.35	285.00
+D+Lr+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.032	0.022	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.12	121.39	3737.50	0.31	7.82	356.25
Length = 5.0 ft	2	0.032	0.022	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.12	121.39	3737.50	0.31	7.82	356.25
+D+S+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.054	0.033	1.15	1.000	1.00	1.15	1.00	1.00	1.00	1.71	184.78	3438.50	0.43	10.79	327.75
Length = 5.0 ft	2	0.054	0.033	1.15	1.000	1.00	1.15	1.00	1.00	1.00	1.71	184.78	3438.50	0.43	10.79	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.047	0.034	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.62	175.55	3737.50	0.47	11.96	356.25
Length = 5.0 ft	2	0.047	0.034	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.62	175.55	3737.50	0.47	11.96	356.25
+D+0.750L+0.750S+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.065	0.043	1.15	1.000	1.00	1.15	1.00	1.00	1.00	2.06	223.10	3438.50	0.56	14.19	327.75
Length = 5.0 ft	2	0.065	0.043	1.15	1.000	1.00	1.15	1.00	1.00	1.00	2.06	223.10	3438.50	0.56	14.19	327.75
+D+0.60W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.354	0.179	1.60	1.000	1.00	1.15	1.00	1.00	1.00	15.61	1,691.52	4784.00	3.21	81.42	456.00
Length = 5.0 ft	2	0.354	0.179	1.60	1.000	1.00	1.15	1.00	1.00	1.00	15.61	1,691.52	4784.00	3.21	81.42	456.00
+D+0.70E+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.025	0.017	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.12	121.39	4784.00	0.31	7.82	456.00
Length = 5.0 ft	2	0.025	0.017	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.12	121.39	4784.00	0.31	7.82	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.283	0.147	1.60	1.000	1.00	1.15	1.00	1.00	1.00	12.49	1,353.15	4784.00	2.64	67.16	456.00
Length = 5.0 ft	2	0.283	0.147	1.60	1.000	1.00	1.15	1.00	1.00	1.00	12.49	1,353.15	4784.00	2.64	67.16	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.293	0.152	1.60	1.000	1.00	1.15	1.00	1.00	1.00	12.93	1,400.70	4784.00	2.73	69.39	456.00
Length = 5.0 ft	2	0.293	0.152	1.60	1.000	1.00	1.15	1.00	1.00	1.00	12.93	1,400.70	4784.00	2.73	69.39	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.047	0.031	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.06	223.10	4784.00	0.56	14.19	456.00
Length = 5.0 ft	2	0.047	0.031	1.60	1.000	1.00	1.15	1.00	1.00	1.00	2.06	223.10	4784.00	0.56	14.19	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.343	0.172	1.60	1.000	1.00	1.15	1.00	1.00	1.00	15.16	1,642.97	4784.00	3.08	78.29	456.00
Length = 5.0 ft	2	0.343	0.172	1.60	1.000	1.00	1.15	1.00	1.00	1.00	15.16	1,642.97	4784.00	3.08	78.29	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.015	0.010	1.60	1.000	1.00	1.15	1.00	1.00	1.00	0.67	72.83	4784.00	0.18	4.69	456.00
Length = 5.0 ft	2	0.015	0.010	1.60	1.000	1.00	1.15	1.00	1.00	1.00	0.67	72.83	4784.00	0.18	4.69	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	W Only	-0.0820	3.486
W Only	2	0.6452	5.000		0.0000	3.486

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-4.025	8.855	
Overall MINimum	0.010	0.215	
+D+H	-0.027	0.703	
+D+L+H	0.022	1.241	
+D+Lr+H	-0.027	0.703	
+D+S+H	-0.125	0.918	
+D+0.750Lr+0.750L+H	0.010	1.107	
+D+0.750L+0.750S+H	-0.064	1.268	
+D+0.60W+H	-2.442	6.016	
+D+0.70E+H	-0.027	0.703	
+D+0.750Lr+0.750L+0.450W+H	-1.802	5.091	
+D+0.750L+0.750S+0.450W+H	-1.875	5.252	
+D+0.750L+0.750S+0.5250E+H	-0.064	1.268	
+0.60D+0.60W+0.60H	-2.431	5.735	
+0.60D+0.70E+0.60H	-0.016	0.422	
D Only	-0.027	0.703	
Lr Only			
L Only	0.049	0.538	

Wood Beam

Description : FJ-2 sistered joists (with OT force)

Vertical Reactions

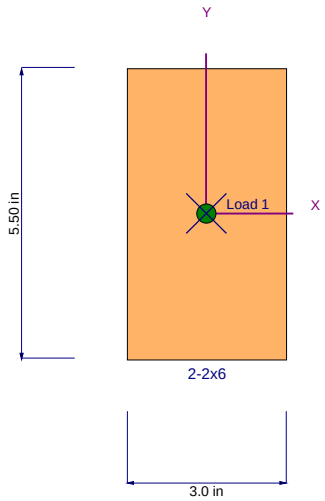
Support notation : Far left is #1 Values in KIPS

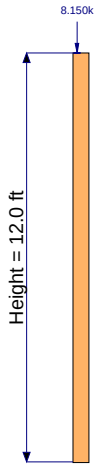
Load Combination	Support 1	Support 2	Support 3
S Only	-0.098	0.215	
W Only	-4.025	8.855	
E Only			
H Only			

Wood Column

Description : C-1 (supporting RB-1)

Sketches





Loads are total entered value. Arrows do not reflect absolute direction.

Wood Column

File = C:\Egnyte\Shared\AXIOMP~1\2016PR~1\A16-10~1\ENGINE~1\Enercalc\GROVET~1.EC6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264 — **Licensee : LH Engineering**

Description : C-2 (supporting RB-1 and FB-1)

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 10.0 ft
(Used for non-slender calculations)

Wood Species : Douglas Fir - Larch
Wood Grade : No.2

Fb - Tension	900.0 psi	Fv	180.0 psi
Fb - Compr	900.0 psi	Ft	575.0 psi
Fc - Prll	1,350.0 psi	Density	31.20 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Wood Section Name : **2-2x6**
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	**3.0**	in
Exact Depth	**5.50**	in
Area	16.50	in^2
Ix	41.594	in^4
Iy	12.375	in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.30
Cf or Cv for Compression	1.10
Cf or Cv for Tension	1.30
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 35.750 lbs * Dead Load Factor
AXIAL LOADS . . .
RB-1: Axial Load at 10.0 ft, D = 3.380, S = 4.770 k
FB-1: Axial Load at 10.0 ft, D = 1.340, S = 1.440 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.3892** : 1
Load Combination +D+S+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 0.0 ft
At maximum location values are . . .
Applied Axial 10.966 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 1,707.75 psi

PASS Maximum Shear Stress Ratio = **0.0** : 1
Load Combination +0.60D+0.70E+0.60H
Location of max.above base 10.0 ft
Applied Design Shear 0.0 psi
Allowable Shear 288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base

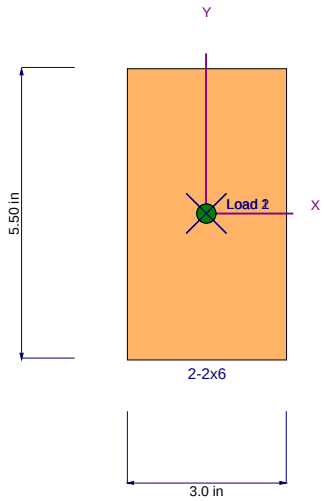
Maximum Deflections for Load Combinations

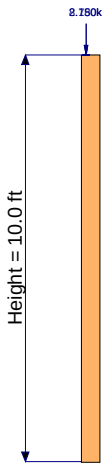
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Wood Column

Description : C-2 (supporting RB-1 and FB-1)

Sketches





Loads are total entered value. Arrows do not reflect absolute direction.

Wood Column

File = C:\Egnyte\Shared\AXIOMP~1\2016PR~1\A16-10~1\ENGINE~1\Enercalc\GROVET~1.EC6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264 — **Licensee : LH Engineering**

Description : C-3 (supporting (2)2x8 header)

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 10.0 ft
(Used for non-slender calculations)

Wood Species : Douglas Fir - Larch
Wood Grade : No.2

Fb - Tension	900.0 psi	Fv	180.0 psi
Fb - Compr	900.0 psi	Ft	575.0 psi
Fc - Prll	1,350.0 psi	Density	31.20 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Wood Section Name : **2x6**
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	**1.50**	in
Exact Depth	**5.50**	in
Area	8.250	in^2
Ix	20.797	in^4
Iy	1.547	in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.30
Cf or Cv for Compression	1.10
Cf or Cv for Tension	1.30
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 17.875 lbs * Dead Load Factor
AXIAL LOADS . . .
FB-1: Axial Load at 10.0 ft, D = 0.860, L = 0.80, S = 0.460 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.1370** : 1
Load Combination +D+L+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 0.0 ft
At maximum location values are . . .
Applied Axial 1.678 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 1,485.0 psi

PASS Maximum Shear Stress Ratio = **0.0** : 1
Load Combination +0.60D+0.70E+0.60H
Location of max.above base 10.0 ft
Applied Design Shear 0.0 psi
Allowable Shear 288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base

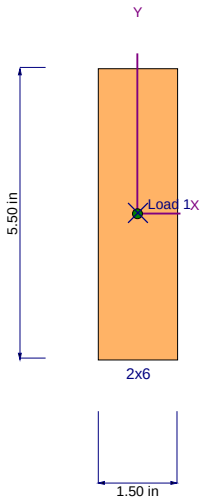
Maximum Deflections for Load Combinations

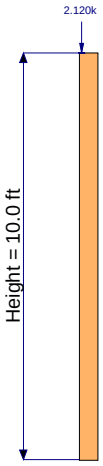
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Wood Column

Description : C-3 (supporting (2)2x8 header)

Sketches





Loads are total entered value. Arrows do not reflect absolute direction.

Wood Column

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ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06009264
Licensee : LH Engineering

Description : WW4 check

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 14.750 ft
(Used for non-slender calculations)

Wood Species : Douglas Fir - Larch
Wood Grade : No.2

Fb - Tension	900 psi	Fv	180 psi
Fb - Compr	900 psi	Ft	575 psi
Fc - Prll	1350 psi	Density	31.2 pcf
Fc - Perp	625 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1600	1600	1600 ksi
Minimum	580	580	

Wood Section Name : **2x4**
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	**1.50**	in
Exact Depth	**3.50**	in
Area	5.250	in^2
Ix	5.359	in^4
Iy	0.9844	in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.50
Cf or Cv for Compression	1.150
Cf or Cv for Tension	1.50
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	Yes

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Lu for X-X Axis buckling : 9 ft, 4.5 ft, K = 1.0
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 16.778 lbs * Dead Load Factor
AXIAL LOADS . . .
Upper Roof: Axial Load at 14.750 ft, D = 0.1920, S = 0.30 k
Stair roof: Axial Load at 9.0 ft, D = 0.050, S = 0.1350 k
BENDING LOADS . . .
Lat. Uniform Load from 9.0-->14.750 ft creating Mx-x, W = 0.0270 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.5883** : 1
Load Combination +D+S+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 14.750 ft
At maximum location values are . . .
Applied Axial 0.6770 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 219.177 psi

PASS Maximum Shear Stress Ratio = **0.04960** : 1
Load Combination +D+0.60W+H
Location of max.above base 14.750 ft
Applied Design Shear 21.427 psi
Allowable Shear 288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction: @ Base	@ Top	Y-Y Axis Reaction: @ Base	@ Top	Axial Reaction: @ Base

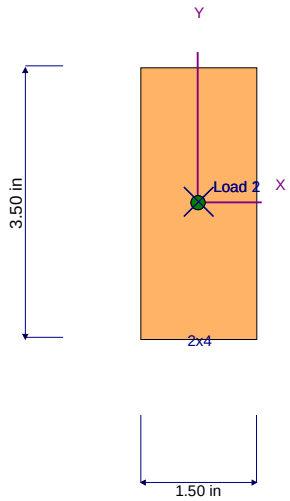
Maximum Deflections for Load Combinations

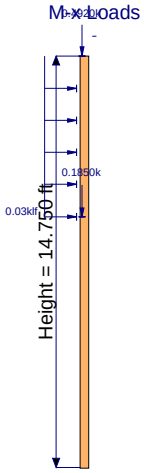
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Wood Column

Description : WW4 check

Sketches





Loads are total entered value. Arrows do not reflect absolute direction.

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121 N 9th St., Suite 401 T. 208.639.4520
Boise, ID 83702

Project	The Grove Townhomes	Job #	A15-094	Page	of
Client	Think Architecture	By	SMB	Date	11/03/16
Subject	EXTERIOR WALL STUD CHECK	Checked		Date	

Wood Stud Wall Design

Structure:
Wall Line: Tall Walls - 2nd Floor

Wall Configuration

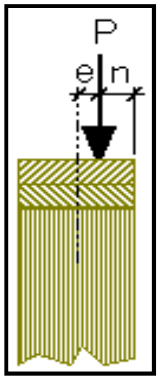
Wall Height (ft): 15.00 wall height is from top of floor below to top of of double top plate above

Stud Size: **2x6** Stud Spacing (in): **16** Stud Species & Grade: **DF-L #2**

Bot. Plate Size: **2x** Bot. Plate Species & Grade: **DF-L #2**

Wall Finish Type: **Brittle** Deflection Limit: **L/240** = .75 in per IBC 1604.3.1

Does Wall Qualify for Bending Stress Increase per NDS 3.1.1 **Yes**



Wall Loading

Axial Load

Dead (plf): 153
Live (plf): 0
Snow (plf): 225

Lateral (Out-of-Plane) Uniform Pressure Load

Wind (psf): 25 ASD
Seismic (psf): 2 Strength Level

Wall Axial Load Eccentricity

n (in): 2.75
e (in): 0.00

Note:
Load location "n" for open web T.J.M. joists is 1" to 1.5".
For normal full plate bearing sawn joist, I joist and gang nail trusses, "n" can be assumed to be d/2.

Stud Properties

b (in):	1.5	E (psi):	1600000	per NDS Table 4A	F_c (psi):	1350	per NDS Table 4A	F_b (psi):	900	per NDS Table 4A
d (in):	5.5	E' (psi):	1600000	= $E*C_M*C_t$	C_F:	1.10	per NDS Table 4A	C_F:	1.30	per NDS Table 4A
A (in^2):	8.3	E_{min} (psi):	580000	per NDS Table 4A	C_P:	L_e (ft): 14.625	stud height	C_M:	1.00	per NDS 4.3.3
S (in^3):	7.6	E'_{min} (psi):	580000	= $E_{min}*C_M*C_t$		L_e/d: 31.91		C_t:	1.00	per NDS 4.3.4
I (in^4):	20.8					F_{cE} (psi): 468	= $0.822*E'_{min}/(L_e/d)^2$			
						c: 0.80	per NDS 3.7.1.5			

Bot. Plate Properties

b (in):	1.5				
$F_{c\perp}$ (psi):	625	per NDS Table 4A	$F'_{c\perp}$ (psi):	781	= $F_{c\perp}*C_M*C_t*C_b$
C_b:	1.25	per NDS 3.10.4	P_{all} (lb):	6445	= F'_c*A

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Boise, ID 83702

Project	The Grove Townhomes	Job #	A15-094	Page	of
Client	Think Architecture	By	SMB	Date	11/03/16
Subject	EXTERIOR WALL STUD CHECK	Checked		Date	

Wood Stud Wall Design

Structure:
Wall Line: Tall Walls - 2nd Floor

Check Wall Axial and Flexural Capacities for Load Cases per IBC 1605.3.1

$f_c = P_{axial}/A$ $M_e = P_{axial}*e$ $f_b = M_{tot}/S$ Interaction = $(f_c/F'_c)^2 + f_b/(F'_b*(1 - (f_c/F_{cE})))$

$C_P = ((1+(F_{cE}/F^*_c))/2c) - (((1+(F_{cE}/F^*_c))/2c)^2 - (F_{cE}/F^*_c)/c)^{1/2}$ $M_{lat} = w*L_e^2/8$ $F'_b = F_b*C_D*C_M*C_t*C_F*C_r$ Deflection = $(0.0642*M_e*L_e^2)/(E*I) + (5*w_{lat}*L_e^4)/(384*E*I)$

$F^*_c = F_c*C_D*C_M*C_t*C_F$ $F'_c = F_c*C_D*C_M*C_t*C_F*C_P$ $M_{tot} = M_e + M_{lat}$

P_{Axial} (lb)	Bot. Plate P_{all} Status	f_c (psi)	C_P	F'_c (psi)	f_c/F'_c	M_e (lb-ft)	M_{lat} (lb-ft)	M_{tot} (lb-ft)	f_b (psi)	F'_b (psi)	Interaction per NDS 3.9.2	Interaction Chk Status	Deflection (in)	Deflection Status	**Wall Status**
Load Case: D + L			**C_D:**	**1.00**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
204	<= Pall: OK	25	0.29	433	0.06	0	0	0	0	1346	0.00	<= 1.0: OK	0.00	OK	**OK**
Load Case: D + S			**C_D:**	**1.15**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
504	<= Pall: OK	61	0.26	438	0.14	0	0	0	0	1547	0.02	<= 1.0: OK	0.00	OK	**OK**
Load Case: D + 0.75(L + S)			**C_D:**	**1.15**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
429	<= Pall: OK	52	0.26	438	0.12	0	0	0	0	1547	0.01	<= 1.0: OK	0.00	OK	**OK**
Load Case: D + 0.6W			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.35**	per IBC 2306.2						
204	<= Pall: OK	25	0.19	447	0.06	0	535	535	848	2527	0.36	<= 1.0: OK	0.72	OK	**OK**
Load Case: D + 0.75(L + S + 0.6W)			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.35**	per IBC 2306.2						
429	<= Pall: OK	52	0.19	447	0.12	0	401	401	636	2527	0.30	<= 1.0: OK	0.54	OK	**OK**
Load Case: D + 0.7E			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
204	<= Pall: OK	25	0.19	447	0.06	0	50	50	79	2153	0.04	<= 1.0: OK	0.06	OK	**OK**
Load Case: D + 0.75(L + S + 0.7E)			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
429	<= Pall: OK	52	0.19	447	0.12	0	37	37	59	2153	0.04	<= 1.0: OK	0.04	OK	**OK**

Wall Status: 2x6 @ 16 in. o.c. is acceptable for the loads given in all of the load cases

AXIOM innovative engineering solutions

121 N 9th St., Suite 401 T. 208.639.4520
Boise, ID 83702

Project	The Grove Townhomes	Job #	A15-094	Page	of
Client	Think Architecture	By	SMB	Date	11/03/16
Subject	EXTERIOR WALL STUD CHECK	Checked		Date	

Wood Stud Wall Design

Structure: 4" walls on main floor
Wall Line:

Wall Configuration

Wall Height (ft): 9.50 wall height is from top of floor below to top of of double top plate above

Stud Size:	2x4	Stud Spacing (in):	16	Stud Species & Grade:	DF-L #2
Bot. Plate Size:	2x	Bot. Plate Species & Grade:	DF-L #2		
Wall Finish Type:	Brittle	Deflection Limit:	L/240	= .48 in	per IBC 1604.3.1
Does Wall Qualify for Bending Stress Increase per NDS 3.1.1			Yes		

Wall Loading

Axial Load

Dead (plf): 341
Live (plf): 310
Snow (plf): 195

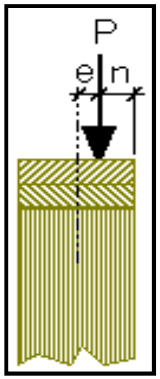
Lateral (Out-of-Plane) Uniform Pressure Load

Wind (psf): 5 ASD
Seismic (psf): 2 Strength Level

Wall Axial Load Eccentricity

n (in): 1.75
e (in): 0.00

Note:
Load location "n" for open web T.J.M. joists is 1" to 1.5".
For normal full plate bearing sawn joist, I joist and gang nail trusses, "n" can be assumed to be d/2.



Stud Properties

b (in):	1.5	E (psi):	1600000	per NDS Table 4A	F_c (psi):	1350	per NDS Table 4A	F_b (psi):	900	per NDS Table 4A
d (in):	3.5	E' (psi):	1600000	= $E*C_M*C_t$	C_F:	1.15	per NDS Table 4A	C_F:	1.50	per NDS Table 4A
A (in^2):	5.3	E_{min} (psi):	580000	per NDS Table 4A	C_P:	L_e (ft): 9.125	stud height	C_M:	1.00	per NDS 4.3.3
S (in^3):	3.1	E'_{min} (psi):	580000	= $E_{min}*C_M*C_t$		L_e/d: 31.29		C_t:	1.00	per NDS 4.3.4
I (in^4):	5.4					F_{cE} (psi): 487	= $0.822*E'_{min}/(L_e/d)^2$			
						c: 0.80	per NDS 3.7.1.5			

Bot. Plate Properties

b (in):	1.5				
$F_{c\perp}$ (psi):	625	per NDS Table 4A	$F'_{c\perp}$ (psi):	781	= $F_{c\perp}*C_M*C_t*C_b$
C_b:	1.25	per NDS 3.10.4	P_{all} (lb):	4102	= F'_c*A

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Wood Stud Wall Design

Structure: 4" walls on main floor
Wall Line:

Check Wall Axial and Flexural Capacities for Load Cases per IBC 1605.3.1

$f_c = P_{axial}/A$ $M_e = P_{axial}*e$ $f_b = M_{tot}/S$ Interaction = $(f_c/F'_c)^2 + f_b/(F'_b*(1 - (f_c/F_{cE})))$

$C_P = ((1+(F_{cE}/F^*_c))/2c) - (((1+(F_{cE}/F^*_c))/2c)^2 - (F_{cE}/F^*_c)/c)^{1/2}$ $M_{lat} = w*L_e^2/8$ $F'_b = F_b*C_D*C_M*C_t*C_F*C_r$ Deflection = $(0.0642*M_e*L_e^2)/(E*I) + (5*w_{lat}*L_e^4)/(384*E*I)$

$F^*_c = F_c*C_D*C_M*C_t*C_F$ $F'_c = F_c*C_D*C_M*C_t*C_F*C_P$ $M_{tot} = M_e + M_{lat}$

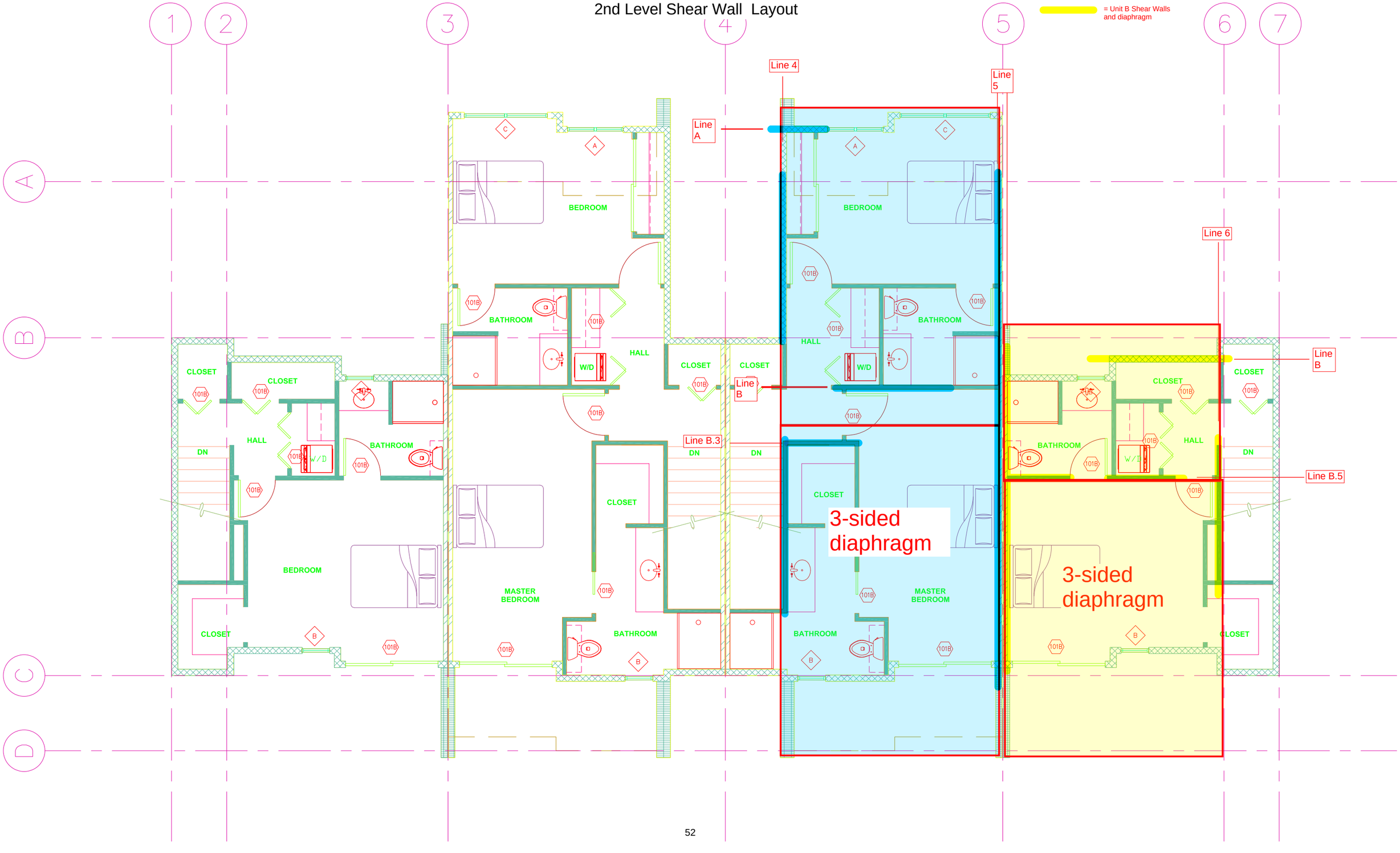
P_{Axial} (lb)	Bot. Plate P_{all} Status	f_c (psi)	C_P	F'_c (psi)	f_c/F'_c	M_e (lb-ft)	M_{lat} (lb-ft)	M_{tot} (lb-ft)	f_b (psi)	F'_b (psi)	Interaction per NDS 3.9.2	Interaction Chk Status	Deflection (in)	Deflection Status	**Wall Status**
Load Case: D + L			**C_D:**	**1.00**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
868	<= Pall: OK	165	0.29	450	0.37	0	0	0	0	1553	0.13	<= 1.0: OK	0.00	OK	**OK**
Load Case: D + S			**C_D:**	**1.15**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
715	<= Pall: OK	136	0.26	456	0.30	0	0	0	0	1785	0.09	<= 1.0: OK	0.00	OK	**OK**
Load Case: D + 0.75(L + S)			**C_D:**	**1.15**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
960	<= Pall: OK	183	0.26	456	0.40	0	0	0	0	1785	0.16	<= 1.0: OK	0.00	OK	**OK**
Load Case: D + 0.6W			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.50**	per IBC 2306.2						
455	<= Pall: OK	87	0.19	466	0.19	0	42	42	163	3240	0.10	<= 1.0: OK	0.08	OK	**OK**
Load Case: D + 0.75(L + S + 0.6W)			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.50**	per IBC 2306.2						
960	<= Pall: OK	183	0.19	466	0.39	0	31	31	122	3240	0.21	<= 1.0: OK	0.06	OK	**OK**
Load Case: D + 0.7E			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
455	<= Pall: OK	87	0.19	466	0.19	0	19	19	76	2484	0.07	<= 1.0: OK	0.03	OK	**OK**
Load Case: D + 0.75(L + S + 0.7E)			**C_D:**	**1.60**	per NDS Table 2.3.2		**C_r:**	**1.15**	per NDS 4.3.9						
960	<= Pall: OK	183	0.19	466	0.39	0	15	15	57	2484	0.19	<= 1.0: OK	0.03	OK	**OK**

Wall Status: 2x4 @ 16 in. o.c. is acceptable for the loads given in all of the load cases

2nd Level Shear Wall Layout

= Unit A Shear Walls and diaphragm

= Unit B Shear Walls and diaphragm



= Unit A Shear Walls and diaphragm

= Unit B Shear Walls and diaphragm

1st Level Shear Wall Layout

1 2 3 4 5 6 7

A B C D

Line 4 Line 5 Line 6

Line A Line A

Line B Line B

Line B.5 Line B.5

cantilevered diaphragm

3-sided diaphragm

3-sided diaphragm

BEDROOM BEDROOM BEDROOM BEDROOM BEDROOM

WH WH WH

HALL HALL HALL

BATHROOM BATHROOM BATHROOM

PANTRY DW DW PANTRY PANTRY DW DW PANTRY DW PANTRY

KITCHEN KITCHEN

UP UP

LIVING ROOM LIVING ROOM LIVING ROOM

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Axiom Innovative Engineering Solutions Design Spreadsheet

These units are all designed with separate diaphragms as there is no penetration at the party walls. See key plan included in calculation package for diaphragm layout.
The loads shown below are all strength level.

Unit A Line Loads

Roof Diaphragm

	Wind		Seismic	
N/S	3080	lbs	668	lbs
E/W	3619	lbs	668	lbs

Line Mark	T_{area} (ft^2)	Force lbs	T_{area} (ft^2)	Force lbs
A	77.0	1694.0	176.0	160.1
B	85.8	1886.5	218.0	176.4
B.3	125.0	2750.0	400.0	331.6
4	84.0	1848.0	496.0	344.1
5	56.0	1232.0	484.0	324.8

Unit A Line Loads

Floor Diaphragm

	Wind		Seismic	
N/S	7810	lbs	1,304	lbs
E/W	8822	lbs	1,304	lbs

Line Mark	T_{area} (ft^2)	Force lbs	T_{area} (ft^2)	Force lbs
A	80.6	2580.9	165.0	272.3
B	0.0	1886.5	350.0	414.3
B.5	64.5	4169.0	272.0	516.5
4	123.6	4567.8	415.0	537.0
5	77.9	2946.6	350.0	768.0

Unit B Line Loads

Roof Diaphragm

	Wind		Seismic	
N/S	3080	lbs	668	lbs
E/W	4774	lbs	668	lbs

Line Mark	T_{area} (ft^2)	Force lbs	T_{area} (ft^2)	Force lbs
B	49.0	1078.0	109.0	134.0
B.5	169.8	3734.5	469.0	535.0
5	56.0	1232.0	249.0	219.0
6	84.0	1848.0	356.0	449.0

Unit B Line Loads

Floor Diaphragm

	Wind		Seismic	
N/S	7810	lbs	1,304	lbs
E/W	12106	lbs	1,304	lbs

Line Mark	T_{area} (ft^2)	Force lbs	T_{area} (ft^2)	Force lbs
A	64.5	1419.0	126.0	85.7
B	118.3	3679.5	171.0	250.3
B.5	261.6	9489.3	382.0	794.7
5	86.0	3124.0	249.0	537.0
6	129.0	4686.0	356.0	768.0

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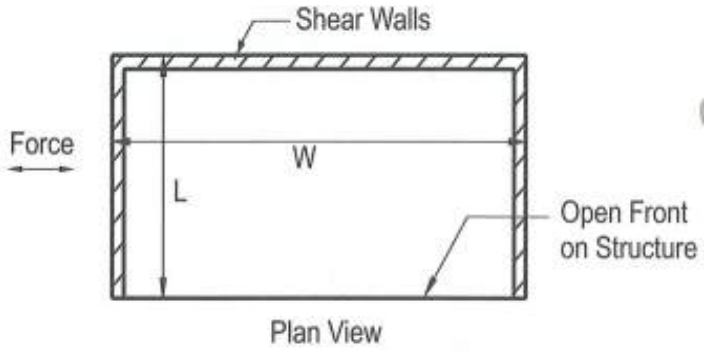
Axiom Innovative Engineering Solutions Design Spreadsheet

Open front diaphragm deflection check



$$\delta_{dia} = \frac{5vL^3}{8EAW} + \frac{0.25vL}{1000G_a} + \frac{\sum(x\Delta_c)}{2W} \qquad (4.2\text{-}1)$$

E=	1400000	PSI	*DF-L STUD
A=	8.25	IN^2	*(1) 2X6
W=	15.167	FT	
L=	19.167	FT	
Ga=	6	KIPS/IN	*NDS TABLE 4.2B
V=	236.50	PLF	*CALC PACKAGE
x=	7.5835	FT	

$$\Delta_c = \frac{2(T \text{ or } C)}{\gamma n}$$

T=C= $wL^2/2$
= 43441.9624 LB

γ= $180000*D^{1.5}$ _B/IN/NAILS *NDS 10.3.6 PG 60
= 10248.6126 _B/IN/NAILS

n= 24 NAILS

Δ_c= 0.3532345 IN

Δ= 0.28 IN < L/400 deflection

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Subject	Shear wall design	Checked		Date	

Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: A
Location: See Attached Plan

Shear Wall Line Loading:

Lateral Loads
Wind (lb): 1,016 ASD Level Seismic (lb): 160 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	3.33	10.00	3.00	DF #2	0.50	x6	Interstory	507								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **3.33**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	MST37 (3700-VARIES)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: A
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	34	0.67	1.00	50	305	40%	218	**218**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	3.33	3.33	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Client Matt Huffield By SMB Date 11/03/16
Subject Shear wall design Checked Date

Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: A
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	336	0	336	3050	0	3050	127	0	0	127	0	0	3176	2414	3176	2414	**3176**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 C_M = 1.00 C_t = 1.00 c = 0.8 C_b = 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-336	-3050	253	253	-2898	-184	-2898	-184	**-2898**	**Wind**	MST37 (3700-VARIES)	**-3387**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,132 ASD Level Seismic (lb): 176 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	7.50	10.00	1.33	DF #2	0.50	x6	Interstory	1140								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **7.50**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	MSTC28 (3455-VARIES)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	16	1.00	1.00	16	151	40%	108	**108**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	7.50	7.50	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Client Matt Huffield By SMB Date 11/03/16
Subject Shear wall design Checked Date

Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: B
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	165	0	165	1509	0	1509	127	0	0	127	0	0	1636	1259	1636	1259	**1636**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 C_M = 1.00 C_t = 1.00 c = 0.8 C_b = 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-165	-1509	570	570	-1167	177	-1167	177	**-1167**	**Wind**	MSTC28 (3455-VARIES)	**-1919**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: B.3
Location: See Attached Plan

Shear Wall Line Loading:

Lateral Loads
Wind (lb): 1,650 ASD Level Seismic (lb): 332 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	5.50	10.00	1.82	DF #2	0.50	x6	Interstory	836								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **5.50**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	MSTC40 (4745-VARIES)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: B.3
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	42	1.00	1.00	42	300	40%	214	**214**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	5.50	5.50	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: B.3
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	422	0	422	3000	0	3000	127	0	0	127	0	0	3127	2377	3127	2377	**3127**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-422	-3000	418	418	-2749	-171	-2749	-171	**-2749**	**Wind**	MSTC40 (4745-VARIES)	**-3285**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: 4
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,109 ASD Level Seismic (lb): 344 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	10.25	10.00	0.98	DF #2	0.50	x6	Interstory	3198								
2	8.00	10.00	1.25	DF #2	0.50	x6	Interstory	2496								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **18.25**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	No Strap
2	SW-6	x6	2	No Strap
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: 4
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	13	1.00	1.00	13	61	40%	43	**43**	**SW-6**	**240**	**OK**	**Wind**
2.00	13	1.00	1.00	13	61	40%	43	**43**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	10.25	10.25	0.00%	**OK**	No		
2.00	8.00	8.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: 4
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	132	0	132	608	0	608	260	0	0	260	0	0	868	716	868	716	**868**	**Wind**
2.00	132	0	132	608	0	608	260	0	0	260	0	0	868	716	868	716	**868**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
2.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-132	-608	1599	1599	352	827	352	827	**352**	**Wind**	No Strap	**0**	**OK**
2.00	-132	-608	1248	1248	141	617	141	617	**141**	**Wind**	No Strap	**0**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Line Loading:

Lateral Loads
Wind (lb): 739 ASD Level Seismic (lb): 484 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	40.00	10.00	0.25	DF #2	0.50	x6	Interstory	9440								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **40.00**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	No Strap
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	8	1.00	1.00	8	18	40%	13	**13**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	40.00	40.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Client Matt Huffield By SMB Date 11/03/16
Subject Shear wall design Checked Date

Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit A
Shear Wall Line: 5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	85	0	85	185	0	185	197	0	0	197	0	0	381	335	381	335	**381**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 C_M = 1.00 C_t = 1.00 c = 0.8 C_b = 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-85	-185	4720	4720	2647	2747	2647	2747	**2647**	**Wind**	No Strap	**0**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: A
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,549 ASD Level Seismic (lb): 272 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	3.25	10.00	3.08	DF #2	0.50	x6	Base	436								
2	5.33	10.00	1.88	DF #2	0.50	x6	Base	715								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **8.58**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	HDU2 (3075DF,2215HF)
2	SW-6	x6	2	HDU2 (3075DF,2215HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: A
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	22	0.65	1.00	34	180	40%	129	**129**	**SW-6**	**240**	**OK**	**Wind**
2.00	22	1.00	1.00	22	180	40%	129	**129**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	3.25	3.25	0.00%	**OK**	No		
2.00	5.33	5.33	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: A
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	222	0	222	1804	0	1804	112	0	0	112	0	0	1916	1465	1916	1465	**1916**	**Wind**
2.00	222	0	222	1804	0	1804	112	0	0	112	0	0	1916	1465	1916	1465	**1916**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{Alt} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
2.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-222	-1804	218	218	-1674	-91	-1674	-91	**-1674**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
2.00	-222	-1804	357	357	-1590	-8	-1590	-8	**-1590**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,132 ASD Level Seismic (lb): 414 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	7.33	10.00	1.36	DF #2	0.50	x6	Base	968								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **7.33**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	HDU2 (3075DF,2215HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	40	1.00	1.00	40	154	40%	110	**110**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	7.33	7.33	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: B
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	396	165	560	1544	1509	3053	110	0	0	110	0	0	3163	2400	3163	2400	**3163**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 C_M = 1.00 C_t = 1.00 c = 0.8 C_b = 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-560	-3053	484	484	-2762	-270	-2762	-270	**-2762**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: B.5
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 2,501 ASD Level Seismic (lb): 517 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	5.00	10.00	2.00	DF #2	0.50	x6	Base	660								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **5.00**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-3	x6	3	HDU8 (3) Studs (7870DF, 5665HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: B.5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	72	1.00	1.00	72	500	40%	357	**357**	**SW-3**	**450**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	5.00	5.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: B.5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	723	165	888	5003	1509	6512	110	0	0	110	0	0	6622	4994	6622	4994	**6622**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	20.82	580000	1100	0.4071	967	7980	625	625	5156	5156	**3**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-888	-6512	330	330	-6314	-690	-6314	-690	**-6314**	**Wind**	HDU8 (3) Studs (7870DF, 5665HF)	**-7870**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: 4
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 2,741 ASD Level Seismic (lb): 537 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	10.25	10.00	0.98	DF #2	0.50	x6	Base	3477								
2	8.00	10.00	1.25	DF #2	0.50	x6	Base	2714								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **18.25**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	HDU2 (3075DF,2215HF)
2	SW-6	x6	2	HDU2 (3075DF,2215HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: 4
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	21	1.00	1.00	21	150	40%	107	**107**	**SW-6**	**240**	**OK**	**Wind**
2.00	21	1.00	1.00	21	150	40%	107	**107**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	10.25	10.25	0.00%	**OK**	No		
2.00	8.00	8.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: 4
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	206	132	338	1502	608	2109	283	0	0	283	0	0	2392	1865	2392	1865	**2392**	**Wind**
2.00	206	132	338	1502	608	2109	283	0	0	283	0	0	2392	1865	2392	1865	**2392**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{Alt} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
2.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-338	-2109	1739	1739	-1066	705	-1066	705	**-1066**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
2.00	-338	-2109	1357	1357	-1295	476	-1295	476	**-1295**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,768 ASD Level Seismic (lb): 768 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	40.00	10.00	0.25	DF #2	0.50	x6	Base	13570								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **40.00**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	No HD
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	13	1.00	1.00	13	44	40%	32	**32**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	40.00	40.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit A
Shear Wall Line: 5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	134	85	219	442	185	627	283	0	0	283	0	0	910	753	910	753	**910**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 C_M = 1.00 C_t = 1.00 c = 0.8 C_b = 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-219	-627	6785	6785	3444	3852	3444	3852	**3444**	**Wind**	No HD	**0**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 647 ASD Level Seismic (lb): 134 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	7.75	10.00	1.29	DF #2	0.50	x6	Interstory	1178								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **7.75**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	CS22 (845)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	12	1.00	1.00	12	83	40%	60	**60**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	7.75	7.75	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: B
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	121	0	121	835	0	835	127	0	0	127	0	0	961	753	961	753	**961**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-121	-835	589	589	-481	232	-481	232	**-481**	**Wind**	CS22 (845)	**-845**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: B.5
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 2,241 ASD Level Seismic (lb): 535 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	4.50	10.00	2.22	DF #2	0.50	x6	Interstory	684								
2	3.33	10.00	3.00	DF #2	0.50	x6	Interstory	506								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **7.83**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	MSTC40 (4745-VARIES)
2	SW-6	x6	2	MSTC40 (4745-VARIES)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: B.5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	48	0.90	1.00	53	286	40%	204	**204**	**SW-6**	**240**	**OK**	**Wind**
2.00	48	0.67	1.00	72	286	40%	204	**204**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	4.50	4.50	0.00%	**OK**	No		
2.00	3.33	3.33	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: B.5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	478	0	478	2862	0	2862	127	0	0	127	0	0	2988	2273	2988	2273	**2988**	**Wind**
2.00	478	0	478	2862	0	2862	127	0	0	127	0	0	2988	2273	2988	2273	**2988**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
2.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-478	-2862	342	342	-2656	-273	-2656	-273	**-2656**	**Wind**	MSTC40 (4745-VARIES)	**-3285**	**OK**
2.00	-478	-2862	253	253	-2710	-326	-2710	-326	**-2710**	**Wind**	MSTC40 (4745-VARIES)	**-3285**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,874 ASD Level Seismic (lb): 537 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	21.00	10.00	0.48	DF #2	0.50	x6	Interstory	4956								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **21.00**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	No Strap
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	18	1.00	1.00	18	89	40%	64	**64**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	21.00	21.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	179	0	179	893	0	893	197	0	0	197	0	0	1089	866	1089	866	**1089**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-179	-893	2478	2478	594	1308	594	1308	**594**	**Wind**	No Strap	**0**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 6
Location: See Attached Plan

Shear Wall Line Loading:

Lateral Loads
Wind (lb): 1,109 ASD Level Seismic (lb): 449 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	9.50	10.00	1.05	DF #2	0.50	x6	Interstory	2242								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **9.50**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	CS22 (845)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 6
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	33	1.00	1.00	33	117	40%	83	**83**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	9.50	9.50	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 6
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	331	0	331	1167	0	1167	197	0	0	197	0	0	1364	1072	1364	1072	**1364**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{Alt} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-331	-1167	1121	1121	-495	342	-495	342	**-495**	**Wind**	CS22 (845)	**-845**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: A
Location: See Attached Plan

Shear Wall Line Loading:

Lateral Loads
Wind (lb): 851 ASD Level Seismic (lb): 86 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	5.33	10.00	1.88	DF #2	0.50	x6	Base	811								
2	3.33	10.00	3.00	DF #2	0.50	x6	Base	506								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **8.66**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	HDU2 (3075DF,2215HF)
2	SW-6	x6	2	HDU2 (3075DF,2215HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: A
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	7	1.00	1.00	7	98	40%	70	**70**	**SW-6**	**240**	**OK**	**Wind**
2.00	7	0.67	1.00	10	98	40%	70	**70**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	5.33	5.33	0.00%	**OK**	No		
2.00	3.33	3.33	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: A
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	69	0	69	983	0	983	127	0	0	127	0	0	1109	864	1109	864	**1109**	**Wind**
2.00	69	0	69	983	0	983	127	0	0	127	0	0	1109	864	1109	864	**1109**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{Alt} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
2.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-69	-983	405	405	-740	174	-740	174	**-740**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
2.00	-69	-983	253	253	-831	83	-831	83	**-831**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 2,208 ASD Level Seismic (lb): 250 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	6.75	10.00	1.48	DF #2	0.50	x6	Base	1026								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **6.75**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	HDU4 (4565DF, 3285HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: B
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	26	1.00	1.00	26	327	40%	234	**234**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-2**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	6.75	6.75	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: B
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	260	121	381	3271	835	4105	127	0	0	127	0	0	4232	3206	4232	3206	**4232**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-381	-4105	513	513	-3797	-73	-3797	-73	**-3797**	**Wind**	HDU4 (4565DF, 3285HF)	**-4565**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: B.5
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 5,694 ASD Level Seismic (lb): 795 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{seg} (ft)	h_{sw} (ft)	h_{sw}/l_{seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	4.50	10.00	2.22	DF #2	0.50	x6	Base	684								
2	3.33	10.00	3.00	DF #2	0.50	x6	Base	506								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{sw} (ft) = **7.83**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-2	x6	5	HDU11 (5) Studs (11175DF, 8045HF)
2	SW-2	x6	5	HDU11 (5) Studs (11175DF, 8045HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: B.5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	71	0.90	1.00	79	727	40%	519	**519**	**SW-2**	**585**	**OK**	**Wind**
2.00	71	0.67	1.00	107	727	40%	519	**519**	**SW-2**	**585**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	4.50	4.50	0.00%	**OK**	No		
2.00	3.33	3.33	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: B.5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	710	478	1189	7271	2862	10133	127	0	0	127	0	0	10260	7727	10260	7727	**10260**	**Wind**
2.00	710	478	1189	7271	2862	10133	127	0	0	127	0	0	10260	7727	10260	7727	**10260**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{Alt} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	20.82	580000	1100	0.4071	967	7980	625	625	5156	5156	**5**
2.00	5.50	1.10	1350	2376	20.82	580000	1100	0.4071	967	7980	625	625	5156	5156	**5**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-1189	-10133	342	342	-9928	-984	-9928	-984	**-9928**	**Wind**	HDU11 (5) Studs (11175DF, 8045HF)	**-11175**	**OK**
2.00	-1189	-10133	253	253	-9981	-1037	-9981	-1037	**-9981**	**Wind**	HDU11 (5) Studs (11175DF, 8045HF)	**-11175**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Subject	Shear wall design	Checked		Date	

Base Floor Wood Shear Wall Design
Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Line Loading:
Lateral Loads
Wind (lb): 1,874 ASD Level Seismic (lb): 537 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	40.00	10.00	0.25	DF #2	0.50	x6	Base	9440								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **40.00**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	No HD
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Subject	Shear wall design	Checked		Date	

Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: 5
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	240	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	350	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	450	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	585	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	700	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	900	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	1170	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	9	1.00	1.00	9	47	40%	33	33	SW-6	240	OK	Wind
						40%			SW-2			
						40%			SW-4			
						40%			SW-4			
						40%			SW-4			
						40%			SW-6			
						40%			SW-6			
						40%			SW-6			
						40%			SW-4			
						40%			SW-6			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	40.00	40.00	0.00%	OK	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 1st Level Unit B
Shear Wall Line: 5
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	94	179	273	469	893	1361	197	0	0	197	0	0	1558	1218	1558	1218	**1558**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 **C_M =** 1.00 **C_t =** 1.00 c = 0.8 **C_b =** 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-273	-1361	4720	4720	1471	2559	1471	2559	**1471**	**Wind**	No HD	**0**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 6
Location: See Attached Plan

Shear Wall Line Loading:

Lateral Loads
Wind (lb): 2,812 ASD Level Seismic (lb): 768 Strength Level House?: Yes

Shear Wall Line Information — **Loads Over Length of the Wall** — **Loads Tributary to End 1** — **Loads Tributary to End 2**

SW Segment Mark	l_{Seg} (ft)	h_{sw} (ft)	h_{SW}/l_{Seg}	Wall Framing Species	Specific Gravity G	Wall Depth	Interstory of Base?	Wall DL (lb) Wall	Wall LL (lb) Wall	Wall SL (lb) Wall	Wall DL (lb) End 1	Wall LL (lb) End 1	Wall SL (lb) End 1	Wall DL (lb) End 2	Wall LL (lb) End 2	Wall SL (lb) End 2
1	10.25	10.00	0.98	DF #2	0.50	x6	Base	2419								
2	8.00	10.00	1.25	DF #2	0.50	x6	Base	1888								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				DF #2		x6	Base	0								
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									
				HF #2			Base									

l_{SW} (ft) = **18.25**

Depth of Floor Framing at Interstory SW Segments (in) = 12.00

Shear Wall Summary

SW Segment Mark	Shear Wall Type	Wall Depth	# of End Studs	Holdown
1	SW-6	x6	2	HDU2 (3075DF,2215HF)
2	SW-6	x6	2	HDU2 (3075DF,2215HF)
			2	
			2	
			2	
			2	
			2	
			2	
			2	
			2	

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 6
Location: See Attached Plan

Shear Wall Schedule — **Shear Wall Factors to Determine Deflection**

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	SW Capacity (plf)	Sheathing Shear Stiffness, Gt (lb/in)	Fastener Slip Struct I Factor	Fastener Slip Denom-inator	Fastener Slip Power	Max Fastener Slip (in)
SW-6	APA Rated, 7/16", 8d Common	6	**240**	34000	1.2	616	3.018	0.053661
SW-4	APA Rated, 7/16", 8d Common	4	**350**	34000	1.2	616	3.018	0.053661
SW-3	APA Rated, 7/16", 8d Common	3	**450**	34000	1.2	616	3.018	0.053661
SW-2	APA Rated, 7/16", 8d Common	2	**585**	34000	1.2	616	3.018	0.053661
2SW-4	APA Rated, 7/16", 8d Common	4	**700**	34000	1.2	616	3.018	0.053661
2SW-3	APA Rated, 7/16", 8d Common	3	**900**	34000	1.2	616	3.018	0.053661
2SW-2	APA Rated, 7/16", 8d Common	2	**1170**	34000	1.2	616	3.018	0.053661

Determine Shear Wall Type

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Species Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Allowable Shear Increase	Adjusted Wind Shear (plf)	Req'd Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.00	29	1.00	1.00	29	154	40%	110	**110**	**SW-6**	**240**	**OK**	**Wind**
2.00	29	1.00	1.00	29	154	40%	110	**110**	**SW-6**	**240**	**OK**	**Wind**
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-4**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-6**			
						40%			**SW-4**			
						40%			**SW-6**			

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Assumed M_{OT} Lever Arm (ft)	Actual M_{OT} Lever Arm (ft)	% Different	Status	Override Lever Arm?	User Input M_{OT} Lever Arm (ft)	% Different
1.00	10.25	10.25	0.00%	**OK**	No		
2.00	8.00	8.00	0.00%	**OK**	No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		
			NA		No		

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Base Floor Wood Shear Wall Design

Per IBC 2012, ASCE 7-10, & NDS 2012

Structure: 2nd Level Unit B
Shear Wall Line: 6
Location: See Attached Plan

Determine Controlling Shear Wall End Axial Compression Load

SW Segment Mark	Seismic Comp. (lb)	Seismic Comp. Above (lb)	Seismic Comp. Total (lb)	Wind Comp. (lb)	Wind Comp. Above (lb)	Wind Comp. Total (lb)	End 1 Dead (lb)	End 1 Live (lb)	End 1 Snow (lb)	End 2 Dead (lb)	End 2 Live (lb)	End 2 Snow (lb)	End 1 Eq. 16-12	End 1 Eq. 16-13	End 2 Eq. 16-12	End 2 Eq. 16-13	Controll-ing Comp. Load (lb)	Controll-ing Lateral Load
1.00	295	331	625	1541	1167	2708	197	0	0	197	0	0	2904	2227	2904	2227	**2904**	**Wind**
2.00	295	0	295	1541	0	1541	197	0	0	197	0	0	1737	1352	1737	1352	**1737**	**Wind**
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													
		0			0													

Determine Number of Shear Wall End Compression Studs

C_D = 1.60 C_M = 1.00 C_t = 1.00 c = 0.8 C_b = 1.00

SW Segment Mark	d (in)	C_F	F_c (psi)	F'_c (psi)	l_e/d	E'_{min} (psi)	F_{cE} (psi)	C_P	F'_c (psi)	P'_c (lb)	$F_{c\perp}$ (psi)	$F'_{c\perp}$ (psi)	$P'_{c\perp}$ (lb)	P_{All} per Stud (lb)	# of End Studs Req'd
1.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
2.00	5.50	1.10	1350	2376	21.00	580000	1081	0.4012	953	7865	625	625	5156	5156	**2**
															2
															2
															2
															2
															2
															2
															2

Determine Controlling Shear Wall End Axial Tension Load and Required Holdown

SW Segment Mark	Seismic Ten. Total (lb)	Wind Ten. Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)	End 1 Eq. 16-14	End 1 Eq. 16-15	End 2 Eq. 16-14	End 2 Eq. 16-15	Controll-ing Ten. Load (lb)	Controll-ing Lateral Load	Holdown	Holdown Capacity (lb)	Status
1.00	-625	-2708	1210	1210	-1982	100	-1982	100	**-1982**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
2.00	-295	-1541	944	944	-974	272	-974	272	**-974**	**Wind**	HDU2 (3075DF,2215HF)	**-3075**	**OK**
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		
											No HD		

Wall Footing

Description : CF18

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL		Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

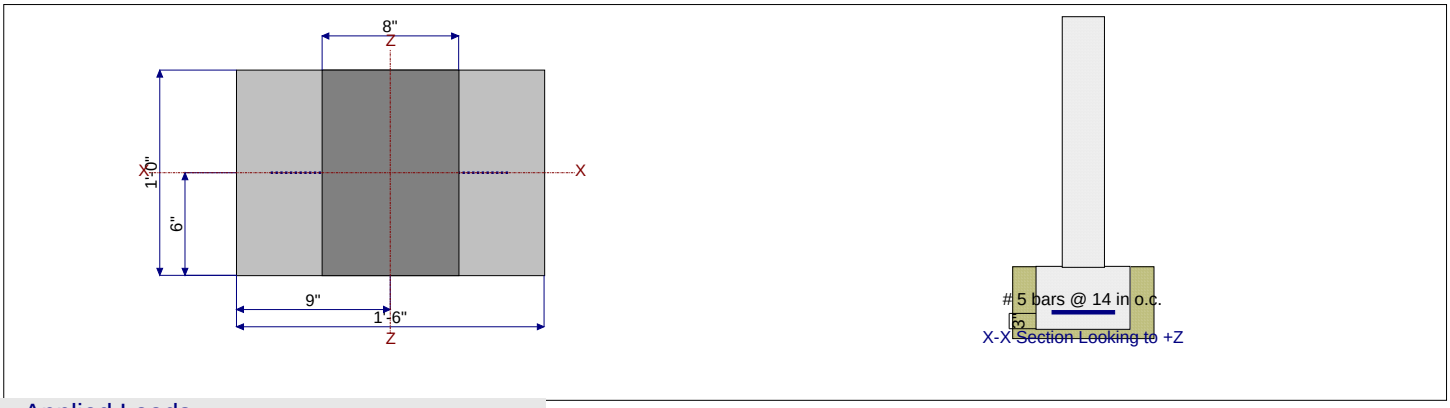
Increases based on footing Width

Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft
Adjusted Allowable Bearing Pressure	=	3.0 ksf

Dimensions

Footing Width	=	1.50 ft	Footing Thickness	=	12.0 in	Bars along X-X Axis	
Wall Thickness	=	8.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 14.00
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 5

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.450		0.440	0.2250				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=	in above top of footing							

Wall Footing

Description : CF18

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
PASS	0.0	Z Flexure (+X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	n/a	1-way Shear (+X)	0.0 psi	0.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio

Overturning Stability

Units k-ft

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

Footing Has NO Overturning

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status

Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combinatic	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mı k-ft	Status

One Way Shear

Units k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Wall Footing

Description : TS24

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL		Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

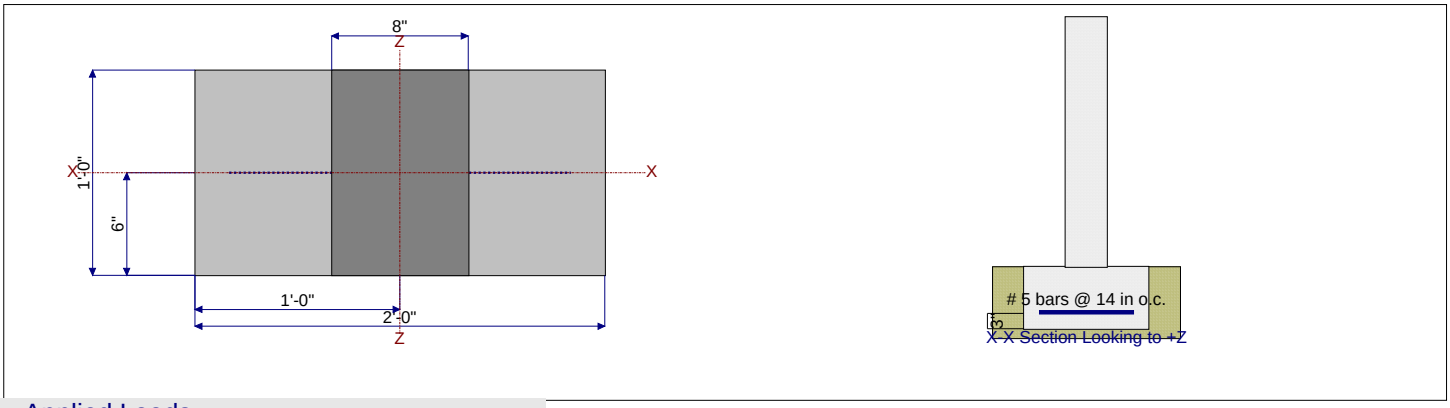
Increases based on footing Width

Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft
Adjusted Allowable Bearing Pressure	=	3.0 ksf

Dimensions

Footing Width	=	2.0 ft	Footing Thickness	=	12.0 in	Bars along X-X Axis	
Wall Thickness	=	8.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 14.00
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 5

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.40		1.080	0.60				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=	in above top of footing							

Wall Footing

Description : TS24

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
PASS	0.0	Z Flexure (+X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	n/a	1-way Shear (+X)	0.0 psi	0.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio

Overturning Stability

Units k-ft

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

Footing Has NO Overturning

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status

Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combinatic	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mı k-ft	Status

One Way Shear

Units k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Wall Footing

Description : TS16

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL		Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

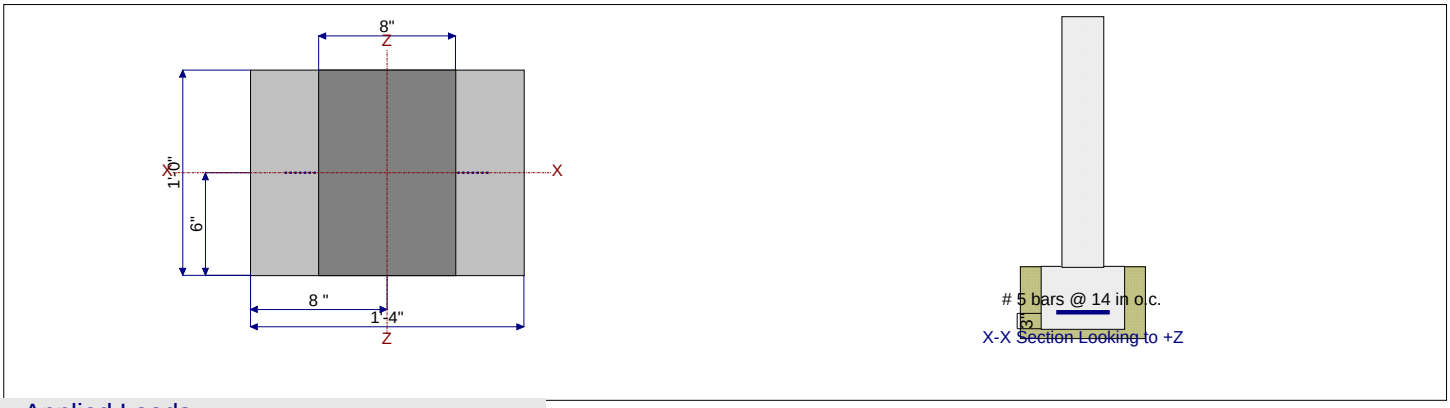
Increases based on footing Width

Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft
Adjusted Allowable Bearing Pressure	=	3.0 ksf

Dimensions

Footing Width	=	1.333 ft	Footing Thickness	=	12.0 in	Bars along X-X Axis	
Wall Thickness	=	8.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 14.00
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 5

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.70		0.50	0.30				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=	in above top of footing							

Wall Footing

Description : TS16

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
PASS	0.0	Z Flexure (+X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	n/a	1-way Shear (+X)	0.0 psi	0.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio

Overturning Stability

Units k-ft

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

Footing Has NO Overturning

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status

Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combinatic	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mı k-ft	Status

One Way Shear

Units k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Concrete Beam

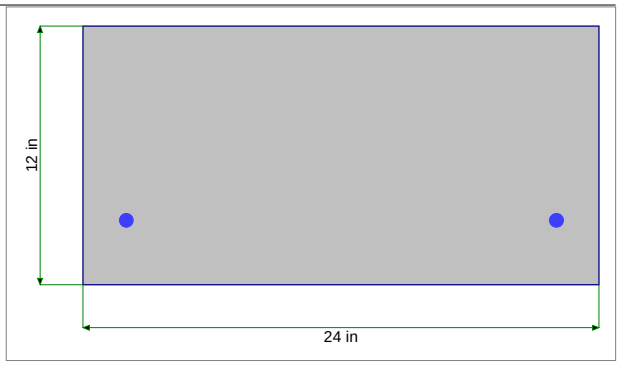
Description : Span check per geotech

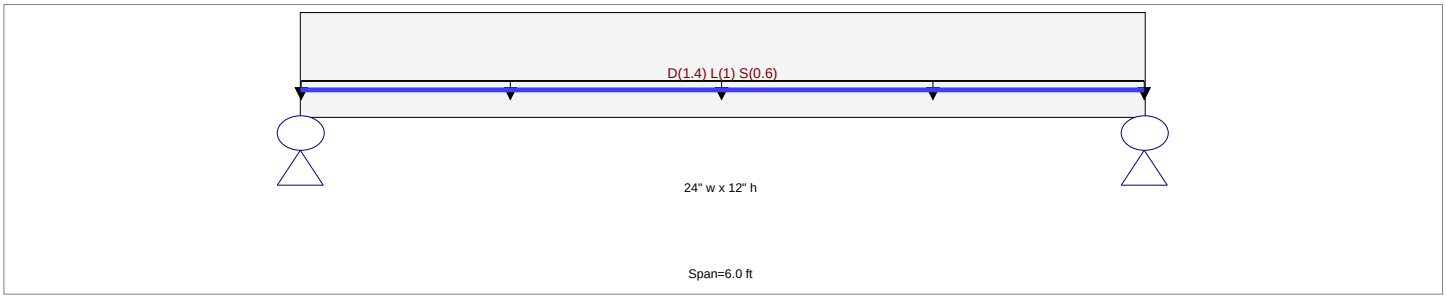
CODE REFERENCES

Calculations per ACI 318-11, IBC 2012, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

f'c	=	3.0 ksi	ϕ Phi Values	Flexure	0.90
fr = f'c$^{1/2}$ 7.50	=	410.792 psi		Shear	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulu	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Reba	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Reba	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 6.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 1.40, L = 1.0, S = 0.60 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.729 : 1	Maximum Deflection			
Section used for this span		Typical Section	Max Downward Transient Deflection	0.003 in	Ratio =	26649 >=360
Mu : Applied		17.676 k-ft	Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Mn * Phi : Allowable		24.262 k-ft	Max Downward Total Deflection	0.008 in	Ratio =	9221 >=180
Location of maximum on span		2.99 ft	Max Upward Total Deflection	0.000 in	Ratio =	999 <180
Span # where maximum occurs		Span #				

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	8.670	8.670
Overall MINimum	1.800	1.800
+D+H	5.070	5.070
+D+L+H	8.070	8.070
+D+Lr+H	5.070	5.070
+D+S+H	6.870	6.870
+D+0.750Lr+0.750L+H	7.320	7.320
+D+0.750L+0.750S+H	8.670	8.670
+D+0.60W+H	5.070	5.070
+D+0.70E+H	5.070	5.070
+D+0.750Lr+0.750L+0.450W+H	7.320	7.320
+D+0.750L+0.750S+0.450W+H	8.670	8.670
+D+0.750L+0.750S+0.5250E+H	8.670	8.670

Concrete Beam

Description : Span check per geotech

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+0.60D+0.60W+0.60H	3.042	3.042
+0.60D+0.70E+0.60H	3.042	3.042
D Only	5.070	5.070
Lr Only		
L Only	3.000	3.000
S Only	1.800	1.800
W Only		
E Only		
H Only		

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Suggest
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.7	11.7	0.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.7	11.7	0.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.7	11.7	0.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.6	11.6	0.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.6	11.6	0.5	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.5	11.5	0.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.5	11.5	0.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.4	11.4	0.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.0	9.0(	11.4	11.4	1.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.4	11.4	1.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.3	11.3	1.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.3	11.3	1.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.2	11.2	1.5	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.2	11.2	1.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.1	11.1	1.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.1	11.1	1.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.1	11.1	2.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.1	9.0(	11.0	11.0	2.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	11.0	11.0	2.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.9	10.9	2.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.9	10.9	2.4	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.8	10.8	2.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.8	10.8	2.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.8	10.8	2.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.7	10.7	2.9	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.7	10.7	3.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.2	9.0(	10.6	10.6	3.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.6	10.6	3.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.5	10.5	3.4	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.5	10.5	3.5	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.5	10.5	3.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.4	10.4	3.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.4	10.4	3.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.3	10.3	3.9	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.3	10.3	4.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.2	10.2	4.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.3	9.0(	10.2	10.2	4.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.4	9.0(	10.2	10.2	4.4	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.4	9.0(	10.1	10.1	4.5	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.4	9.0(	10.1	10.1	4.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.4	9.0(	10.0	10.0	4.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.4	9.0(	10.0	10.0	4.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	0.4	9.0(	9.9	9.9	5.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Suggest
+1.20D+1.60L+0.50S+1.(	1	5.7	9.0(	-10.9	10.9	2.4	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.7	9.0(	-10.9	10.9	2.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.0	11.0	2.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.0	11.0	2.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.1	11.1	2.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.1	11.1	1.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.1	11.1	1.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.2	11.2	1.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.2	11.2	1.5	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.3	11.3	1.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.8	9.0(	-11.3	11.3	1.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.4	11.4	1.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.4	11.4	1.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.4	11.4	0.8	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.5	11.5	0.7	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.5	11.5	0.6	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.6	11.6	0.5	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.6	11.6	0.3	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.7	11.7	0.2	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	5.9	9.0(	-11.7	11.7	0.1	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(
+1.20D+1.60L+0.50S+1.(	1	6.0	9.0(	-11.7	11.7	0.0	1.0(	18.0	PhiVc/2 < Vu <=	H<0.5W, N	18.(	0.(	0.(

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft Mu : Ma	Phi*Mn	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	6.00(	17.(	24.2	0.7
+1.40D+1.60H					
Span # 1	1	6.00(	10.(	24.2	0.4
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	6.00(	16.3	24.2	0.6
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	6.00(	17.(	24.2	0.7
+1.20D+1.60Lr+0.50L+1.60H					
Span # 1	1	6.00(	11.3	24.2	0.4
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	6.00(	9.1	24.2	0.3
+1.20D+0.50L+1.60S+1.60H					
Span # 1	1	6.00(	15.7	24.2	0.6
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	6.00(	13.4	24.2	0.5
+1.20D+0.50Lr+0.50L+W+1.60H					
Span # 1	1	6.00(	11.3	24.2	0.4
+1.20D+0.50L+0.50S+W+1.60H					
Span # 1	1	6.00(	12.7	24.2	0.5
+1.20D+0.50L+0.70S+E+1.60H					
Span # 1	1	6.00(	13.2	24.2	0.5
+0.90D+W+0.90H					
Span # 1	1	6.00(	6.8	24.2	0.2
+0.90D+E+0.90H					
Span # 1	1	6.00(	6.8	24.2	0.2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Def	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.0078	3.000		0.0000	0.000

General Footing

Description : F24

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Beari	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	1.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

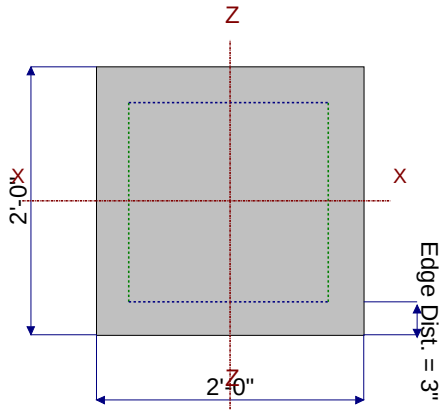
Width parallel to X-X Axis	=	2.0 ft
Length parallel to Z-Z Axis	=	2.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

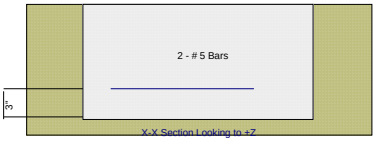


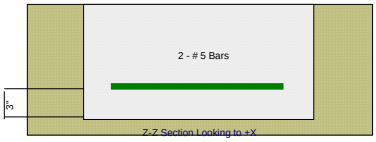
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	4.750		1.450	4.780				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Description : F24

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8427	Soil Bearing	2.52 ksf	3.0 ksf	+D+S+H about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1450	Z Flexure (+X)	1.75 k-ft	12.13 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1450	Z Flexure (-X)	1.75 k-ft	12.13 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1450	X Flexure (+Z)	1.75 k-ft	12.13 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1450	X Flexure (-Z)	1.75 k-ft	12.13 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.09252	1-way Shear (+X)	7.60 psi	82.15 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.1057	1-way Shear (-X)	8.68 psi	82.15 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.09252	1-way Shear (+Z)	7.60 psi	82.15 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.1057	1-way Shear (-Z)	8.68 psi	82.15 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2288	2-way Punching	37.59 psi	164.31 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

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

Overturning Stability

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

All unit k

Sliding Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.831	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.40D+1.60H	0.831	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.00	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.00	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60L+0.50S+1.60H	1.30	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60L+0.50S+1.60H	1.30	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60Lr+0.50L+1.60H	0.803	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60Lr+0.50L+1.60H	0.803	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60Lr+0.50W+1.60	0.712	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60Lr+0.50W+1.60	0.712	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50L+1.60S+1.60H	1.75	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50L+1.60S+1.60H	1.75	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60S+0.50W+1.60H	1.66	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+1.60S+0.50W+1.60H	1.66	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50Lr+0.50L+W+1.	0.803	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50Lr+0.50L+W+1.	0.803	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50L+0.50S+W+1.6	1.10	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50L+0.50S+W+1.6	1.10	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50L+0.70S+E+1.6	1.22	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +1.20D+0.50L+0.70S+E+1.6	1.22	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +0.90D+W+0.90H	0.534	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +0.90D+W+0.90H	0.534	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +0.90D+E+0.90H	0.534	+Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok
X-X, +0.90D+E+0.90H	0.534	-Z	Bottom	0.259	Min Temp %	0.31	12.13	Ok

Description : F24

Z-Z, +1.40D+1.60H	0.831	-X	Bottom	0.259	Min Temp %	0.31(	12.13	Ok
Z-Z, +1.40D+1.60H	0.831	+X	Bottom	0.259	Min Temp %	0.31(	12.13	Ok
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.00:	-X	Bottom	0.259	Min Temp %	0.31(	12.13	Ok

General Footing

Description : F24

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.00	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.30	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.30	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	0.803	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	0.803	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60Lr+0.50W+1.60I	0.712	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60Lr+0.50W+1.60I	0.712	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50L+1.60S+1.60H	1.75	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50L+1.60S+1.60H	1.75	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.66	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.66	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50Lr+0.50L+W+1.(	0.803	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50Lr+0.50L+W+1.(	0.803	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50L+0.50S+W+1.6	1.10	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50L+0.50S+W+1.6	1.10	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50L+0.70S+E+1.6(	1.22	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +1.20D+0.50L+0.70S+E+1.6(	1.22	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +0.90D+W+0.90H	0.534	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +0.90D+W+0.90H	0.534	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +0.90D+E+0.90H	0.534	-X	Bottom	0.259	Min Temp %	0.31	12.13	Ok
Z-Z, +0.90D+E+0.90H	0.534	+X	Bottom	0.259	Min Temp %	0.31	12.13	Ok

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	4.10 psi	3.59 psi	4.10 psi	3.59 psi	4.10 psi	82.15 psi	0.0499	Ok
+1.20D+0.50Lr+1.60L+1.60H	4.95 psi	4.33 psi	4.95 psi	4.33 psi	4.95 psi	82.15 psi	0.0602	Ok
+1.20D+1.60L+0.50S+1.60H	6.42 psi	5.62 psi	6.42 psi	5.62 psi	6.42 psi	82.15 psi	0.0782	Ok
+1.20D+1.60Lr+0.50L+1.60H	3.96 psi	3.47 psi	3.96 psi	3.47 psi	3.96 psi	82.15 psi	0.0482	Ok
+1.20D+1.60Lr+0.50W+1.60H	3.51 psi	3.07 psi	3.51 psi	3.07 psi	3.51 psi	82.15 psi	0.0428	Ok
+1.20D+0.50L+1.60S+1.60H	8.68 psi	7.60 psi	8.68 psi	7.60 psi	8.68 psi	82.15 psi	0.105	Ok
+1.20D+1.60S+0.50W+1.60H	8.24 psi	7.22 psi	8.24 psi	7.22 psi	8.24 psi	82.15 psi	0.100	Ok
+1.20D+0.50Lr+0.50L+W+1.60H	3.96 psi	3.47 psi	3.96 psi	3.47 psi	3.96 psi	82.15 psi	0.0482	Ok
+1.20D+0.50L+0.50S+W+1.60H	5.44 psi	4.76 psi	5.44 psi	4.76 psi	5.44 psi	82.15 psi	0.0662	Ok
+1.20D+0.50L+0.70S+E+1.60H	6.03 psi	5.27 psi	6.03 psi	5.27 psi	6.03 psi	82.15 psi	0.0734	Ok
+0.90D+W+0.90H	2.63 psi	2.30 psi	2.63 psi	2.30 psi	2.63 psi	82.15 psi	0.0321	Ok
+0.90D+E+0.90H	2.63 psi	2.30 psi	2.63 psi	2.30 psi	2.63 psi	82.15 psi	0.0321	Ok

Punching Shear

All unit k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	17.76 psi	164.31psi	0.108	OK
+1.20D+0.50Lr+1.60L+1.60H	21.42 psi	164.31psi	0.130	OK
+1.20D+1.60L+0.50S+1.60H	27.8 psi	164.31psi	0.169	OK
+1.20D+1.60Lr+0.50L+1.60H	17.16 psi	164.31psi	0.104	OK
+1.20D+1.60Lr+0.50W+1.60H	15.22 psi	164.31psi	0.0926	OK
+1.20D+0.50L+1.60S+1.60H	37.59 psi	164.31psi	0.228	OK
+1.20D+1.60S+0.50W+1.60H	35.65 psi	164.31psi	0.21	OK
+1.20D+0.50Lr+0.50L+W+1.60H	17.16 psi	164.31psi	0.104	OK
+1.20D+0.50L+0.50S+W+1.60H	23.54 psi	164.31psi	0.143	OK
+1.20D+0.50L+0.70S+E+1.60H	26.10 psi	164.31psi	0.158	OK
+0.90D+W+0.90H	11.42 psi	164.31psi	0.069	OK
+0.90D+E+0.90H	11.42 psi	164.31psi	0.069	OK