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BARNETT ADDITION 7530 86TH AVE SE, MERCER ISLAND, WA 98040 STRUCTURAL CALCULATIONS

PROJECT NO: 20201 DATE: 12-02-20
PREPARED BY: BASRI BASRI PE, SE



Design Criteria

International Building Code (IBC) 2015
American Society of Civil Engineers (ASCE) 7-10

Project Description

CONSTRUCTION OF NEW SINGLE STORY ADDITION AND ROOF OVER PORCH UTILIZING CONVENTIONAL WOOD FRAMING ON SHALLOW CONCRETE FOUNDATION (ASSUMED SOIL BEARING PRESSURE OF 1500 PSF). THE LATERAL SYSTEM CONSISTS PLYWOOD/OSB SHEARWALLS WITH SIMPSON HOLDOWNS/STRAPS. THE SEISMIC ACCELERATIONS ARE OBTAINED FROM USGS WEBSITE. THE WIND TOPOGRAPHIC FACTOR (K_{zt}) OF 1.6 IS DERIVED FROM CITY OF MERCER ISLAND WIND MAP.
PLEASE SEE ATTACHED CALCULATIONS

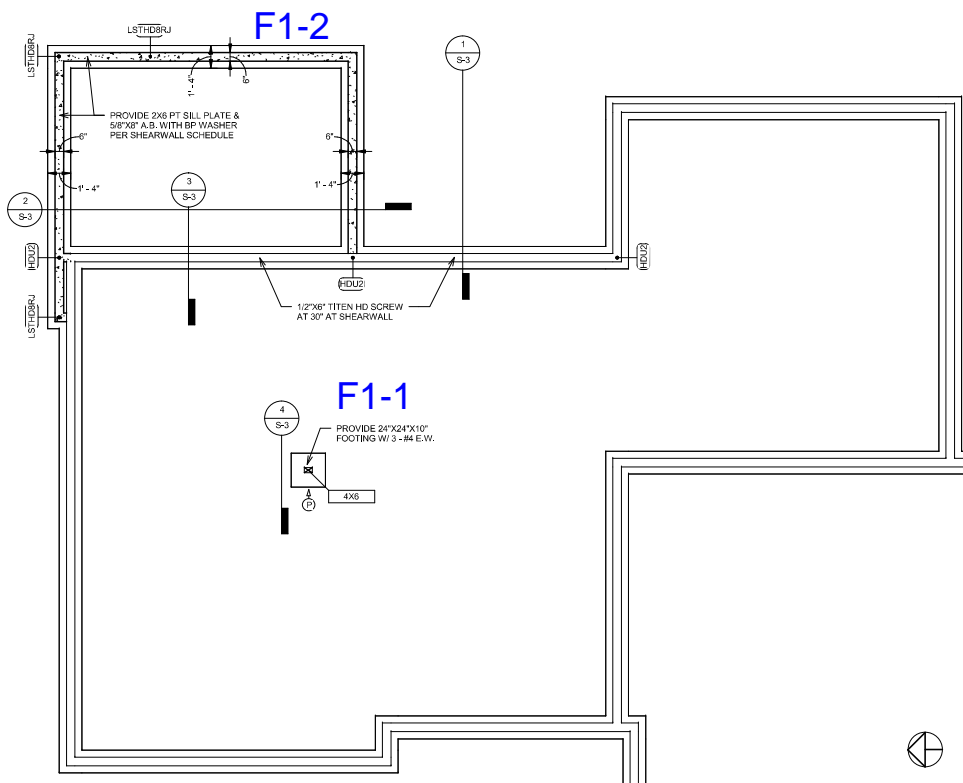
Seismic Criteria

S_s , %g	146
S_1 , %g	50
Risk Category	II
Site Class	D
Ductility Factor, R	6.5
Seismic Performance Category	D

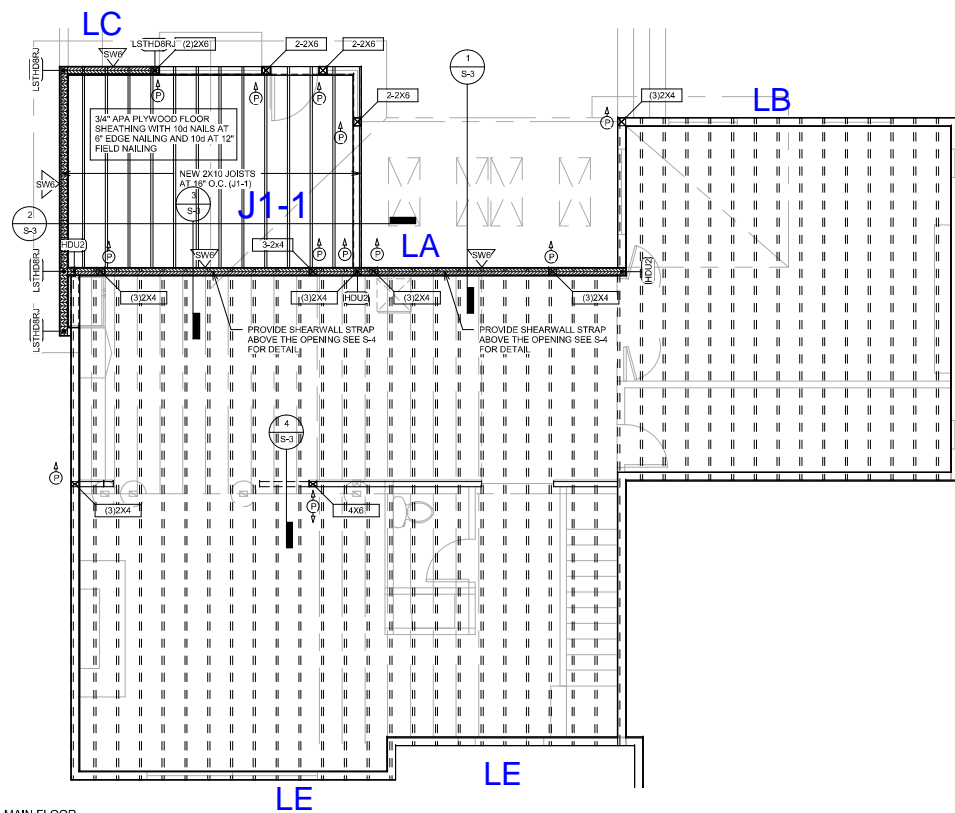
Wind Criteria

Ultimate Wind Speed, mph	110
Building Classifications	II
Wind Exposure Category	B
Topographic Effect, K_{zt}	1.6

**BARNETT ADDITION
STRUCTURAL CALC**

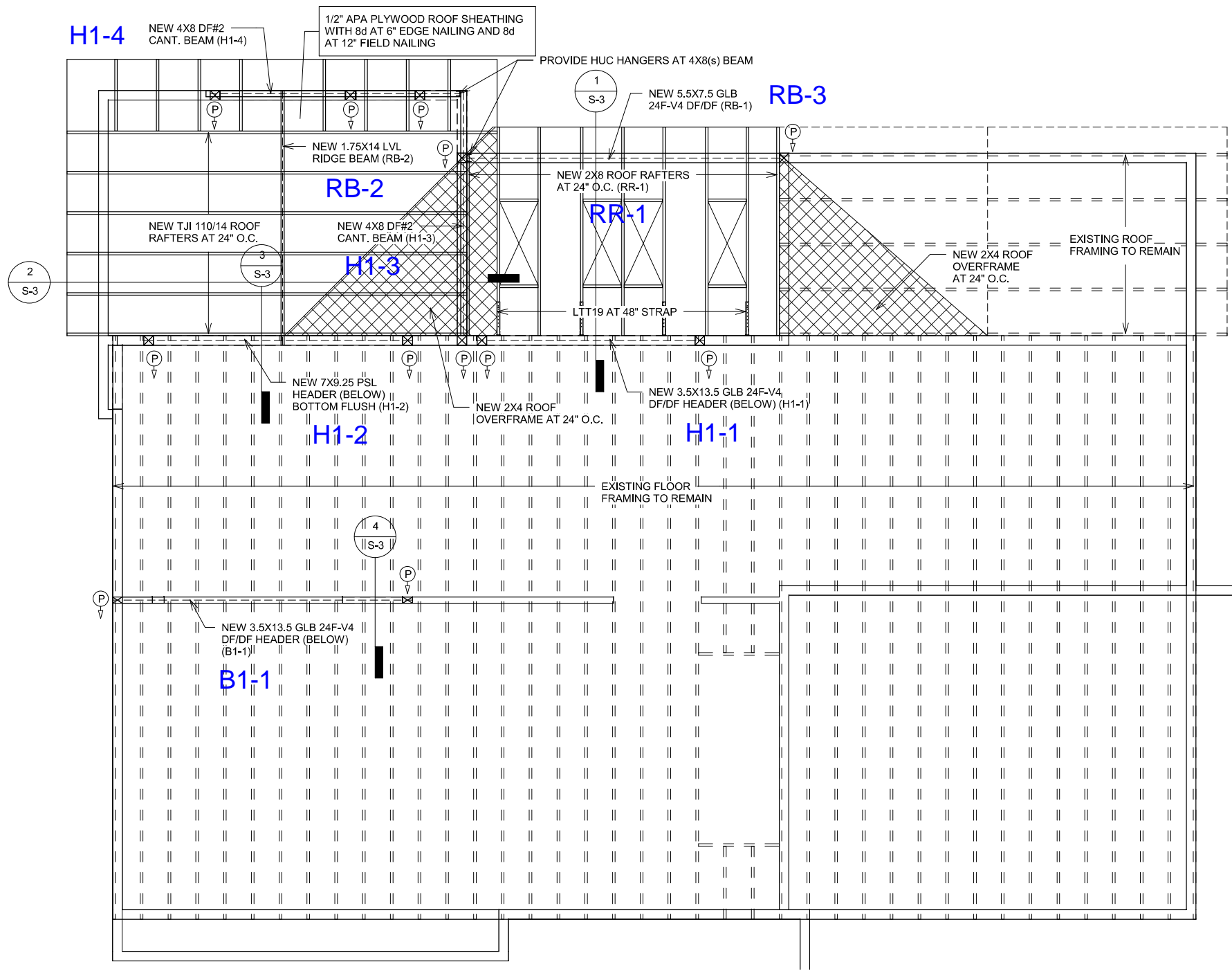


① FOUNDATION
1/4" = 1'-0"



② MAIN FLOOR
1/4" = 1'-0"

NOTES;
 F1-1 DENOTES FOOTING CALLOUT PER CALC
 J1-1, B1-1 DENOTES JOIST AND BEAM CALLOUT PER CALC
 LA, LE DENOTES SHEARWALL CALLOUT PER CALC

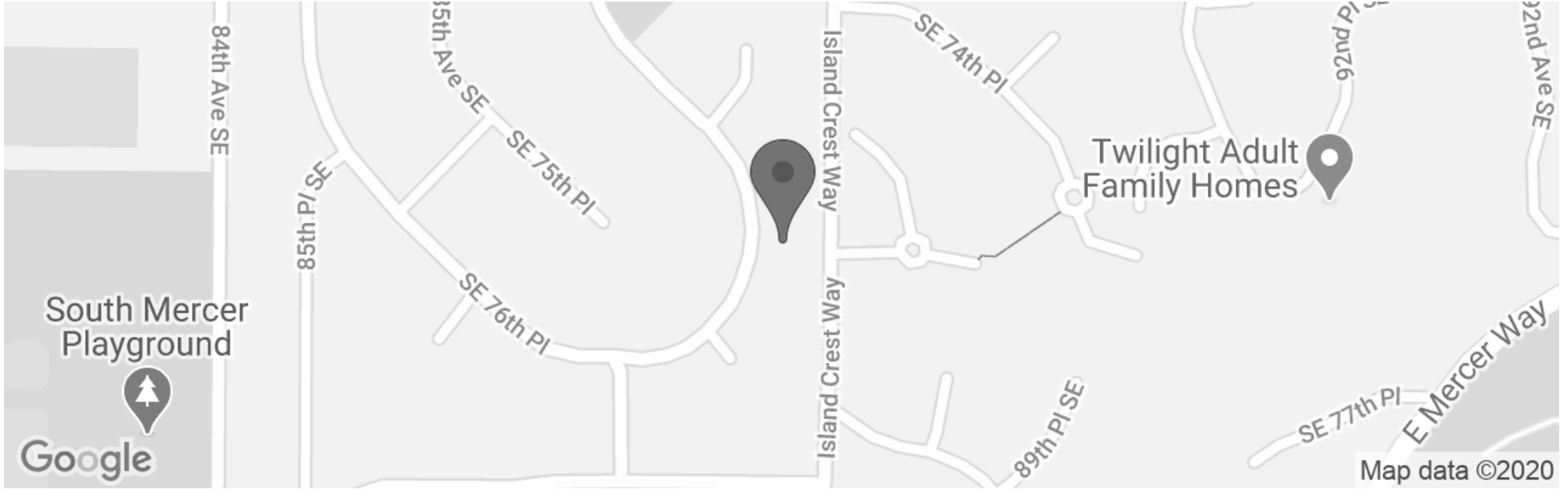


1 UPPER FLOOR
1/4" = 1'-0"



7530 86th Ave SE, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.5348114, -122.2221817



Date	12/9/2020, 9:21:12 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S _S	1.461	MCE _R ground motion. (for 0.2 second period)
S ₁	0.504	MCE _R ground motion. (for 1.0s period)
S _{MS}	1.753	Site-modified spectral acceleration value
S _{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S _{DS}	1.169	Numeric seismic design value at 0.2 second SA
S _{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F _a	1.2	Site amplification factor at 0.2 second
F _v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.625	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.75	Site modified peak ground acceleration
T _L	6	Long-period transition period in seconds

Type	Value	Description
SsRT	1.461	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.619	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	4.306	Factored deterministic acceleration value. (0.2 second)
S1RT	0.504	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.561	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.638	Factored deterministic acceleration value. (1.0 second)
PGAd	1.423	Factored deterministic acceleration value. (Peak Ground Acceleration)
C _{RS}	0.902	Mapped value of the risk coefficient at short periods
C _{R1}	0.898	Mapped value of the risk coefficient at a period of 1 s



DEFLECTIONS		Center
Live Load	0.12	IN L/1112
Dead Load	0.06	in
Total Load	0.18	IN L/741
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/480		

REACTIONS		A	B
Live Load	300 lb	300 lb	
Dead Load	150 lb	150 lb	
Total Load	450 lb	450 lb	
Bearing Length	0.48 in	0.48 in	

SUPPORT LOADS		A	B
Live Load	225 plf	225 plf	
Dead Load	113 plf	113 plf	
Total Load	338 plf	338 plf	

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

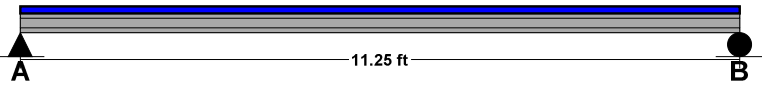
	Base Values	Adjusted
Bending Stress:	Fb = 900 psi	Fb' = 1139 psi
	<i>Cd=1.00 CF=1.10 Cr=1.15</i>	
Shear Stress:	Fv = 180 psi	Fv' = 180 psi
	<i>Cd=1.00</i>	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 625 psi	Fc - ⊥' = 625 psi

Controlling Moment: 1266 ft-lb
5.62 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 450 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	13.34 in ³	21.39 in ³
Area (Shear):	3.75 in ²	13.88 in ²
Moment of Inertia (deflection):	64.06 in ⁴	98.93 in ⁴
Moment:	1266 ft-lb	2029 ft-lb
Shear:	450 lb	1665 lb

LOADING DIAGRAM



JOIST DATA

	Center
Span Length	11.25 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Floor sheathing applied to top of joists-top of joists fully braced.	
Floor Duration Factor	1.00

JOIST LOADING

Uniform Floor Loading	Center
Live Load	LL = 40 psf
Dead Load	DL = 20 psf
Total Load	TL = 60 psf
TL Adj. For Joist Spacing wT	= 80 plf

NOTES

Project: BARNETT ADDITION

Location: RB-1

Roof Beam

[2015 International Building Code(2012 NDS)]

5.5 IN x 7.5 IN x 15.0 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 3.5%

Controlling Factor: Deflection

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DEFLECTIONS		Center
Live Load	0.48	IN L/373
Dead Load	0.27	in
Total Load	0.76	IN L/238
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/230		

REACTIONS		A	B
Live Load	1106 lb	1106 lb	
Dead Load	627 lb	627 lb	
Total Load	1733 lb	1733 lb	
Bearing Length	0.48 in	0.48 in	

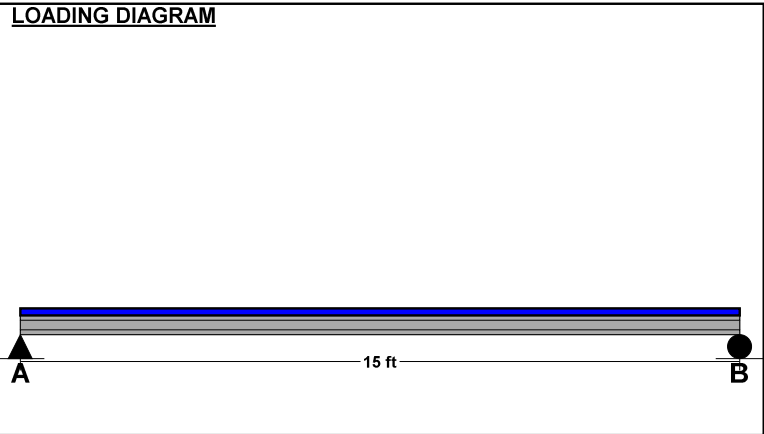
BEAM DATA	
Span Length	15 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Roof Pitch	4 :12
Roof Duration Factor	1.15

MATERIAL PROPERTIES			
24F-V4 - Visually Graded Western Species			
	Base Values	Adjusted	Controlled by:
Bending Stress:	Fb =	2400 psi	
	Fb_cmpr =	1850 psi	Fb' = 2760 psi
	Cd=	1.15	
Shear Stress:	Fv =	265 psi	Fv' = 305 psi
	Cd=	1.15	
Modulus of Elasticity:	E =	1800 ksi	E' = 1800 ksi
Comp. \perp to Grain:	Fc - \perp =	650 psi	Fc - \perp ' = 650 psi

Controlling Moment: 6499 ft-lb
7.5 ft from left support
Created by combining all dead and live loads.

Controlling Shear: -1733 lb
At support.
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	28.26 in ³	51.56 in ³
Area (Shear):	8.53 in ²	41.25 in ²
Moment of Inertia (deflection):	186.81 in ⁴	193.36 in ⁴
Moment:	6499 ft-lb	11859 ft-lb
Shear:	-1733 lb	8381 lb



ROOF LOADING	
Side One:	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	12 psf
Tributary Width: TW =	5.9 ft
Side Two:	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	15 psf
Tributary Width: TW =	0 ft
Wall Load: WALL =	0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS	
Adjusted Beam Length:	Ladj = 15 ft
Beam Self Weight:	BSW = 9 plf
Beam Uniform Live Load:	wL = 148 plf
Beam Uniform Dead Load:	wD_adj = 84 plf
Total Uniform Load:	wT = 231 plf

NOTES

Location: RB-2

Roof Beam

[2015 International Building Code(2012 NDS)]

1.75 IN x 14.0 IN x 11.25 FT

1.5E-2250F - APA EWS LVL Stress Classes

Section Adequate By: 122.0%

Controlling Factor: Shear

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DEFLECTIONS		Center
Live Load	0.13	IN L/1046
Dead Load	0.07	in
Total Load	0.20	IN L/680
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240		

REACTIONS		
	A	B
Live Load	1209 lb	1209 lb
Dead Load	652 lb	652 lb
Total Load	1861 lb	1861 lb
Bearing Length	1.85 in	1.85 in

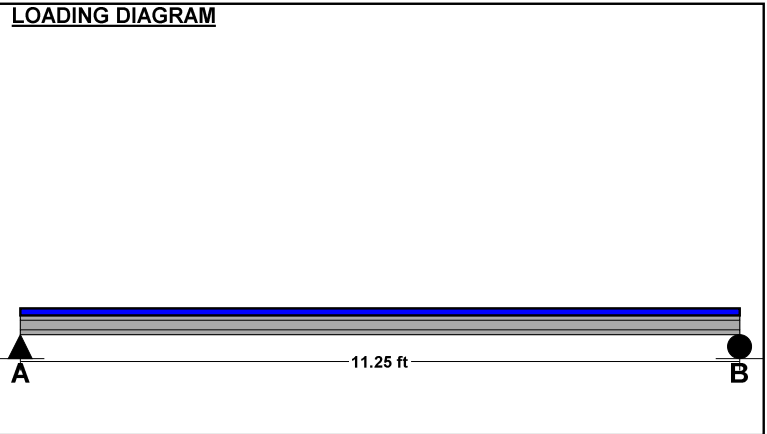
BEAM DATA	
Span Length	11.3 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Roof Pitch	4 :12
Roof Duration Factor	1.15

MATERIAL PROPERTIES			
1.5E-2250F - APA EWS LVL Stress Classes			
	Base Values	Adjusted	
Bending Stress:	Fb = 2250 psi	Fb' = 2538 psi	
	Cd=1.15 CF=0.98		
Shear Stress:	Fv = 220 psi	Fv' = 253 psi	
	Cd=1.15		
Modulus of Elasticity:	E = 1500 ksi	E' = 1500 ksi	
Comp. \perp to Grain:	Fc - \perp = 575 psi	Fc - \perp ' = 575 psi	

Controlling Moment: 5235 ft-lb
5.625 ft from left support
Created by combining all dead and live loads.

Controlling Shear: 1861 lb
At support.
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	24.75 in3	57.17 in3
Area (Shear):	11.04 in2	24.5 in2
Moment of Inertia (deflection):	141.33 in4	400.17 in4
Moment:	5235 ft-lb	12091 ft-lb
Shear:	1861 lb	4132 lb



ROOF LOADING	
Side One:	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	12 psf
Tributary Width: TW =	8.6 ft
Side Two:	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	15 psf
Tributary Width: TW =	0 ft
Wall Load: WALL =	0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS	
Adjusted Beam Length:	Ladj = 11.25 ft
Beam Self Weight:	BSW = 7 plf
Beam Uniform Live Load:	wL = 215 plf
Beam Uniform Dead Load:	wD_adj = 116 plf
Total Uniform Load:	wT = 331 plf

NOTES



DEFLECTIONS		Center
Live Load	0.09	IN L/1406
Dead Load	0.07	in
Total Load	0.15	IN L/789
Live Load Deflection Criteria: L/720 Total Load Deflection Criteria: L/720		

REACTIONS		A	B
Live Load	2704 lb	2704 lb	
Dead Load	2116 lb	2116 lb	
Total Load	4820 lb	4820 lb	
Bearing Length	1.35 in	1.35 in	

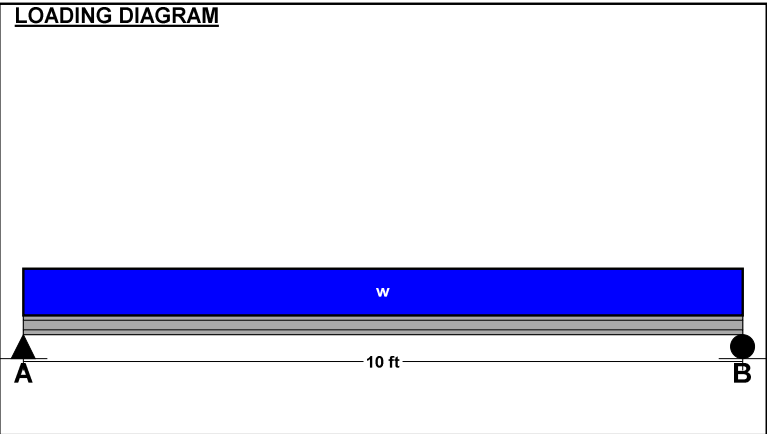
BEAM DATA		Center
Span Length	10	ft
Unbraced Length-Top	0	ft
Roof Pitch	0	:12
Floor Duration Factor	1.00	
Roof Duration Factor	1.15	
Camber Adj. Factor	1.5	
Camber Required	0.1	
Notch Depth	0.00	

MATERIAL PROPERTIES			
24F-V4 - Visually Graded Western Species			
	Base Values	Adjusted	
Bending Stress:	Fb = 2400 psi	Controlled by:	
	Fb _{cmpr} = 1850 psi	Fb' = 2760 psi	
	Cd=1.15		
Shear Stress:	Fv = 265 psi	Fv' = 305 psi	
	Cd=1.15		
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi	
Comp. \perp to Grain:	Fc \perp = 650 psi	Fc \perp ' = 650 psi	

Controlling Moment: 12050 ft-lb
5.0 ft from left support
Created by combining all dead and live loads.

Controlling Shear: 4820 lb
At support.
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	52.39 in ³	132 in ³
Area (Shear):	23.72 in ²	66 in ²
Moment of Inertia (deflection):	722.89 in ⁴	792 in ⁴
Moment:	12050 ft-lb	30360 ft-lb
Shear:	4820 lb	13409 lb



ROOF LOADING			
		Side 1	Side 2
Roof Live Load	RLL =	19 psf	25 psf
Roof Dead Load	RDL =	12 psf	15 psf
Roof Tributary Width	RTW =	18.2 ft	0 ft

FLOOR LOADING			
		Side 1	Side 2
Floor Live Load	FLL =	30 psf	40 psf
Floor Dead Load	FDL =	17 psf	15 psf
Floor Tributary Width	FTW =	6.5 ft	0 ft

Wall Load	WALL =	80 plf
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BEAM LOADING		
Roof Uniform Live Load:	wL-roof =	346 plf
Roof Uniform Dead Load:	wD-roof =	218 plf
Floor Uniform Live Load:	wL-floor =	195 plf
Floor Uniform Dead Load:	wD-floor =	111 plf
Beam Self Weight:	BSW =	14 plf
Combined Uniform Live Load:	wL =	541 plf
Combined Uniform Dead Load:	wD =	423 plf
Combined Uniform Total Load:	wT =	964 plf
Controlling Total Design Load:	wT-cont =	964 plf

NOTES



DEFLECTIONS	Center		Right	
Live Load	0.06	IN L/1590	-0.07	IN 2L/994
Dead Load	0.02	in	0.00	in
Total Load	0.08	IN L/1230	-0.07	IN 2L/972
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360				

REACTIONS	A		B	
Live Load	438	lb	992	lb
Dead Load	189	lb	518	lb
Total Load	627	lb	1510	lb
Bearing Length	0.29	in	0.69	in

BEAM DATA	Center	Right
Span Length	8.25 ft	3 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	8.25 ft	3 ft
Floor Duration Factor	1.15	
Notch Depth	0.00	

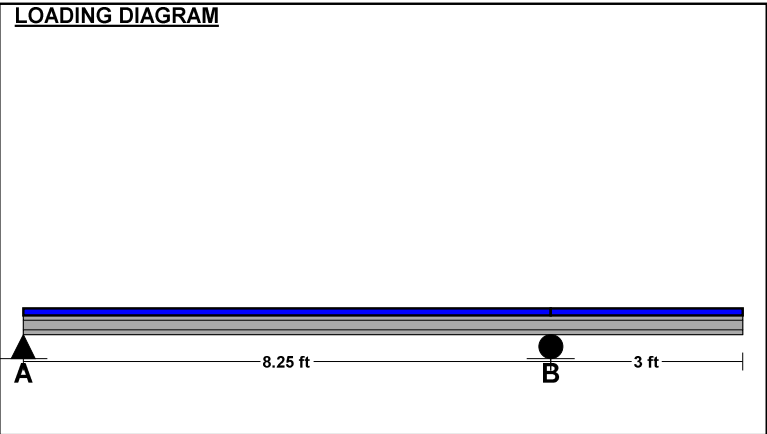
MATERIAL PROPERTIES
#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Bending Stress:	Fb = 900 psi Cd=1.15 CF=1.30	Fb' = 1346 psi
Shear Stress:	Fv = 180 psi Cd=1.15	Fv' = 207 psi
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Comp. \perp to Grain:	Fc - \perp = 625 psi	Fc - \perp ' = 625 psi

Controlling Moment: 1209 ft-lb
3.88 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -800 lb
8.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2, 3

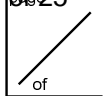
Comparisons with required sections:	Req'd	Provided
Section Modulus:	10.79 in ³	30.66 in ³
Area (Shear):	5.8 in ²	25.38 in ²
Moment of Inertia (deflection):	53.69 in ⁴	111.15 in ⁴
Moment:	1209 ft-lb	3438 ft-lb
Shear:	-800 lb	3502 lb



FLOOR LOADING	Center	Right
Floor Live Load	FLL = 25 psf	25 psf
Floor Dead Load	FDL = 12 psf	12 psf
Floor Tributary Width Side One	TW1 = 4.3 ft	4.3 ft
Floor Tributary Width Side Two	TW2 = 0 ft	2 ft
Wall Load	WALL = 0 plf	0 plf

BEAM LOADING	Center	Right
Reduced Floor Live Load	25 psf	25 psf
Total Live Load	106 plf	156 plf
Total Dead Load	51 plf	75 plf
Beam Self Weight	6 plf	6 plf
Total Load	163 plf	237 plf

NOTES



DEFLECTIONS		Center
Live Load	0.06	IN L/1179
Dead Load	0.03	in
Total Load	0.09	IN L/763
Live Load Deflection Criteria: L/480		Total Load Deflection Criteria: L/360

REACTIONS		A	B
Live Load	755 lb	755 lb	
Dead Load	415 lb	415 lb	
Total Load	1170 lb	1170 lb	
Bearing Length	0.53 in	0.53 in	

BEAM DATA		Center
Span Length	6	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	6	ft
Floor Duration Factor	1.15	
Notch Depth	0.00	

MATERIAL PROPERTIES

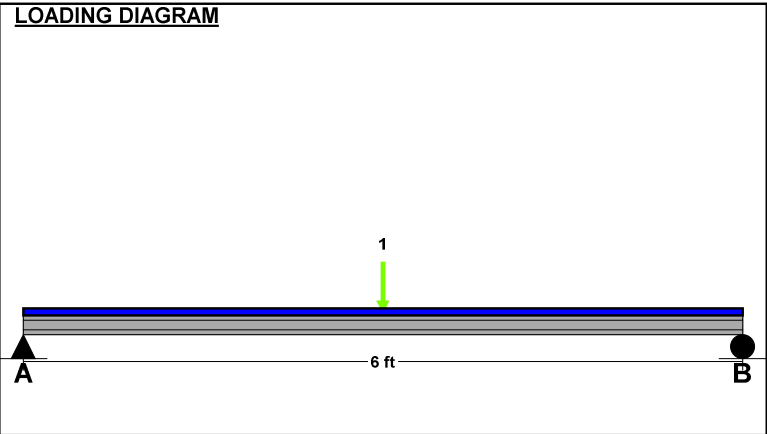
#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Bending Stress:	Fb = 900 psi Cd=1.15 CF=1.30	Fb' = 1346 psi
Shear Stress:	Fv = 180 psi Cd=1.15	Fv' = 207 psi
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 625 psi	Fc - ⊥' = 625 psi

Controlling Moment: 3149 ft-lb
3.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 1169 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	28.09 in ³	30.66 in ³
Area (Shear):	8.47 in ²	25.38 in ²
Moment of Inertia (deflection):	52.46 in ⁴	111.15 in ⁴
Moment:	3149 ft-lb	3438 ft-lb
Shear:	1169 lb	3502 lb



FLOOR LOADING		Center
Floor Live Load	FLL =	25 psf
Floor Dead Load	FDL =	12 psf
Floor Tributary Width Side One	TW1 =	2 ft
Floor Tributary Width Side Two	TW2 =	0 ft
Wall Load	WALL =	0 plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	1209 lb
Dead Load	652 lb
Location	3 ft

BEAM LOADING		Center
Reduced Floor Live Load	25	psf
Total Live Load	50	plf
Total Dead Load	24	plf
Beam Self Weight	6	plf
Total Load	80	plf

NOTES

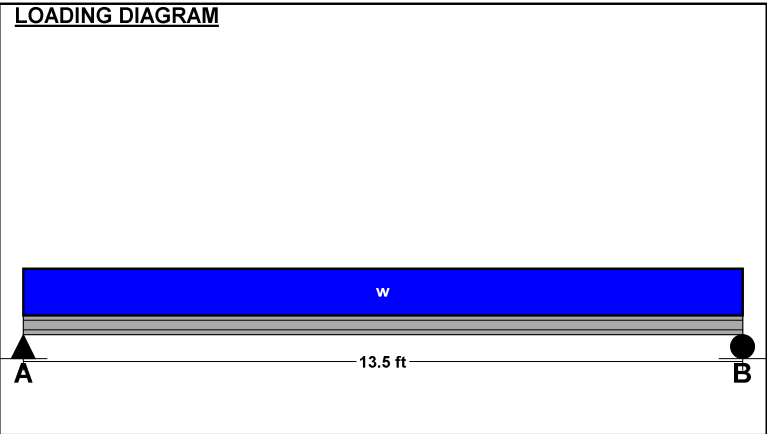


DEFLECTIONS		Center
Live Load	0.32	IN L/509
Dead Load	0.15	in
Total Load	0.47	IN L/348
Live Load Deflection Criteria: L/480		Total Load Deflection Criteria: L/340

REACTIONS		A	B
Live Load	3713 lb	3713 lb	
Dead Load	1714 lb	1714 lb	
Total Load	5427 lb	5427 lb	
Bearing Length	2.39 in	2.39 in	

BEAM DATA		Center
Span Length	13.5	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	13.5	ft
Floor Duration Factor	1.00	
Camber Adj. Factor	1.5	
Camber Required	0.22	
Notch Depth	0.00	

MATERIAL PROPERTIES			
24F-V4 - Visually Graded Western Species			
	<u>Base Values</u>	<u>Adjusted</u>	
Bending Stress:	Fb = 2400 psi	<i>Controlled by:</i>	
	Fb_cmp = 1850 psi	Fb' = 2400 psi	
	Cd=1.00		
Shear Stress:	Fv = 265 psi	Fv' = 265 psi	
	Cd=1.00		
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi	
Comp. \perp to Grain:	Fc \perp = 650 psi	Fc \perp ' = 650 psi	



FLOOR LOADING		Center
Floor Live Load	FLL =	40 psf
Floor Dead Load	FDL =	17 psf
Floor Tributary Width Side One	TW1 =	13.8 ft
Floor Tributary Width Side Two	TW2 =	0 ft
Wall Load	WALL =	10 plf

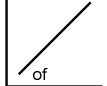
BEAM LOADING		Center
Reduced Floor Live Load	40	psf
Total Live Load	550	plf
Total Dead Load	244	plf
Beam Self Weight	10	plf
Total Load	804	plf

Controlling Moment: 18316 ft-lb
6.75 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -5427 lb
14.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	91.58 in ³	106.31 in ³
Area (Shear):	30.72 in ²	47.25 in ²
Moment of Inertia (deflection):	700.47 in ⁴	717.61 in ⁴
Moment:	18316 ft-lb	21263 ft-lb
Shear:	-5427 lb	8348 lb

NOTES



Footing
[2015 International Building Code(2012 NDS)]
Footing Size: 2.0 FT x 2.0 FT x 10.00 IN
Reinforcement: #4 Bars @ 8.00 IN. O.C. E/W / (3) min.
Section Footing Design Adequate

FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 1500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 40000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 2$ ft
Length: $L = 2$ ft
Depth: $Depth = 10$ in
Effective Depth to Top Layer of Steel: $d = 6.25$ in

COLUMN AND BASEPLATE SIZE

Column Type: Wood
Column Width: $m = 4$ in
Column Depth: $n = 4$ in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 1357$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 1375$ psf
Required Footing Area: $A_{req} = 3.95$ sf
Area Provided: $A = 4.00$ sf

Baseplate Bearing:

Bearing Required: $Bear = 7998$ lb
Allowable Bearing: $Bear-A = 44200$ lb

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 1916$ lb
Allowable Beam Shear: $V_{c1} = 11250$ lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: $B_o = 41$ in
Punching Shear: $V_{u2} = 6539$ lb
Allowable Punching Shear (ACI 11-35): $vc2-a = 57656$ lb
Allowable Punching Shear (ACI 11-36): $vc2-b = 77813$ lb
Allowable Punching Shear (ACI 11-37): $vc2-c = 38438$ lb
Controlling Allowable Punching Shear: $vc2 = 38438$ lb

Bending Calculations:

Factored Moment: $M_u = 23993$ in-lb
Nominal Moment Strength: $M_n = 127575$ in-lb

Reinforcement Calculations:

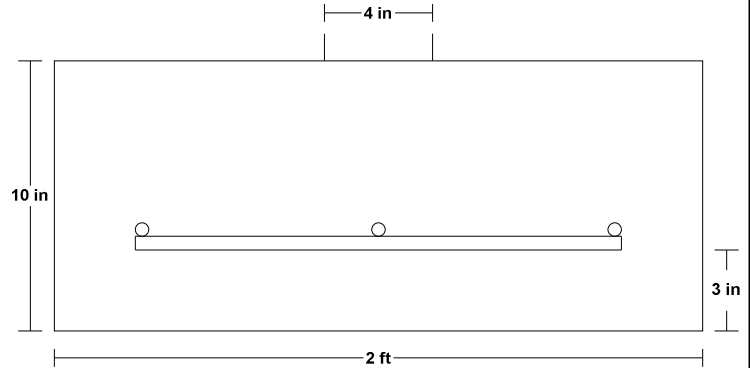
Concrete Compressive Block Depth: $a = 0.46$ in
Steel Required Based on Moment: $A_s(1) = 0.11$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.48$ in²
Controlling Reinforcing Steel: $A_s-reqd = 0.48$ in²
Selected Reinforcement: #4's @ 8.0 in. o.c. e/w (3) Min.
Reinforcement Area Provided: $A_s = 0.59$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 9$ in

Note: Plain concrete adequate for bending, therefore adequate development length not required.

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 3713$ lb
Dead Load: $PD = 1714$ lb
Total Load: $PT = 5427$ lb
Ultimate Factored Load: $P_u = 7998$ lb
Weight to resist uplift w/ 1.5 F.S.: $U.R. = 322$ lb

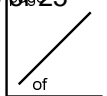
NOTES

Combination Roof And Floor Beam
 [2015 International Building Code(2012 NDS)]
 7.0 IN x 9.25 IN x 12.0 FT
 2.0E Parallam - iLevel Trus Joist
 Section Adequate By: 0.8%
 Controlling Factor: Deflection

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DEFLECTIONS		Center
Live Load	0.29	IN L/504
Dead Load	0.22	in
Total Load	0.51	IN L/282
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/280		

REACTIONS		A	B
Live Load	3393 lb	3393 lb	
Dead Load	2668 lb	2668 lb	
Total Load	6061 lb	6061 lb	
Bearing Length	1.15 in	1.15 in	

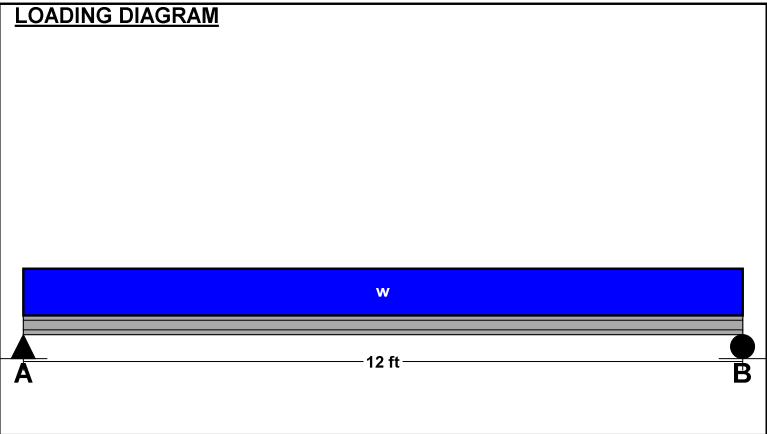
BEAM DATA		Center
Span Length	12	ft
Unbraced Length-Top	0	ft
Roof Pitch	0	:12
Floor Duration Factor	1.00	
Roof Duration Factor	1.15	
Notch Depth	0.00	

MATERIAL PROPERTIES		Base Values	Adjusted
2.0E Parallam - iLevel Trus Joist			
Bending Stress:	Fb =	2900 psi	Fb' = 3433 psi
		<i>Cd=1.15 CF=1.03</i>	
Shear Stress:	Fv =	290 psi	Fv' = 334 psi
		<i>Cd=1.15</i>	
Modulus of Elasticity:	E =	2000 ksi	E' = 2000 ksi
Comp. ⊥ to Grain:	Fc - ⊥ =	750 psi	Fc - ⊥' = 750 psi

Controlling Moment: 18184 ft-lb
 6.0 ft from left support
 Created by combining all dead and live loads.

Controlling Shear: 6061 lb
 At support.
 Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	63.57 in3	99.82 in3
Area (Shear):	27.26 in2	64.75 in2
Moment of Inertia (deflection):	458.17 in4	461.68 in4
Moment:	18184 ft-lb	28556 ft-lb
Shear:	6061 lb	14396 lb



ROOF LOADING		Side 1	Side 2
Roof Live Load	RLL =	19 psf	25 psf
Roof Dead Load	RDL =	12 psf	15 psf
Roof Tributary Width	RTW =	19.5 ft	0 ft

FLOOR LOADING		Side 1	Side 2
Floor Live Load	FLL =	30 psf	40 psf
Floor Dead Load	FDL =	17 psf	15 psf
Floor Tributary Width	FTW =	6.5 ft	0 ft

Wall Load	WALL =	80 plf
-----------	--------	--------

BEAM LOADING			
Roof Uniform Live Load:	wL-roof =	371	plf
Roof Uniform Dead Load:	wD-roof =	234	plf
Floor Uniform Live Load:	wL-floor =	195	plf
Floor Uniform Dead Load:	wD-floor =	111	plf
Beam Self Weight:	BSW =	20	plf
Combined Uniform Live Load:	wL =	566	plf
Combined Uniform Dead Load:	wD =	445	plf
Combined Uniform Total Load:	wT =	1010	plf
Controlling Total Design Load:	wT-cont =	1010	plf

NOTES

Location: **RR-1**

Roof Rafter

[2015 International Building Code(2012 NDS)]

1.5 IN x 7.25 IN x 9.75 FT (8.8 + 1) @ 24 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 119.0%

Controlling Factor: Moment

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<u>DEFLECTIONS</u>	<u>Center</u>	<u>Right</u>
Live Load	0.10 IN L/1151	0.00 IN 2L/12686
Dead Load	0.05 in	0.00 in
Total Load	0.14 IN L/773	0.00 IN 2L/Infinity
Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180		

<u>RAFTER REACTIONS</u>	<u>LOADS</u>	<u>REACTIONS</u>
Upper Live Load @ A	110 plf	219 lb
Upper Dead Load @ A	55 plf	109 lb
Upper Total Load @ A	164 plf	328 lb
Lower Live Load @ B	136 plf	272 lb
Lower Dead Load @ B	69 plf	137 lb
Lower Total Load @ B	205 plf	409 lb

<u>RAFTER SUPPORT DATA</u>	<u>A</u>	<u>B</u>
Bearing Length	0.35 in	0.44 in

<u>RAFTER DATA</u>	<u>Interior</u>	<u>Eave</u>
Span Length	8.75 ft	1 ft
Rafter Pitch	4	:12
Roof sheathing applied to top of joists-top of rafters fully braced.		
Roof Duration Factor	1.15	
Peak Notch Depth	0.00	
Base Notch Depth	0.00	

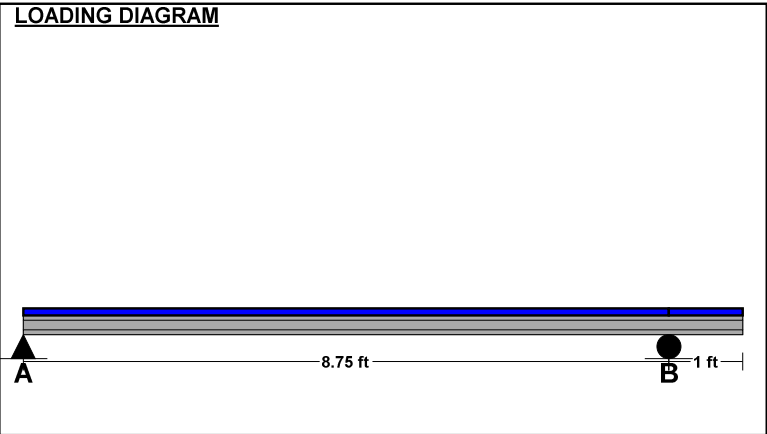
<u>MATERIAL PROPERTIES</u>	<u>Base Values</u>	<u>Adjusted</u>
Bending Stress:	Fb = 900 psi	Fb' = 1428 psi
	Cd=1.15 CF=1.20 Cr=1.15	
Shear Stress:	Fv = 180 psi	Fv' = 207 psi
	Cd=1.15	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 625 psi	Fc - ⊥' = 625 psi

Controlling Moment: 714 ft-lb
4.373 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -317 lb
8.538 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2, 3

<u>Comparisons with required sections:</u>	<u>Req'd</u>	<u>Provided</u>
Section Modulus:	6 in3	13.14 in3
Area (Shear):	2.29 in2	10.88 in2
Moment of Inertia (deflection):	11.1 in4	47.63 in4
Moment:	714 ft-lb	1564 ft-lb
Shear:	-317 lb	1501 lb

NOTES



<u>RAFTER LOADING</u>		
Uniform Roof Loading		
Roof Live Load: LL =		25 psf
Roof Dead Load: DL =		12 psf
Slope Adjusted Spans And Loads		
Interior Span: L-adj =	9.22 ft	
Eave Span: L-Eave-adj =	1.05 ft	
Rafter Live Load: wL-adj =	45 plf	
Eave Live Load: wL-Eave-adj =	45 plf	
Rafter Dead Load: wD-adj =	23 plf	
Rafter Total Load: wT-adj =	68 plf	
Eave Total Load: wT-Eave-adj =	68 plf	

Project: BARNETT ADDITION

Location: H1-1 alt.

Combination Roof And Floor Beam

[2015 International Building Code(2012 NDS)]

3.5 IN x 13.5 IN x 10.0 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 0.2%

Controlling Factor: Deflection

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DEFLECTIONS		Center
Live Load	0.09	IN L/1274
Dead Load	0.07	in
Total Load	0.17	IN L/722
Live Load Deflection Criteria: L/720 Total Load Deflection Criteria: L/720		

REACTIONS		A	B
Live Load	2704 lb	2704 lb	
Dead Load	2071 lb	2071 lb	
Total Load	4775 lb	4775 lb	
Bearing Length	2.10 in	2.10 in	

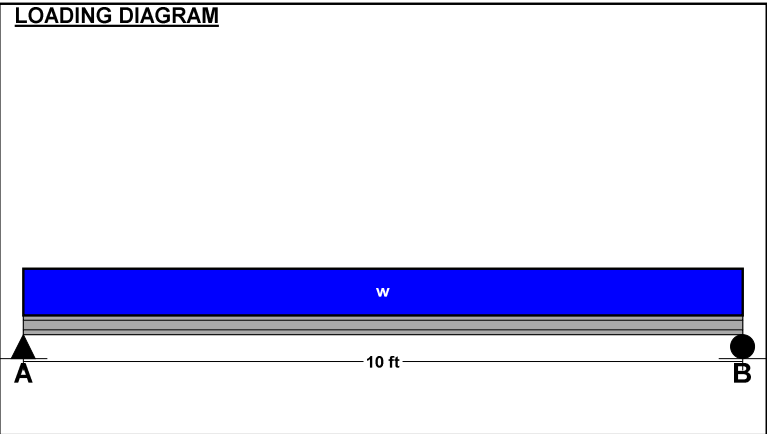
BEAM DATA		Center
Span Length	10	ft
Unbraced Length-Top	0	ft
Roof Pitch	0	:12
Floor Duration Factor	1.00	
Roof Duration Factor	1.15	
Camber Adj. Factor	1.5	
Camber Required	0.11	
Notch Depth	0.00	

MATERIAL PROPERTIES			
24F-V4 - Visually Graded Western Species			
	<u>Base Values</u>	<u>Adjusted</u>	
Bending Stress:	Fb = 2400 psi	<i>Controlled by:</i>	
	Fb _{cmpr} = 1850 psi	Fb' = 2760 psi	
	Cd=1.15		
Shear Stress:	Fv = 265 psi	Fv' = 305 psi	
	Cd=1.15		
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi	
Comp. \perp to Grain:	Fc \perp = 650 psi	Fc \perp ' = 650 psi	

Controlling Moment: 11937 ft-lb
5.0 ft from left support
Created by combining all dead and live loads.

Controlling Shear: 4775 lb
At support.
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	51.9 in3	106.31 in3
Area (Shear):	23.5 in2	47.25 in2
Moment of Inertia (deflection):	716.09 in4	717.61 in4
Moment:	11937 ft-lb	24452 ft-lb
Shear:	4775 lb	9600 lb



ROOF LOADING			
		Side 1	Side 2
Roof Live Load	RLL =	19 psf	25 psf
Roof Dead Load	RDL =	12 psf	15 psf
Roof Tributary Width	RTW =	18.2 ft	0 ft

FLOOR LOADING			
		Side 1	Side 2
Floor Live Load	FLL =	30 psf	40 psf
Floor Dead Load	FDL =	17 psf	15 psf
Floor Tributary Width	FTW =	6.5 ft	0 ft

Wall Load	WALL =	75 plf
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BEAM LOADING	
Roof Uniform Live Load:	wL-roof = 346 plf
Roof Uniform Dead Load:	wD-roof = 218 plf
Floor Uniform Live Load:	wL-floor = 195 plf
Floor Uniform Dead Load:	wD-floor = 111 plf
Beam Self Weight:	BSW = 10 plf
Combined Uniform Live Load:	wL = 541 plf
Combined Uniform Dead Load:	wD = 414 plf
Combined Uniform Total Load:	wT = 955 plf
Controlling Total Design Load:	wT-cont = 955 plf

NOTES

Project: BARNETT ADDITION

Location: F1-2

Footing

[2015 International Building Code(2012 NDS)]

Footing Size: 16.0 IN Wide x 10.0 IN Deep Continuous Footing With 6.0 IN Thick x 30.0 IN Tall Stemwall

LongitudinalReinforcement: (2) Continuous #4 Bars

TransverseReinforcement: #4 Bars @ 10.00 IN. O.C. (unnecessary)

Section Footing Design Adequate

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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 1500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 16$ in
Depth: $Depth = 10$ in
Effective Depth to Top Layer of Steel: $d = 6.25$ in

STEMWALL SIZE

Stemwall Width: 6 in
Stemwall Height: 30 in
Stemwall Weight: 150 pcf

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 433$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 1375$ psf
Width Required: $W_{req} = 0.42$ in²

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 0$ lb
Allowable Beam Shear: $V_{c1} = 5625$ lb

Transverse Direction:

Bending Calculations:

Factored Moment: $M_u = 616$ in-lb
Nominal Moment Strength: $M_n = 0$ in-lb

Reinforcement Calculations:

Concrete Compressive Block Depth: $a = 0.51$ in
Steel Required Based on Moment: $A_s(1) = 0.00$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.22$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.22$ in²
Selected Reinforcement: Trans: #4's @ 10.0 in. o.c.
Reinforcement Area Provided: $A_s = 0.22$ in²

Development Length Calculations:

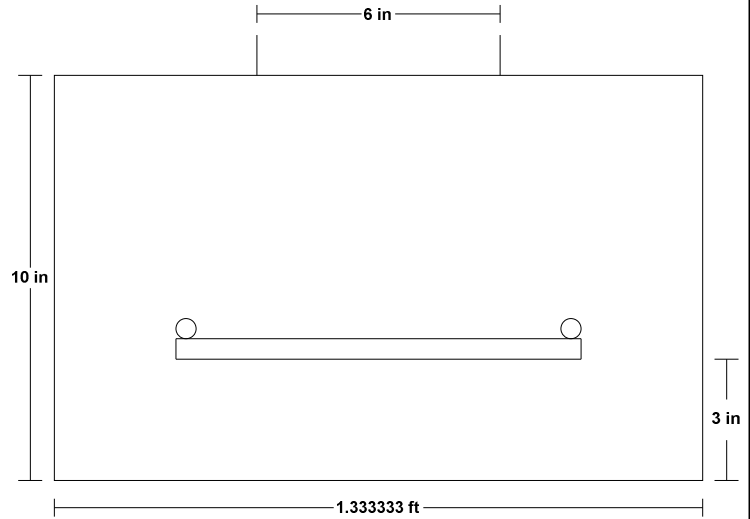
Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 2$ in

Longitudinal Direction:

Reinforcement Calculations:

Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.29$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.29$ in²
Selected Reinforcement: Longitudinal: (2) Cont. #4 Bars
Reinforcement Area Provided: $A_s = 0.39$ in²

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 240$ lb
Dead Load: $PD = 150$ lb
Total Load: $PT = 578$ lb
Ultimate Factored Load: $P_u = 789$ lb

NOTES

Empty box for notes.

SEISMIC BASE SHEAR CALCULATIONS PER IBC 2015 (ASCE 7-10)

Response Spectral Acc. (0.2 sec) $S_s = 148.00\%g = 1.480g$ Figure 22-1 through 22-14
 Response Spectral Acc. (1.0 sec) $S_1 = 50.00\%g = 0.500g$ Figure 22-1 through 22-14

Soil Site Class Table 20-3-1, Default = D

Site Coefficient $F_a = 1.000$ Table 11.4-1
 Site Coefficient $F_v = 1.501$ Table 11.4-2
 Max Considered Earthquake Acc. $S_{MS} = F_a \cdot S_s = 1.480$ (11.4-1)
 Max Considered Earthquake Acc. $S_{M1} = F_v \cdot S_1 = 0.750$ (11.4-2)
 @ 5% Damped Design $S_{DS} = 2/3(S_{MS}) = 0.987$ (11.4-3)
 $S_{D1} = 2/3(S_{M1}) = 0.500$ (11.4-4)

Building Occupancy Categories Table 1-1

Design Category Consideration: with dist. between seismic resisting system >40ft
 Seismic Design Category for 0.1sec Table 11.6-1
 Seismic Design Category for 1.0sec Table 11.6-2
 $S_1 < .75g$ Section 11.6
 Since $T_a < .8T_s$ (see below), SDC = **Control (exception of Section 11.6 does not apply)**

Comply with Seismic Design Category D T-R301.2.2.1.1

12.8 Equivalent lateral force procedure

A. BEARING WALL SYSTEMS T-12.2-

Seismic Force Resisting Systems T-12.2-

$C_t = 0.02$ $x = 0.75$ T-12.8-2

Building ht. $H_n = 20$ ft Limited Building Height (ft) = 65

$C_u = 1.400$ for S_{D1} of 0.500g Table 12.8-1

Approx Fundamental period, $T_a = C_t(h_n)^x = 0.189$ 12.8-7 $T_L = 2.000$ Sec

Calculated T shall not exceed $\leq C_u \cdot T_a$ Use T = sec.

$0.8T_s = 0.8(S_{D1}/S_{DS}) = 0.406$ Control (exception of Section 11.6 does not apply)

Is structure Regular & ≤ 5 stories ? 12.8.1.3

Response Spectral Acc. (0.2 sec) $S_s = 1.480g$ Max $S_s \leq 1.5g$

$F_a = 1.00$
 @ 5% Damped Design $S_{DS} = 2/3(F_a \cdot S_s) = 0.987g$ (11.4-3)

Response Modification Coef. $R = 6.5$ Table-12.2-1

Over Strength Factor $\Omega_o = 2.5$ foot note g

Importance factor $I = 1$ Table 11.5-1

Seismic Base Shear $V = C_s \cdot W$
 $C_s = \frac{S_{DS}}{R/I} = 0.152$ (12.8-2)

or need not to exceed, $C_s = \frac{S_{D1}}{(R/I) \cdot T} = 0.407$ For $T \leq T_L$ (12.8-3)

or $C_s = \frac{S_{D1} \cdot T_L}{T^2 \cdot (R/I)}$ N/A For $T > T_L$ (12.8-4)

C_s shall not be less than = 0.01 (12.8-5)

Min $C_s = 0.5S_1/I/R$ N/A For $S_1 \geq 0.6g$ (12.8-6)

Use $C_s = 0.152$

Design base shear $V = 0.152 W$ Control

WIND FORCES CALCULATIONS PER IBC 2015 (ASCE 7-10)

Ultimate wind speed = 110 MPH
 Bldg. Classification = II
 Exposure B
 $K_{zt} = 1.60$
 Roof Pitch = 4.00 :12
 Mean Roof Height h = 20 ft

CHAPTER 28-MWFRS (ENVELOPE PROCEDURE)

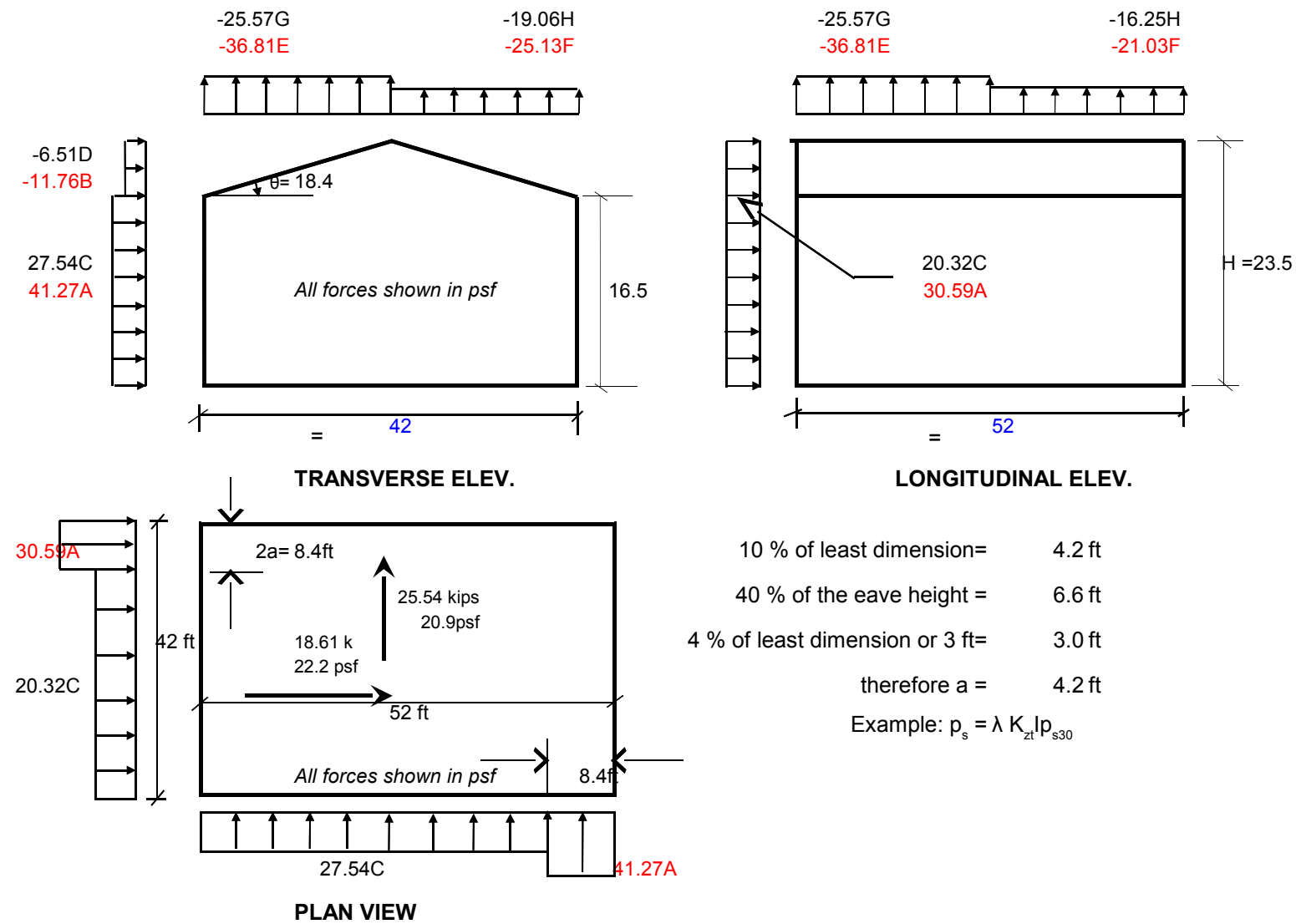


FIGURE 28.4-1, Main Wind Force System

MWFRS

Load Direction	Roof Angle	Horizontal Loads				Vertical Loads					
		End Zone		Interior zone		End Zone		Interior zone		Overhang	
		Wall (A)	Roof (B)	Wall (C)	Roof (D)	WW (E)	LW (F)	WW (G)	LW (H)	E _{OH}	G _{OH}
Transverse	18.4	41.27	-11.76	27.54	-6.51	-36.81	-25.13	-25.57	-19.06	-51.63	-40.39
Longitudinal	All	30.59	-16.01	20.32	-9.56	-36.81	-21.03	-25.57	-16.25	-51.63	-40.39

* If roof pressure under horizontal loads is less than zero, use zero

Plus and minus signs signify pressures acting toward and away from projected surfaces, respectively.

For the design of the longitudinal MWFRS use $\theta = 0^\circ$, and locate the zone E/F, G/H boundary at the mid-length of the building



Job No.	Sheet No.
Project No.	Sheet Title
Checked By	Made By
Date	Date

WIND FORCES:

LOCATION	WIDTH	HEIGHT	INTERIOR PRESSURE	END ZONE PRESSURE		FORCE	SUBTOT
Transverse Direction							
END ZONE WIDTH	8.4	FT					
ROOF							
T.O. Roof to Parapet	52	0.0	-6.51	-11.76	=	0	
T.O. Roof TO MID	52	4.5	27.54	41.27	=	7483	
4th FLOOR							7483
MID TO FLOOR	52		27.54	41.27	=	0	
FLOOR TO MID	52		27.54	41.27	=	0	
3rd FLOOR							0
MID TO FLOOR	52	4.5	27.54	41.27	=	7483	
FLOOR TO MID	52	4.5	27.54	41.27	=	7483	
2nd FLOOR							14966
MID TO FLOOR	52	4.5	27.54	41.27	=	7483	
FLOOR TO MID	52	4.5	27.54	41.27	=	7483	
							14966
TOTAL FOR WALL SHEAR:							<u>37.42</u> Kips

Longitudinal Direction

ROOF							
T.O. Roof to Parapet	42	0.0	20.32	30.59	=	0	
T.O. Roof TO MID	30	4.5	20.32	30.59	=	3520	
4th FLOOR							3520
MID TO FLOOR	42	0.0	20.32	30.59	=	0	
FLOOR TO MID	42	0.0	20.32	30.59	=	0	
3rd FLOOR							0
MID TO FLOOR	30	4.5	20.32	30.59	=	3520	
FLOOR TO MID	30	4.5	20.32	30.59	=	3520	
2nd FLOOR							7040
MID TO FLOOR	30	4.5	20.32	30.59	=	3520	
FLOOR TO MID	42	4.5	20.32	30.59	=	4617	
							8137
TOTAL FOR WALL SHEAR:							<u>18.70</u> Kips



Job No.	Sheet No.
Project No.	Sheet Title
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DEAD LOAD WEIGHTS FOR SEISMIC FORCE CALCULATIONS:

Unit Roof Weight: 12 psf
 Unit Floor Weight: 12 psf
 Unit Exterior Wall Weight : 11 psf
 Unit Interior Corridor Wall Weight: 0 psf
 Unit Interior Party Wall Weight: 0 psf
 Unit Interior Partition Wall Weight: 7 psf

LOCATION	LENGTH	HEIGHT	UNIT WT.	TOTAL WEIGHT	SUB TOTAL
ROOF LEVEL:					
Roof	1620	1.00	12	= 19440	
Ext. Wall Below	168	4.5	11	= 8316	psf
Corridor Wall Below	0	4.5	0	= 0	18
Party Wall Below	0	4.5	0	= 0	
Partition Wall Below	40	4.5	7	= 1260	
					29016
FOURTH FLOOR LEVEL					
Floor	0	1	12	= 0	
Ext. Wall Above	0	0	11	= 0	
Corridor Wall Above	0	0	0	= 0	
Party Wall Above	0	0	0	= 0	
Partition Wall Above	0	0	7	= 0	
Ext. Wall Below	0	0	11	= 0	psf
Corridor Wall Below	0	0	0	= 0	#DIV/0!
Party Wall Below	0	0	0	= 0	
Partition Wall Below	0	0	7	= 0	
					0
THIRD FLOOR LEVEL					
Floor	1620	1	12	= 19440	
Ext. Wall Above	168	4.5	11	= 8316	
Corridor Wall Above	0	0	0	= 0	
Party Wall Above	0	0	0	= 0	
Partition Wall Above	40	4.5	7	= 1260	
Ext. Wall Below	168	4.5	11	= 8316	psf
Corridor Wall Below	0	0	0	= 0	24
Party Wall Below	0	0	0	= 0	
Partition Wall Below	40	4.5	7	= 1260	
					38592
SECOND FLOOR LEVEL					
Floor	2000	1	12	= 24000	
Ext. Wall Above	168	4.5	11	= 8316	
Corridor Wall Above	0	0.0	0	= 0	
Party Wall Above	0	0.0	0	= 0	
Partition Wall Above	40	4.5	7	= 1260	
Ext. Wall Below	185	4.5	11	= 9158	psf
Corridor Wall Below	0	4.5	0	= 0	22
Party Wall Below	0	4.5	0	= 0	
Partition Wall Below	40	4.5	7	= 1260	
					43994
STRUCTURE WEIGHT FOR SHEAR WALL TOTAL:					111.6 Kips
FOUNDATION LEVEL:					
Ext. Wall Above	0	0.0	11	= 0	
Corridor Wall Above	0	0.0	0	= 0	
Party Wall Above	0	0.0	0	= 0	
Partition Wall Above	0	0.0	7	= 0	
STRUCTURE WEIGHT FOR BASE SHEAR TOTAL:					111.6 Kips



Job No.	Sheet No.
Project No.	Sheet Title
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Date	Date

Vertical Seismic Distribution

Cs = 0.15 W
 W = 111.6 kips
 V = 16.9 kips
 Rho = 1

Important: It is assumed that the R value is the same for both directions

Floor	Story Height Hi (ft)	Total Height Ht (ft)	Story Weight Wi (kips)	Wi*Ht (k-ft)	N/S Direction		E/W Direction		Mot E (kip-ft)
					Story Force Fi (kips)	Story Shear E (kips)	Story Force Fi (kips)	Story Shear E (kips)	
Roof	9.00	27.00	29.0	783	7.1	7.1	7.1	7.1	191.21
Fourth	0.00	18.00	0.0	0	0.0	0.0	0.0	0.0	0
Third	9.00	18.00	38.6	695	6.3	6.3	6.3	6.3	113.03
Second	9.00	9.00	44.0	396	3.6	3.6	3.6	3.6	32.21
Ground	0.00	0.00	0.0	0	0.0	0.0	0.0	0.0	0
			111.6	1874	16.94	16.94	16.94	16.94	336.46

Diaphragm Seismic Distribution

Floor	Story Height Hi (ft)	Total Height Ht (ft)	Story Weight Wi (kips)	Force Distribution Fx (kips)	Calculated Fpx (kips)	Max Fpx (kips)	Min Fpx (kips)	Governing Fpx (kips)	Transverse Fpx (plf)	Longitudinal Fpx (plf)
Roof	9.00	27.00	29.0	7.1	7.1	11.5	5.7	7.1	184	227
Fourth	0.00	18.00	0.0	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
Third	9.00	18.00	38.6	6.3	7.6	15.2	7.6	7.6	198	245
Second	9.00	9.00	44.0	3.6	6.7	17.4	8.7	8.7	182	226
Ground	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			111.6	16.9						

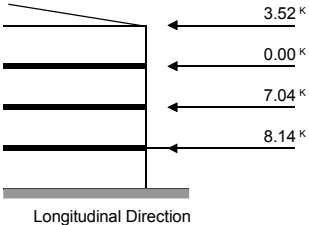
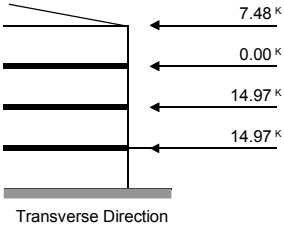
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(425) 296-2993

Job No.	Sheet No.
Project No.	Sheet Title
Checked By	Made By
Date	Date

Lateral Forces Summary

Level	Wind (Trans.) (kips)	Wind (Long.) (kips)	Seismic (Trans.) (kips)	Seismic (Long.) (kips)
Roof	7.48	3.52	7.08	7.08
Fourth	0.00	0.00	0.00	0.00
Third	14.97	7.04	6.28	6.28
Second	14.97	8.14	3.58	3.58
Total	37.42	18.70	16.94	16.94

Controlling:
Transverse - Wind
Longitudinal - Wind



2nd story

Shearwall Forces-Longitudinal Direction

Story shear(kips) = 6.3
 Story height (ft) = 9.0
 Total Width(ft) = 28.0
 Accumulated shear(kips) = 13.36

Story	Wall	Wall D(ft)	Opening Width (ft)	Opening Height (ft)	Opening to Edge (ft)	Plate to Opening (ft)	Sheathing Ratio	Min Panel Width (ft)	Co	Trib.Width (ft)	%Sharing	Story V(kips)	Sum V(kips)	Story DL(klf)	Sum DL(klf)	Panel Shear (plf)	Req. Panel Shear (plf)	Plate Shear (plf)	Sum OTM(k-ft)	RM (k-ft)	Resultant HD(kips)	Force at Window (kips)
2	LA	50.0	0.00	0.00	0.00	0.00	1.00	50.00	1.00	14.00	1.00	3.14	6.68	0.14	0.38	134	134	134	91.98	472.50	-6.67	NA
2	LB	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LC	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LD	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LE	50.0	0.00	0.00	0.00	0.00	1.00	50.00	1.00	14.00	1.00	3.14	6.68	0.14	0.38	134	134	134	91.98	472.50	-6.67	NA
2	LF	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LG	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LH	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LI	0.0	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0.00	NA
2	LJ	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LK	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LL	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LM	0.0	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0.00	NA
2	LN	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LO	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
2	LP	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
Sum		100.0	0.00							28.00	4.00	6.28	13.36									

1st story

Shearwall Forces-Longitudinal Direction

Story shear(kips) = 3.6
 Story height (ft) = 9.0
 Total Width(Ft) = 40.0
 Accumulated shear(kips) = 16.96

Story	Wall	Wall D(ft)	Opening Width (ft)	Opening Height (ft)	Opening to Edge (ft)	Plate to Opening (ft)	Sheathing Ratio	Min Panel Width (ft)	Co	Trib.Width (ft)	%Sharing	Story V(kips)	Sum V(kips)	Story DL(klf)	Sum DL(klf)	Panel Shear (plf)	Req. Panel Shear (plf)	Plate Shear (plf)	Sum OTM(k-ft)	RM (k-ft)	Resultant HD(kips)	Force at Window (kips)
1	LA	33.0	22.00	7.00	3.00	2.00	0.33	3.00	1.00	20.00	0.38	0.68	3.22	0.14	0.51	292	439	97	120.93	279.33	-11.86	2.41
1	LB	20.0	8.00	4.00	3.00	2.00	0.60	3.00	1.00	20.00	0.41	0.74	3.51	0.14	0.14	292	439	175	31.58	27.00	0.61	1.75
1	LC	6.0	0.00	0.00	0.00	0.00	1.00	6.00	1.00	20.00	0.21	0.37	1.75	0.14	0.14	292	292	292	15.79	2.43	2.27	NA
1	LD	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LE	50.0	0.00	0.00	0.00	0.00	1.00	50.00	1.00	20.00	1.00	1.80	8.48	0.14	0.51	170	170	170	168.30	641.25	-8.18	NA
1	LF	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LG	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LH	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LI	0.0	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0.00	NA
1	LJ	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LK	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LL	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LM	0.0	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0.00	NA
1	LN	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LO	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
1	LP	0.0	0.00	0.00	0.00	0.00	#DIV/0!	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.00	#DIV/0!	NA
Sum		109.0	30.00							40.00	4.00	3.60	16.96									

SW6
 HD UPLIFT CS14 STRAP
 USE HDU2
 OR LST4D8
 RJ

SHEARWALL, DIAPHRAGM, STRAP AND HOLDOWN CAPACITY TABLE PER IBC 2012

PLYWOOD SHEATHED SHEARWALL	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
SW6 (15/32" PLYWOOD WITH 10d AT 6" AT EDGE, 10d AT 12" FIELD NAILING)	496 PLF/ 696 PLF	SDPWS TABLE 4.3A
SW4 (15/32" PLYWOOD WITH 10d AT 4" AT EDGE, 10d AT 12" FIELD NAILING)	736 PLF/ 1032 PLF	MULTIPLY VALUES BY TWO IF SHEATHING
SW3 (15/32" PLYWOOD WITH 10d AT 3" AT EDGE, 10d AT 12" FIELD NAILING)	960 PLF/ 1344PLF	APPLIED ON BOTH SIDES
SW2 (15/32" PLYWOOD WITH 10d AT 2" AT EDGE, 10d AT 12" FIELD NAILING)	1232 PLF/ 1724 PLF	
UNBLOCKED FLOOR DIAPHRAGM	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
15/32" PLYWOOD WITH 8d AT 6" AT EDGE, 8d AT 12" FIELD NAILING	368 PLF/ 516 PLF	SPDWS TABLE 4.2B
15/32" PLYWOOD WITH 10d AT 6" AT EDGE, 10d AT 12" FIELD NAILING	408 PLF/ 572 PLF	
19/32" PLYWOOD WITH 10d AT 6" AT EDGE, 10d AT 12" FIELD NAILING	456 PLF/ 640 PLF	
SIMPSON'S FLOOR STRAP	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
CS18	1916 LBS/ 2190 LBS	12" END LENGTH
CS16	2363 LBS/ 2700 LBS	14" END LENGTH
CS14	3487 LBS/ 3985 LBS	20" END LENGTH
CMSTC16	6236 LBS/ 7336 LBS	26" END LENGTH
CMSTC14	9086 LBS/ 10384 LBS	36" END LENGTH
SIMPSON'S HOLDOWN	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
HDU2	4305 LBS/ 4920 LBS	
HDU4	6391 LBS/ 7304 LBS	
HDU5	7905 LBS/ 9032 LBS	
HDU8	8372 LBS/ 9568 LBS	
LSTDH8/ LSTDH8RJ AT 6" STEMWALL	2730 LBS/ 3120 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD10/ STH10RJ AT 6" STEMWALL	3700 LBS/ 4224 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD14/ STHD14RJ AT 6" STEMWALL	5173 LBS/ 5912 LBS	CRACKED CONCRETE (CORNER CONDITION)
LSTDH8/ LSTDH8RJ AT 8" STEMWALL	2730 LBS/ 3120 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD10/ STH10RJ AT AT 8" STEMWALL	4116 LBS/ 4700 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD14/ STHD14RJ AT AT 8" STEMWALL	5340 LBS/ 6100 LBS	CRACKED CONCRETE (CORNER CONDITION)
SIMPSON'S ANCHOR BOLT FOR SHEARWALL HOLDOWNS	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
SSTB16 (5/8" DIAMETER, 12 5/8" MIN. EMBED., 6" STEMWALL)	3570 LBS/ 5776 LBS	2500 PSI MIN. CONCRETE (CORNER CONDITION)
SSTB20 (5/8" DIAMETER, 16 5/8" MIN. EMBED., 6" STEMWALL)	4403 LBS/ 6464 LBS	1 3/4" MIN. EDGE DISTANCE
SB 5/8"X24 (5/8" DIAMETER, 18" MIN. EMBED., 6" STEMWALL)	8022 LBS/ 10680 LBS	
SB 7/8"X24 (7/8" DIAMETER, 18" MIN. EMBED., 8" STEMWALL)	10997 LBS/ 14968 LBS	
SB 1"X30 (1" DIAMETER, 24" MIN. EMBED., 8" STEMWALL)	11640 LBS/ 15848 LBS	