February 04, 2022

STRUCTURAL CALCULATIONS
(Permit Submittal)

HEADRICK RESIDENCE
8822 SE 62nd Street
Mercer Island, WA 98040

Quantum Job Number: 21271.01

Prepared for:
NED NELSON, ARCHITECT
1021 92nd Avenue NE
Bellevue, Washington 98004

Prepared by:
QUANTUM CONSULTING ENGINEERS
1511 Third Avenue, Suite 323
Seattle, WA 98101
TEL 206.957.3900
FAX 206.957.3901

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FAX 206.957.3901

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MERCER ISLAND, WA 98040

QUANTUM JOB NUMBER: 21271.01

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DESIGN CRITERIA

Structural Design Criteria

Building Code: 2018 International Building Code
Building Department: City of Mercer Island

Seismic Criteria

S_s:	1.46	I_e:	1.00
S_1:	0.51	Seismic Soil Site Class:	D
S_{ds}:	1.17	Seismic Design Category:	D
S_{d1}:	0.60		
R:	6.50	Light-Framed Wood Walls Sheathed With Wood Structural Panels	

Wind Criteria

Wind Speed:	110 MPH
Risk Category:	II
Wind Exposure:	B
Kzt:	1.3

Geotechnical Criteria

Allowable Bearing Pressure	3,000 PSF
Minimum Footing Width	Continuous: 18” min., Isolated: 24” min.
Frost Depth	12” min.
Soils Consultant	Geotech Consultants, Inc.
Soils Report Number	#19086
Soils Report Date	March 20, 2019
Active Soil Pressure (Restrained/Unrestrained)	35 PCF + 10H / 35 PCF
Seismic Surcharge Pressure (Restrained)	7H PSF
Passive Soil Pressure	300 PCF
Coefficient of Friction	0.5

Materials Criteria

Concrete (28 Day Strength):

Foundation/Slab on Grade	F'c= 2,500 PSI

Reinforcing Steel:

Grade 60 (#5 bar and larger)	Fy= 60,000 PSI
Grade 40 (#4 bar)	Fy= 40,000 PSI

Wood Framing:

2x, 3x & 4x Framing Members	HF#2 or DF#2
6x Framing Members	DF#1
Glulam Beams	24F-V4 (V8 @ Cont. and Cant. Members)
Parallam Beams	2.0 E PSL
LSL Members - Beams & Headers	1.55 E LSL
LVL Members - Beams & Headers	1.9 E LVL
Wood Sheathing	APA RATED

Residential Building Loads

Snow Load	Roof	25 psf
Live Load	Residential	40 psf
	Residential exterior decks / balconies	60 psf

Assembly Loads

Roof Loads		Comments
Standard Roofing	4.0 psf	
1/2" Plywood Shtg	1.5 psf	
Joists @ 24" o.c.	2.1 psf	
R38 Insulation	1.0 psf	
Lights, ducts	0.5 psf	
5/8" GWB	2.8 psf	
PV Allowance	5.0 psf	INCL W/ MISC
Miscellaneous	1.1 psf	FOR SEISMIC
Total:	**18.0 psf**	SL=25 PSF

Typical Floor Loads		Comments
Flooring	3.0 psf	
1-1/8" Plywood Shtg	3.5 psf	
Floor Joists @ 16" o.c.	2.5 psf	
Lights, ducts	0.5 psf	
5/8" GWB	2.8 psf	
Miscellaneous	2.7 psf	
Total:	**15.0 psf**	LL=40 PSF

Deck Floor Loads		Comments
2x6 Decking	5.0 psf	
Glulam Purlin @ 48" o.c.	4.0 psf	
Lights, ducts	0.5 psf	
Miscellaneous	2.5 psf	
Total:	**12.0 psf**	LL=60 PSF

Deflection Criteria

Roof	Walls			Floor	
Live Load: **L/240**		**L/240**	*flexible finishes	Live Load:	**L/360**
Total Load: **L/240**		**L/240**	*brittle finish	Total Load:	**L/240**
		L/240	*supporting glass		

Hazards by Location

Search Information

Address:	8822 SE 62nd St, Mercer Island, WA 98040, USA
Coordinates:	47.5477214, -122.2203573
Elevation:	311 ft
Timestamp:	2021-12-04T00:57:36.695Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D

Basic Parameters

Name	Value	Description
S_S	1.457	MCE_R ground motion (period=0.2s)
S_1	0.505	MCE_R ground motion (period=1.0s)
S_{MS}	1.457	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.971	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.902	Coefficient of risk (0.2s)
CR_1	0.898	Coefficient of risk (1.0s)
PGA	0.624	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.686	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.457	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.615	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	4.268	Factored deterministic acceleration value (0.2s)
S1RT	0.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.562	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.644	Factored deterministic acceleration value (1.0s)
PGAd	1.422	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

ROOF SNOW LOAD [a] (psf)	WIND DESIGN				SEISMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			OUTDOOR DESIGN TEMP (F) - Heat/Cool	ICE BARRIER UNDERLAYMENT REQUIRED	FLOOD HAZARD[e]	AIR FREZING INDEX	MEAN ANNUAL TEMP
	Speed [b] (mph)	Topographic effects[c]	Special wind region	Windborne debris zone		Weathering[d]	Frost line depth	Termite					
25	110	Yes	No	No	D2	Moderate	12"	Slight to Moderate	83/24	No	N.A.	113	53

MANUAL J DESIGN CRITERIA							
Elevation	**Latitude**	**Winter heating**	**Summer cooling**	**Altitude correction factor**	**Indoor design temperature**	**Design temperature cooling**	**Heating temperature difference**
338 feet	**47°34'39''**	**72°F max**	**75°F min**	**0.99**	**72°F**	**75°F**	**48°F**
Cooling temperature difference	**Wind velocity heating**	**Wind velocity cooling**	**Coincident wet bulb**	**Daily range**	**Winter humidity**	**Summer humidity**	
8°F	**N.A.**	**N.A.**	**66**	**Medium**	**75%**	**68%**	

a. This is the minimum roof snow load. When using this snow load it will be left to the engineer's judgment whether to consider drift or sliding snow. However, rain on snow surcharge of 5 psf must be considered for roof slopes less than 5 degrees.

b. The 110 mph Ultimate Design Wind Speed (3-second gust) as adopted by the 2018 IRC/ASCE 7-10 (or if using the IBC for structural design, the 98 mph Basic Design Wind Speed as adopted by the 2018 IBC/ASCE 7-16 may be used).

c. Wind exposure category and Topographic effects (Wind Speed-up Kzt factor) shall be determined on a site-specific basis by the Engineer of Record (components and cladding need not consider topographic effects unless otherwise determined by the engineer of record).

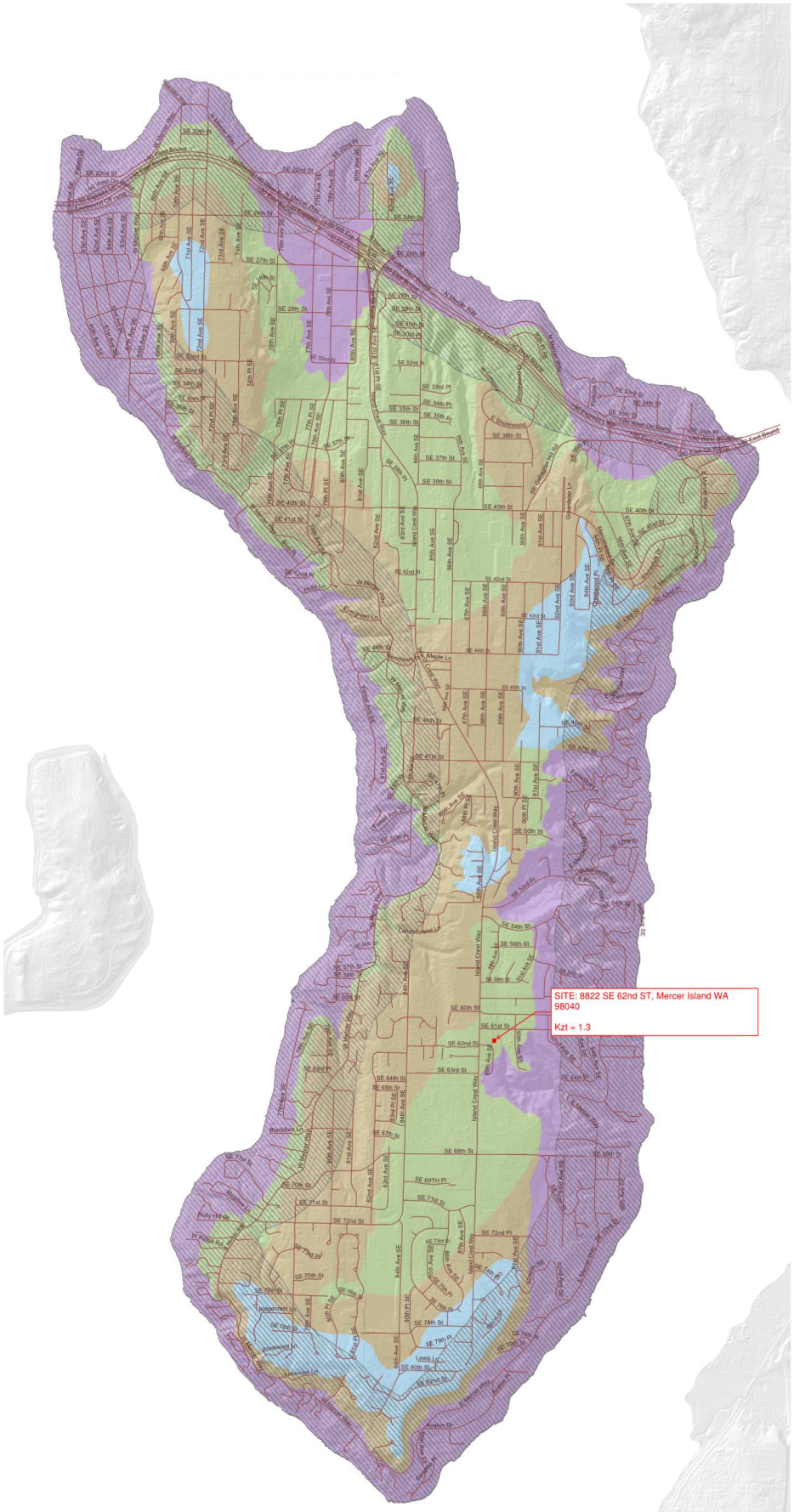
d. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

e. The City of Mercer Island participates in the National Flood Insurance Program (NFIP); Regular Program (No Special Flood Hazard Area). Further NFIP participation information: CID 530083, Initial FHBM Identified 06/28/74, Initial FIRM Identified 05/16/95, Current Effective Map Date (NSFHA), Reg-Emer Date 06/30/97, 53033C0654G effective 8/19/2020.

Mercer Island Wind Exposure and Wind Speed-Up (Topographic Effect)

by Development Services Group (DSG), City of Mercer Island
April 2009

0 0.5 1 Kilometers 1:12,000
0 0.5 1 Miles
T N



WIND EXPOSURE CATEGORIES & WIND SPEED-UP FACTORS
(ICC Section 1609 & ASCE 7-05 Chapter 6)

It is the responsibility of the Owner (or their Design Professional) to review site conditions and determine the Kzt factor to be utilized for each specific project. The Kzt factors and wind exposure categories indicated on this map are the minimum values accepted by the City of Mercer Island without requiring the design professional to submit additional calculations and supporting topographic documentation (to verify the values utilized in their wind load determination).

Please note – The Kzt values indicated on this map are approximations based upon periodic calculations of representative samplings around Mercer Island. These values are intended for City of Mercer Island's plan review purposes only.

WIND EXPOSURE CATEGORIES:

Wind Exposure Category	
	Exposure 'C' (1500 feet from Lake)
	Exposure 'B' (all other areas)

WIND SPEED-UP (TOPOGRAPHIC EFFECT) - K_zt Factor :

K_zt Factor	
	$K_zt = 1.0$
	$K_zt = 1.3$
	$K_zt = 1.6$
	$K_zt = 1.9$

GENERAL NOTES FOR WIND EXPOSURE AND WIND SPEED-UP MAP

This map is the Wind Exposure Category and Wind Speed-up (Topographic Effects) Map for the City of Mercer Island. This map shows the minimum wind exposure category and the minimum wind speed-up, "K_zt" factor, which will be accepted without site specific documentation and calculation.

Other wind speed phenomena may occur on Mercer Island that is not specifically indentified on this map. It is the responsibility of the Owner (or their Design Professional) to review site conditions and determine the appropriate design wind speed and exposure category for their specific project and location.

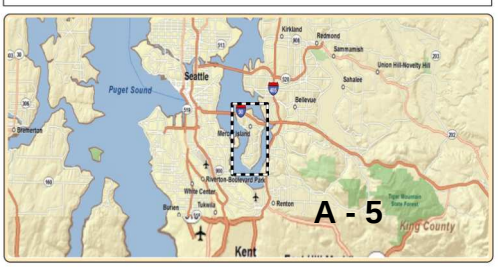
This map is for the sole use of the staff of the City of Mercer Island's Development Services Group (DSG) for the purposes of permit application evaluation. This map provides DSG staff a general assessment of Wind Exposure Category and Wind Speed-up (Topographic Effects). All areas have not been specifically evaluated and there may be locations that are not correctly represented on this map. It is the responsibility of individual property owners and map users to evaluate risk associated with their proposed development. No site-specific assessment of risk is implied or otherwise indicated by the City of Mercer Island with this map.

Information about data used for the map, references, and data limitation are all described the associated "Read Me" document. The digital version of this map is accompanied by a meta data file containing pertinent information about map construction. This data map is available on the City of Mercer Island website.

The City of Mercer Island is using guidance provided within ICC Section 1609 & ASCE 7-05 Chapter 6 regarding definitions used when creating this map.

DEFINITIONS:

K_zt factor:	The topographic effect of wind speed-up at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, that meet all of the conditions noted in ASCE 7-05 Minimum Design Loads for Buildings and Other Structures, Section 6.5.7.
Exposure B:	The wind exposure category that applies where the site in question is located a minimum of 1500 feet from the shoreline and the mean roof height is less than or equal to 30 feet per IBC 2006 section 1609.4.3.
Exposure C:	The wind exposure category that applies where the site in question is located within 1500 feet from the shoreline per IBC 2006 section 1609.4.3.
Wind Speed:	Minimum 85 mph 3-second gust per IRC Figure R301.2(4)



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LATERAL DESIGN

Wind Loads Criteria

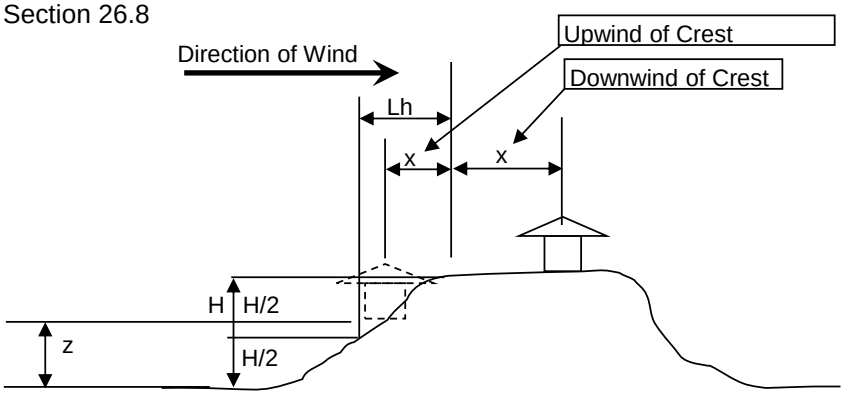
ASCE 7-16

Wind Load Criteria

Risk Category:	II	Table 1.5-1	Roof Type:	Gable/Mansard	
Basic Wind Speed:	110	Figure 26.5.1	Roof Slope:	3.0:12	14.0 DEG
Exposure Category:	B	Section 26.7.3	Mean Roof HT:	22.0 ft	UP TO 160FT
Ground Elevation:	311 ft		Parapet:	No	
Wall Ht:	19.0 ft			0.0 ft	UP TO 160FT

Wind Topographic Factor, K_{zt}:

per Section 26.8



Terrain Type:	Per Local Jurisdiction
Direction:	

L_h:		*DIST UPWIND OF CREST TO HALF HT OF HILL OR ESCARP.*
H:		*HT. OF HILL OR ESCARP. RELATIVE TO THE UPWIND TERRAIN*
x:		*DIST. (UPWIND OR DOWNWIND) FROM THE CREST TO THE BUILDING*
z:		*HEIGHT ABOVE GROUND SURFACE AT BUILDING SITE*

K_{zt}:	NA	*EQUATION 26.8-1*
K_{zt}:	1.30	*MANUALLY INPUT*

K_e: 0.989 ASCE 26.10.1

K_d: 0.85 ASCE 26.6

Wind Loads - Main Wind Force Resisting System

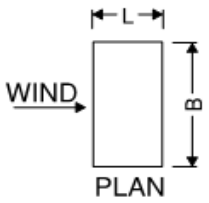
ASCE 7-16 Chapter 27.3 Part 1 - Enclosed Simple Diaphragm, h<160ft

Wind Load Criteria

Risk Category:	**II**	Table 1.5-1	K_e:	**0.9888**	Section 26.10.1
Basic Wind Speed:	**110 mph**	Figure 26.5.1	K_d:	**0.85**	Section 26.6
Exposure Category:	**B**	Section 26.7.3	G:	**0.85**	Section 26.11
K_{zt}:	**1.30**	Section 26.8	Wall Height:	**19.0 ft**	

L/B Ratio:

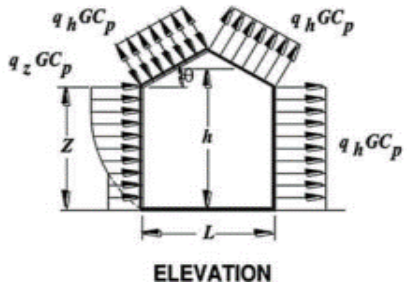
Short Dimension:	**73.0 ft**
Long Dimension:	**103.0 ft**
Transverse Wind L/B:	0.7087379
Longitudinal Wind L/B:	1.4



*NOTE: INTERNAL BUILDING PRESSURE CANCEL EACH OTHER OUT IN ENCLOSED BUILDING

Wall Pressures:

K_h & K_z:	0.615	At Top of Wall
K_z:	0.57	0 ft to 15 ft



ELEVATION

	Transverse Wind Direction	Longitudinal Wind Direction	
Top of Wall:	**23.0 psf**	**21.5 psf**	ASCE EQ 27.3-1
0 ft to 15 ft Wall:	**22.0 psf**	**20.5 psf**	ASCE EQ 27.3-1

*Enveloped Leeward and Windward Pressure

*All Values Ultimate (multiply x0.6 for ASD)

Seismic Base Shear for the Equivalent Lateral Force Procedure

Per IBC 2018 & ASCE 7-16

Structure: **Headrick Residence**
Address: **8822 SE 62nd Street, Mercer Island, WA 98040**
Latitude: **47.5477** Longitude: **-122.2204**

Structure Classification

Risk Category : **II** per ASCE Table 1.5-1

Seismic Force-Resisting System: **Light-Framed Wood Walls Sheathed with Structural Panels**
R: **6 1/2** per ASCE Table 12.2-1
W_o: **3** per ASCE Table 12.2-1
C_d: **4** per ASCE Table 12.2-1
h_n (ft): **30.00** height above the base to the highest level of the structure

Site Ground Motion

Reg. Structure/5 Stories Max: **No** Per ASCE 12.8.1.3
S_1 (g-sec): **0.51** S_S (g-sec): **1.46**
Site Class: **D** **Assumed Value** per ASCE 11.4.3

ASCE 11.4.8 Exception 2 Used

F_v **1.80** F_a **1.20**
1.2 Min Value where SC D Assumed

S_{M1} (g-sec): **0.91** S_{MS} (g-sec): **1.75** per ASCE 11.4.4
S_{D1} (g-sec): **0.60** S_{DS} (g-sec): **1.17** per ASCE 11.4.5
SDC: **D** per ASCE 11.6
I_E: **1.00** per ASCE Table 1.5-2

Fundamental Period per ASCE 12.8.2

Period Method: **Approximate Fundamental Period**
Structure Type: **All Other Structural Systems**
T_L (sec): **6.00** ASCE Figures 22-14 through 22-17
T_S: 0.52

Ta (sec): 0.26 Ct * hnx per ASCE Eq. 12.8-7

T_{use} (sec): **0.26** <= TL

Equivalent Lateral Force Procedure Design Base Shear per ASCE 12.8

C_s: 0.18 = S_{DS} / (R/I_E) per ASCE Eq. 12.8-2
$C_{s\text{-max}}$: 0.36 = S_{D1} / (T_a*R/I_E) for T <= T_L per ASCE Eq. 12.8-3
$C_{s\text{-max}}$: 8 = S_{D1}*T_L / (T_a^2*R/I_E) for T > T_L per ASCE Eq. 12.8-4
$C_{s\text{-min}}$: 0.05 per ASCE Eq. 12.8-5
$C_{s\text{-min}}$: -- = $0.5S_1$ / (R/I_E) for S_1 => 0.6g per ASCE Eq. 12.8-6
$C_{s\text{-use}}$: 0.179

V : 0.179 W = $C_{S\text{-use}}$ * W per ASCE Eq. 12.8-1

Vert. Distribution of Seismic Forces for the Equiv. Lateral Force Procedure

Per IBC 2018 & ASCE 7-16

Structure: **Headrick Residence**

Seismic Parameters

I_E:	1.00	per ASCE Table 1.5-2
S_{DS} (g-sec):	1.17	per ASCE 11.4.4
Period (Sec):	0.26	per ASCE 12.8.2.1
k:	1.00	per ASCE 12.8.3

Vertical Distribution of Seismic Forces per ASCE 12.8.3

$F_x = C_{vx}V$ per ASCE Eq. 12.8-11

$C_{vx} = (w_x h_x^k)/(\Sigma w_i h_i^k)$ per ASCE Eq. 12.8-12

Level	h_x (ft)	w_x (k)	% of W_{total}	$w_x * h_x^k$	C_{vx} (%)	F_x (k)	V_x (k)
Roof	24.00	35.60	27.9%	854.4	46.9%	10.74	
Main	10.50	92.20	72.1%	968.1	53.1%	12.17	10.74
							22.92

Total WT (k): 127.80 Sum: 1823

$C_{s\text{-}use}$: 0.179

V (k): **22.92** per ASCE 12.8.1

Vertical Distribution of Seismic Diaphragm Forces per ASCE 12.10.1.1

$F_{px} = (SF_i/Sw_i) * w_{px}$ per ASCE Eq 12.10-1

$F_{px\text{-}max} = 0.4*S_{DS}*I_E*w_{px}$ per per ASCE 12.10.1.1

$F_{px\text{-}min} = 0.2*S_{DS}*I_E*w_{px}$ per per ASCE 12.10.1.1

Level	w_{px} (k)	Σw_i (k)	F_x (k)	ΣF_i (k)	F_{px} (k)	Notes	Diaphragm/Story Force Ratio
Roof	35.60	35.60	10.74	10.74	**10.74**		1.000
Main	92.20	127.80	12.17	22.92	**21.49**	**= Fp-min**	1.766

Level	h_x (ft)	w_x (k)	% of W_{total}	$w_x * h_x^k$	C_{vx} (%)	F_x (k)	V_x (k)
Roof	24.00	35.60	27.9%	854.4	46.9%	10.74	
L2	10.50	92.20	72.1%	968.1	53.1%	12.17	10.74
							22.92
Total WT (k):	127.80	Sum:	1823				
$C_{s\text{-use}}$:	0.179						
V (k):	22.92	per ASCE 12.8.1					

	Transverse Wind Direction	Longitudinal Wind Direction
Top of Wall:	23.0 psf	21.5 psf
0 ft to 15 ft Wall:	22.0 psf	20.5 psf

Seismic Base Shear:

2nd Level: Ve = 10.8 K
Main Level: Ve = 23 K

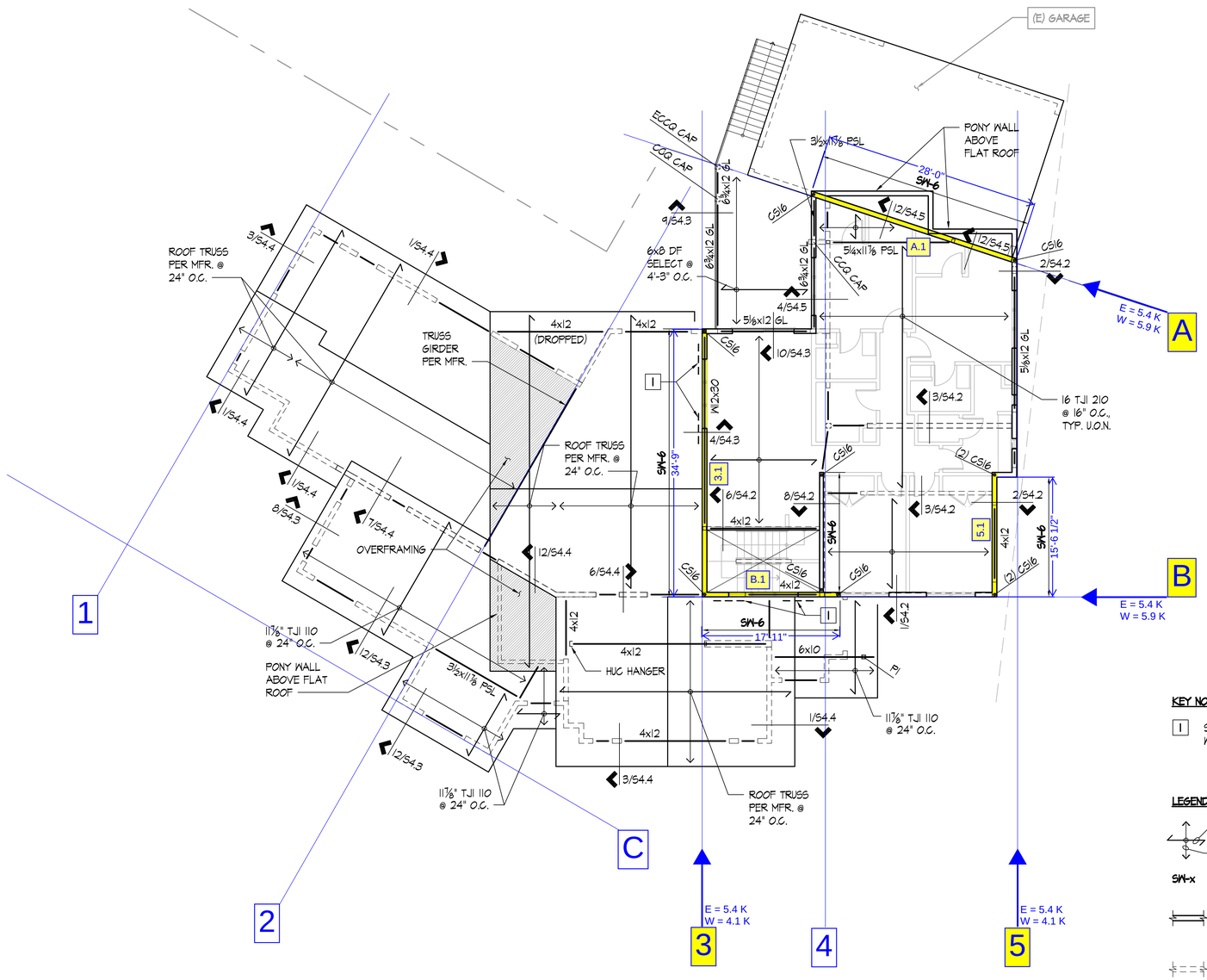
Wind Base Shear: (WIND GOVERN)

2nd Level:

Vw-Trans. (N-S): 23.0 PSF * (510 SF) = 11.7 K
Vw-Long. (E-W): 21.5 PSF * (380 SF) = 8.2 K

Main Level:

Vw-Trans. (N-S): 23.0 PSF * (510 SF + 960 SF) = 33.8 K
Vw-Long. (E-W): 21.5 PSF * (380 SF + 1070 SF) = 31.2 K



SECOND LEVEL / LOWER ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"

(KEY PLAN)

SECOND LEVEL / LOWER ROOF FRAMING PLAN NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS ARE FOR GENERAL INFORMATION ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR WITH THE ARCHITECTURAL DRAWINGS BEFORE CONSTRUCTION BEGINS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.
2. SEE SHEETS S1.0 AND S1.1 FOR GENERAL STRUCTURAL NOTES AND ABBREVIATIONS. SEE SHEETS S4.0, S4.1 AND S4.2 FOR TYPICAL WOOD DETAILS.
3. TYPICAL ROOF FRAMING CONSISTS OF 15/32" APA RATED SHEATHING (INDEX 32/16), LAID FACE GRAIN PERPENDICULAR OVER PRE-FABRICATED ROOF TRUSSES AND 2x FRAMING @ 24" O.C., U.O.N. (SEE THE STRUCTURAL GENERAL NOTES FOR TRUSS DESIGN CRITERIA).
4. NAIL ROOF SHEATHING TO FRAMING WITH 8d NAILS (0.131"Φ x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
5. PROVIDE SOLID BLOCKING BETWEEN EACH ROOF JOIST OR TRUSS AT SUPPORTS. PROVIDE AN H1 CLIP AT EVERY MEMBER TO TOP PLATE.
6. ATTACH NON-BEARING INTERIOR WALLS TO BOTTOM OF TRUSSES WITH STC CLIPS AT 48" O.C. INSTALL IN ACCORDANCE WITH MFR. RECOMMENDATIONS. SEE DETAIL 9/S4.4.
7. TYPICAL FLOOR FRAMING CONSISTS OF 1-1/8" APA RATED T&G SHEATHING (INDEX 48/24), LAID FACE GRAIN PERPENDICULAR OVER 16" TJI 210 JOISTS AT 16" O.C. HANG TJI JOISTS WITH ITS TOP FLANGE HANGERS TYPICAL AT FLUSH BEAMS, U.O.N.
8. NAIL FLOOR SHEATHING TO FRAMING WITH 8d NAILS (0.131"Φ x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
9. ALL BEARING AND SHEAR WALLS SHALL BE 2x4 @ 16" O.C. INTERIOR AND 2x6 @ 16" O.C. EXTERIOR U.O.N.
10. POSTS INDICATED ARE AT THIS LEVEL. ALL POSTS NOT SPECIFIED SHALL BE (2) 2x U.O.N. SOLID SAWN MEMBERS OF EQUIVALENT SIZE MAY BE SUBSTITUTED FOR BUILT-UP MEMBERS (SUCH AS A 4x6 FOR (3) 2x4).
11. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL FLOOR BEAMS AND ALL POSTS ABOVE FOR FULL BEARING. PROVIDE BLKG. AT JOISTS PER DETAIL 7/S4.1.
12. ALL HEADERS NOT SHOWN ON PLAN SHALL BE (2) 2x10 FOR EXTERIOR BEARING WALLS AND (2) 2x10 FOR INTERIOR BEARING WALLS. SEE 10/S4.1 FOR HEADER DETAIL.
13. FOR TOP PLATE SPLICE SEE DETAIL 6/S4.1.
14. ALIGN A JOIST OR JOIST BLOCKING OVER THE FULL LENGTH OF ALL BEARING/SHEAR WALLS. SEE 8/S4.0 FOR SPECIAL SHEAR WALL BLOCKING REQUIREMENTS.
15. SW-x — INDICATES SHEAR WALL AT THIS LEVEL. SEE SHEAR WALL SCHEDULE 8/S4.0 FOR SHEATHING, BLOCKING, NAILING, AND ANCHOR BOLT REQUIREMENTS. ALL EXTERIOR WALLS SHALL BE SHEATHED PER SW-6 CRITERIA, U.O.N.
16. HDUx — INDICATES HOLDOWN TO CONCRETE FOUNDATION WALLS OR FOOTINGS. SEE 12/S4.0 FOR HOLDOWN DETAIL. USE MIN. (2) 2x POST U.O.N.
17. CSxx/CMxx — INDICATES HOLDOWN STRAP TO FRAMING BELOW WALL. SEE 10/S4.0 FOR STRAP HOLDOWN DETAIL AT FLOOR-TO-FLOOR AND BEAM SUPPORTING SHEAR WALL END. USE MIN. (2) 2x POST U.O.N.

KEY NOTES:

[I] STRAPPING AROUND SHEAR WALL OPENING PER 1/S4.3

LEGEND:

- INDICATES FRAMING DIRECTION
- INDICATES EXTENT OF FRAMING
- SW-x — INDICATES SHEAR WALL TYPE AT THIS LEVEL. SEE PLAN NOTE 15
- INDICATES WOOD BEARING OR SHEAR WALL AT THIS LEVEL. SEE PLAN NOTES 9 & 15
- INDICATES WOOD BEARING WALL OR SHEAR WALL BELOW
- INDICATES NON-BEARING/ NON-SHEAR WALL AT THIS LEVEL. SEE 1 & 2/S4.1 FOR CONNECTION DETAILS
- INDICATES HEADER MEMBER. SEE PLAN NOTE 13
- 8"/24" — INDICATES MULTIPLE STUD POST AT THIS LEVEL. SEE PLAN NOTE 12
- HDx — INDICATES HOLDOWN TYPE AT THIS LEVEL. SEE PLAN NOTES 16 & 17
- INDICATES ROOF OVERFRAMING PER DETAIL 4/S4.4

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **Second Level**

Sds = **1.17**
Depth of Floor Framing & Plates (Clearspan) at Interstory (in) = **15.25**

Shear Wall Line Information

SW Mark		L_{SW} (ft)	Wall Pier h_{wp} (ft)	Aspect Ratio	Wall Framing Species	Specific Gravity G	Interstory of Base?	h_{sw} (ft)	Wall Wt. (psf)	Roof/Floor Trib. (ft)	Roof/Floor Wt. (psf)
SW GRID	**3**	**34.75**	-	-	-	-	-	-	-	-	-
SW Segment	3.10	34.75	8.50	0.24	HF #2	0.43	Interstory	8.50	10.0	2.0	12.0
SW Segment											
SW Segment											
SW Segment											
SW Segment											
SW GRID	**5**	**15.50**	-	-	-	-	-	-	-	-	-
SW Segment	5.10	15.50	8.50	0.55	HF #2	0.43	Interstory	8.50	10.0	2.0	12.0
SW Segment											
SW Segment											
SW Segment											
SW Segment											
SW GRID	**A**	**28.00**	-	-	-	-	-	-	-	-	-
SW Segment	A.1	28.00	8.50	0.30	HF #2	0.43	Interstory	8.50	10.0	2.0	12.0
SW Segment											
SW Segment											
SW Segment											
SW Segment											
SW GRID	**B**	**18.00**	-	-	-	-	-	-	-	-	-
SW Segment	B.1	18.00	8.50	0.47	HF #2	0.43	Interstory	8.50	10.0	17.0	12.0
SW Segment											
SW Segment											
SW Segment											
SW Segment											

Shear Wall Loads and Summary

SW Mark		EQ (lb) Wall (ULT)	Wind (lb) Wall (ULT)	Wall DL (lb)	Wall DL (lb) End 1	Wall DL (lb) End 2	Shear Wall Type	MIN. # of End Studs	Holdown
SW GRID	**3**	5400	4100	-	-	-	-	-	-
SW Segment	3.10	5400	4100	3788			**SW-6**	**2**	**CS16 (1705)**
SW Segment									
SW Segment									
SW Segment									
SW Segment									
SW GRID	**5**	5400	4100				-	-	-
SW Segment	5.10	5400	4100	1690			**SW-6**	**2**	**(2) CS16 (3410)**
SW Segment									
SW Segment									
SW Segment									
SW Segment									
SW GRID	**A**	5400	5900				-	-	-
SW Segment	A.1	5400	5900	3052			**SW-6**	**2**	**CS16 (1705)**
SW Segment									
SW Segment									
SW Segment									
SW Segment									
SW GRID	**B**	5400	5900				-	-	-
SW Segment	B.1	5400	5900	5202			**SW-6**	**2**	**CS16 (1705)**
SW Segment									
SW Segment									
SW Segment									
SW Segment									

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **Second Level**

Shear Wall Schedule (LRFD) ϕ_D = 0.8

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	Nominal Seismic SW Capacity (plf)	LRFD Seismic SW Capacity (plf)	Nominal Wind SW Capacity (plf)	LRFD Wind SW Capacity (plf)	Sheathing Shear Stiffness, G_a (lb/in)
SW-6	APA Rated, 7/16", 8d Common	6	520	416	730	584	10
SW-4	APA Rated, 7/16", 8d Common	4	760	608	1065	852	13
SW-3	APA Rated, 7/16", 8d Common	3	980	784	1370	1096	15
SW-2	APA Rated, 7/16", 8d Common	2	1280	1024	1790	1432	20
2SW-4	APA Rated, 7/16", 8d Common	4	1520	1216	2130	1704	26
2SW-3	APA Rated, 7/16", 8d Common	3	1960	1568	2740	2192	30
2SW-2	APA Rated, 7/16", 8d Common	2	2560	2048	3580	2864	40

****See SDPWS Table 4.3A Note 2**

Determine Shear Wall Type (LRFD)

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Adjusted Wind Shear (plf)	Controlling Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
3.10	155	1.00	167	118	127	167	SW-6	416	OK	Seismic
5.10	348	1.00	375	265	284	375	SW-6	416	OK	Seismic
A.1	193	1.00	207	211	227	207	SW-6	416	OK	Seismic
B.1	300	1.00	323	328	352	323	SW-6	416	OK	Seismic

***NOTE:** CONTROLLING SHEAR IS BASED ON THE DIFFERENCE IN SHEAR WALL CAPACITY BETWEEN WIND & EQ

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Wall Length Lever Arm (ft)	Calculated Lever Arm (ft)	% Different	Override Wall Length	User Input M_{OT} Lever Arm (ft)
3.10	34.75	34.54	0.60%	No	
5.10	15.50	15.29	1.36%	No	
A.1	28.00	27.79	0.75%	No	
B.1	18.00	17.79	1.17%	No	

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **Second Level**

Shear Wall End Axial Load (ASD)

SW Segment Mark	Seismic Tension (lb)	ASD Seismic Tension Above (lb)	Seismic Tension Total (lb)	Wind Tension (lb)	ASD Wind Tension Above (lb)	Wind Tension Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)
3.10	925	**0**	925	602	**0**	602	1894	1894
5.10	2073	**0**	2073	1349	**0**	1349	845	845
A.1	1148	**0**	1148	1075	**0**	1075	1526	1526
B.1	1785	**0**	1785	1672	**0**	1672	2601	2601

Determine Required Holdown (ASD)

SW Segment Mark	Wind End 1 Eq. 16-15	EQ End 1 Eq. 16-16	Wind End 2 Eq. 16-15	EQ End 2 Eq. 16-16	Controlling Ten. Load (lb)	Holdown	Holdown Capacity (lb)	Status
3.10	535	-98	535	-98	**-98**	**CS16 (1705)**	**-1705**	**OK**
5.10	-842	-1704	-842	-1704	**-1704**	**(2) CS16 (3410)**	**-3410**	**OK**
A.1	-159	-482	-159	-482	**-482**	**CS16 (1705)**	**-1705**	**OK**
B.1	-111	-650	-111	-650	**-650**	**CS16 (1705)**	**-1705**	**OK**

Level	h_x (ft)	w_x (k)	% of W_{total}	$w_x * h_x^k$	C_{vx} (%)	F_x (k)	V_x (k)
Roof	24.00	35.60	27.9%	854.4	46.9%	10.74	
L2	10.50	92.20	72.1%	968.1	53.1%	12.17	10.74
							22.92
Total WT (k):		127.80	Sum:	1823			
$C_{s\text{-use}}$:		0.179					
V (k):		22.92	per ASCE 12.8.1				

	Transverse Wind Direction	Longitudinal Wind Direction
Top of Wall:	23.0 psf	21.5 psf
0 ft to 15 ft Wall:	22.0 psf	20.5 psf

Seismic Base Shear:

2nd Level: Ve = 10.8 K
Main Level: Ve = 23 K

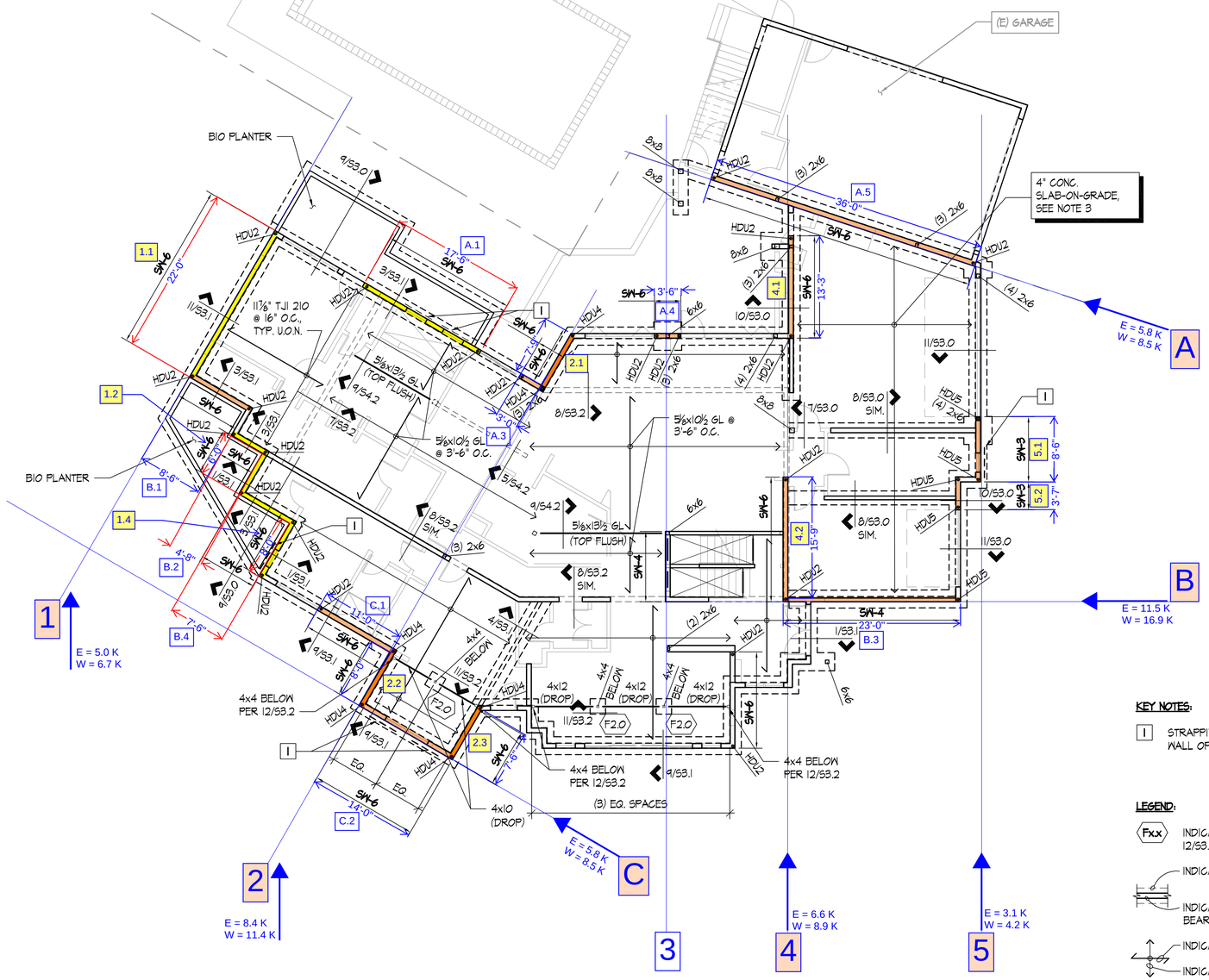
Wind Base Shear: (WIND GOVERN)

2nd Level:

Vw-Trans. (N-S): 23.0 PSF * (510 SF) = 11.7 K
Vw-Long. (E-W): 21.5 PSF * (380 SF) = 8.2 K

Main Level:

Vw-Trans. (N-S): 23.0 PSF * (510 SF + 960 SF) = 33.8 K
Vw-Long. (E-W): 21.5 PSF * (380 SF + 1070 SF) = 31.2 K



FOUNDATION / FIRST LEVEL FRAMING PLAN

SCALE: 1/8" = 1'-0"

(KEY PLAN)

FOUNDATION / FIRST LEVEL FRAMING PLAN NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS ARE FOR GENERAL INFORMATION ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR WITH THE ARCHITECTURAL DRAWINGS BEFORE CONSTRUCTION BEGINS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.
2. SEE SHEETS S1.0 AND S1.1 FOR GENERAL STRUCTURAL NOTES AND ABBREVIATIONS. SEE SHEET S3.0 FOR TYPICAL CONCRETE AND FOUNDATION DETAILS. SEE SHEET S4.0 FOR TYPICAL WOOD DETAILS.
3. SLAB-ON-GRADE SHALL BE 4" THICK CONCRETE REINFORCED WITH #4 @ 16" O.C. EACH WAY AT MID-DEPTH, U.O.N. SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION REGARDING SUB-GRADE MOISTURE BARRIER AND ELEVATIONS, ETC.
4. FOR SLAB-ON-GRADE JOINTS, SEE DETAIL 2/S3.0.
5. WHERE NEW CONCRETE IS CAST AGAINST EXISTING CONCRETE FOUNDATIONS, DRILL AND EPOXY #4 DOWELS x 3'-0" LONG TO LAP WITH THE NEW FOOTING LONGITUDINAL REINFORCING (5" MINIMUM EMBEDMENT).
6. ALL WOOD BEARING ON UNPROTECTED CONCRETE, EXPOSED TO WEATHER, OR WITHIN 8" OF FINISHED GRADE SHALL BE PRESSURE-TREATED, U.O.N.
7. FOR SILL PLATE ANCHOR BOLT LAYOUT TO CONCRETE FOUNDATION WALLS AND SLABS, SEE DETAIL 1/S4.0.
8. TYPICAL FLOOR FRAMING CONSISTS OF 1-1/8" APA RATED T&G SHEATHING (INDEX 48/24), LAID FACE GRAIN PERPENDICULAR OVER JOISTS AT 16" O.C. HANG TJI JOISTS WITH ITS TOP FLANGE HANGERS AND GLULAM WITH BA TOP FLANGE HANGERS TYPICAL AT FLUSH BEAMS, U.O.N.
9. NAIL FLOOR SHEATHING TO FRAMING WITH 8d NAILS (0.131"Φ x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
10. ALL BEARING AND SHEAR WALLS SHALL BE 2x4 @ 16" O.C. INTERIOR AND 2x6 @ 16" O.C. EXTERIOR U.O.N.
11. POSTS INDICATED ARE AT THIS LEVEL. ALL POSTS NOT SPECIFIED SHALL BE (2) 2x U.O.N. SOLID SAWN MEMBERS OF EQUIVALENT SIZE MAY BE SUBSTITUTED FOR BUILT-UP MEMBERS (SUCH AS A 4x6 FOR (3) 2x4).
12. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL FLOOR BEAMS AND ALL POSTS ABOVE FOR FULL BEARING. PROVIDE BLKG. AT JOISTS PER DETAIL 7/S4.1.
13. ALL HEADERS NOT SHOWN ON PLAN SHALL BE (2) 2x10 FOR EXTERIOR BEARING WALLS AND (2) 2x10 FOR INTERIOR BEARING WALLS. SEE 10/S4.1 FOR HEADER DETAIL.
14. FOR TOP PLATE SPLICE SEE DETAIL 6/S4.1.
15. ALIGN A JOIST OR JOIST BLOCKING OVER THE FULL LENGTH OF ALL BEARING/SHEAR WALLS. SEE 8/S4.0 FOR SPECIAL SHEAR WALL BLOCKING REQUIREMENTS.
16. SW-x — INDICATES SHEAR WALL AT THIS LEVEL. SEE SHEAR WALL SCHEDULE 8/S4.0 FOR SHEATHING, BLOCKING, NAILING, AND ANCHOR BOLT REQUIREMENTS. ALL EXTERIOR WALLS SHALL BE SHEATHED PER SW-6 CRITERIA, U.O.N.
17. HDUx — INDICATES HOLDOWN TO CONCRETE FOUNDATION WALLS OR FOOTINGS. SEE 12/S4.0 FOR HOLDOWN DETAIL. USE MIN. (2) 2x POST U.O.N.

KEY NOTES:

I	STRAPPING AROUND SHEAR WALL OPENING PER 1/S4.3

LEGEND:

Fxx	INDICATES SPREAD FOOTING. SEE 12/S3.0 FOR SCHEDULE
	INDICATES FOOTING
	INDICATES FOUNDATION WALL, WOOD BEARING WALL OR SHEAR WALL
	INDICATES FRAMING DIRECTION
	INDICATES EXTENT OF FRAMING
SW-x	INDICATES SHEAR WALL TYPE AT THIS LEVEL. SEE PLAN NOTE 16
	INDICATES WOOD BEARING OR SHEAR WALL AT THIS LEVEL. SEE PLAN NOTES 10 & 16
	INDICATES WOOD BEARING WALL OR SHEAR WALL BELOW
	INDICATES NON-BEARING/ NON-SHEAR WALL AT THIS LEVEL. SEE 1 & 2/S4.1 FOR CONNECTION DETAILS
	INDICATES HEADER MEMBER. SEE PLAN NOTE 13
(#)2X	INDICATES MULTIPLE STUD POST AT THIS LEVEL. SEE PLAN NOTE 12
XX	INDICATES HOLDOWN TYPE AT THIS LEVEL. SEE PLAN NOTE 17

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LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **First Level**

Sds = **1.17**
Depth of Floor Framing & Plates (Clearspan) at Interstory (in) = **15.25**

Shear Wall Line Information

SW Mark		L_{SW} (ft)	Wall Pier h_{wp} (ft)	Aspect Ratio	Wall Framing Species	Specific Gravity G	Interstory of Base?	h_{sw} (ft)	Wall Wt. (psf)	Roof/Floor Trib. (ft)	Roof/Floor Wt. (psf)
SW GRID	**1**	**36.00**	-	-	-	-	-	-	-	-	-
SW Segment	1.10	22.00	9.00	0.41	HF #2	0.43	Base	9.00	10.0		12.0
SW Segment	1.20	6.00	9.00	1.50	HF #2	0.43	Base	9.00	10.0		
SW Segment	1.40	8.00	9.00	1.13	HF #2	0.43	Base	9.00	10.0		
SW Segment											
SW Segment											
SW GRID	**2**	**23.25**	-	-	-	-	-	-	-	-	-
SW Segment	2.10	7.75	9.00	1.16	HF #2	0.43	Base	9.00	10.0		12.0
SW Segment	2.20	8.00	9.00	1.13	HF #2	0.43	Base	9.00	10.0		
SW Segment	2.30	7.50	9.00	1.20	HF #2	0.43	Base	9.00	10.0		
SW Segment											
SW Segment											
SW GRID	**4**	**29.00**	-	-	-	-	-	-	-	-	-
SW Segment	4.10	13.25	10.00	0.75	HF #2	0.43	Base	10.00	10.0		12.0
SW Segment	4.20	15.75	10.00	0.63	HF #2	0.43	Base	10.00	10.0		
SW Segment											
SW Segment											
SW Segment											
SW GRID	**5**	**12.00**	-	-	-	-	-	-	-	-	-
SW Segment	5.10	8.50	10.50	1.24	HF #2	0.43	Base	10.50	10.0		12.0
SW Segment	5.20	3.50	10.50	3.00	HF #2	0.43	Base	10.50	10.0		
SW Segment											
SW Segment											
SW Segment											

Shear Wall Loads and Summary

SW Mark		EQ (lb) Wall (ULT)	Wind (lb) Wall (ULT)	Wall DL (lb)	Wall DL (lb) End 1	Wall DL (lb) End 2	Shear Wall Type	MIN. # of End Studs	Holdown
SW GRID	**1**	5000	6700	-	-	-	-	-	-
SW Segment	1.10	3056	4094	1980			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	1.20	833	1117	540			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	1.40	1111	1489	720			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment									
SW Segment									
SW GRID	**2**	8400	11400				-	-	-
SW Segment	2.10	2800	3800	698			**SW-6**	**2**	**HDU4 (4565DF, 3285HF)**
SW Segment	2.20	2890	3923	720			**SW-6**	**2**	**HDU4 (4565DF, 3285HF)**
SW Segment	2.30	2710	3677	675			**SW-6**	**2**	**HDU4 (4565DF, 3285HF)**
SW Segment									
SW Segment									
SW GRID	**4**	6600	8900				-	-	-
SW Segment	4.10	3016	4066	1325			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	4.20	3584	4834	1575			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment									
SW Segment									
SW Segment									
SW GRID	**5**	3100	4200				-	-	-
SW Segment	5.10	2196	2975	893			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	5.20	904	1225	368			**SW-6**	**2**	**HDU5 (5645DF, 4340HF)**
SW Segment									
SW Segment									
SW Segment									

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **First Level**

Shear Wall Schedule (LRFD) ϕ_D = 0.8

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	Nominal Seismic SW Capacity (plf)	LRFD Seismic SW Capacity (plf)	Nominal Wind SW Capacity (plf)	LRFD Wind SW Capacity (plf)	Sheathing Shear Stiffness, G_a (lb/in)
SW-6	APA Rated, 7/16", 8d Common	6	520	416	730	584	10
SW-4	APA Rated, 7/16", 8d Common	4	760	608	1065	852	13
SW-3	APA Rated, 7/16", 8d Common	3	980	784	1370	1096	15
SW-2	APA Rated, 7/16", 8d Common	2	1280	1024	1790	1432	20
2SW-4	APA Rated, 7/16", 8d Common	4	1520	1216	2130	1704	26
2SW-3	APA Rated, 7/16", 8d Common	3	1960	1568	2740	2192	30
2SW-2	APA Rated, 7/16", 8d Common	2	2560	2048	3580	2864	40

****See SDPWS Table 4.3A Note 2**

Determine Shear Wall Type (LRFD)

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Adjusted Wind Shear (plf)	Controlling Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
1.10	139	1.00	149	186	200	**149**	**SW-6**	**416**	**OK**	**Seismic**
1.20	139	1.00	149	186	200	**149**	**SW-6**	**416**	**OK**	**Seismic**
1.40	139	1.00	149	186	200	**149**	**SW-6**	**416**	**OK**	**Seismic**
2.10	361	1.00	388	490	527	**388**	**SW-6**	**416**	**OK**	**Seismic**
2.20	361	1.00	388	490	527	**388**	**SW-6**	**416**	**OK**	**Seismic**
2.30	361	1.00	388	490	527	**388**	**SW-6**	**416**	**OK**	**Seismic**
4.10	228	1.00	245	307	330	**245**	**SW-6**	**416**	**OK**	**Seismic**
4.20	228	1.00	245	307	330	**245**	**SW-6**	**416**	**OK**	**Seismic**
5.10	258	1.00	278	350	376	**278**	**SW-6**	**416**	**OK**	**Seismic**
5.20	258	0.88	317	350	430	**317**	**SW-6**	**416**	**OK**	**Seismic**

***NOTE: CONTROLLING SHEAR IS BASED ON THE DIFFERENCE IN SHEAR WALL CAPACITY BETWEEN WIND & EQ**

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Wall Length Lever Arm (ft)	Calculated Lever Arm (ft)	% Different	Override Wall Length	User Input M_{OT} Lever Arm (ft)
1.10	22.00	21.52	2.25%	**No**	
1.20	6.00	5.52	8.78%	**No**	
1.40	8.00	7.52	6.44%	**No**	
2.10	7.75	7.27	6.67%	**No**	
2.20	8.00	7.52	6.44%	**No**	
2.30	7.50	7.02	6.90%	**No**	
4.10	13.25	12.77	3.79%	**No**	
4.20	15.75	15.27	3.17%	**No**	
5.10	8.50	8.02	6.04%	**No**	
5.20	3.50	3.02	16.06%	**No**	

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **First Level**

Shear Wall End Axial Load (ASD)

SW Segment Mark	Seismic Tension (lb)	ASD Seismic Tension Above (lb)	Seismic Tension Total (lb)	Wind Tension (lb)	ASD Wind Tension Above (lb)	Wind Tension Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)
1.10	875	**0**	875	1005	**0**	1005	990	990
1.20	875	**0**	875	1005	**0**	1005	270	270
1.40	875	**0**	875	1005	**0**	1005	360	360
2.10	2276	**0**	2276	2648	**0**	2648	349	349
2.20	2276	**0**	2276	2648	**0**	2648	360	360
2.30	2276	**0**	2276	2648	**0**	2648	338	338
4.10	1593	**0**	1593	1841	**0**	1841	663	663
4.20	1593	**0**	1593	1841	**0**	1841	788	788
5.10	1899	**0**	1899	2205	**0**	2205	446	446
5.20	1899	**2073**	3972	2205	**1349**	3554	184	184

Determine Required Holdown (ASD)

SW Segment Mark	Wind End 1 Eq. 16-15	EQ End 1 Eq. 16-16	Wind End 2 Eq. 16-15	EQ End 2 Eq. 16-16	Controlling Ten. Load (lb)	Holdown	Holdown Capacity (lb)	Status
1.10	-411	-443	-411	-443	**-443**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
1.20	-843	-757	-843	-757	**-843**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
1.40	-789	-718	-789	-718	**-789**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
2.10	-2438	-2124	-2438	-2124	**-2438**	**HDU4 (4565DF, 3285HF)**	**-3285**	**OK**
2.20	-2324	-2119	-2324	-2119	**-2324**	**HDU4 (4565DF, 3285HF)**	**-3285**	**OK**
2.30	-2344	-2129	-2344	-2129	**-2344**	**HDU4 (4565DF, 3285HF)**	**-3285**	**OK**
4.10	-1444	-1304	-1444	-1304	**-1444**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
4.20	-1369	-1250	-1369	-1250	**-1369**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
5.10	-1937	-1704	-1937	-1704	**-1937**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
5.20	-3444	-3892	-3444	-3892	**-3892**	**HDU5 (5645DF, 4340HF)**	**-4340**	**OK**

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **First Level**

Sds = **1.17**
Depth of Floor Framing & Plates (Clearspan) at Interstory (in) = **15.25**

Shear Wall Line Information

SW Mark		L_{SW} (ft)	Wall Pier h_{wp} (ft)	Aspect Ratio	Wall Framing Species	Specific Gravity G	Interstory of Base?	h_{sw} (ft)	Wall Wt. (psf)	Roof/Floor Trib. (ft)	Roof/Floor Wt. (psf)
SW GRID	**A**	**60.00**	-	-	-	-	-	-	-	-	-
SW Segment	A.1	17.50	9.00	0.51	HF #2	0.43	Base	9.00	10.0	10.0	12.0
SW Segment											
SW Segment	A.3	3.00	9.00	3.00	HF #2	0.43	Base	9.00	10.0		12.0
SW Segment	A.4	3.50	9.00	2.57	HF #2	0.43	Base	9.00	10.0		12.0
SW Segment	A.5	36.00	9.00	0.25	HF #2	0.43	Base	9.00	10.0	1.0	12.0
SW GRID	**B**	**43.50**	-	-	-	-	-	-	-	-	-
SW Segment	B.1	8.50	9.00	1.06	HF #2	0.43	Base	9.00	10.0		12.0
SW Segment	B.2	4.50	9.00	2.00	HF #2	0.43	Base	9.00	10.0		12.0
SW Segment	B.3	23.00	10.50	0.46	HF #2	0.43	Base	10.50	10.0		12.0
SW Segment	B.4	7.50	9.00	1.20	HF #2	0.43	Base	9.00	10.0		
SW Segment											
SW GRID	**4**	**25.00**	-	-	-	-	-	-	-	-	-
SW Segment	C.1	11.00	9.00	0.82	HF #2	0.43	Base	10.00	10.0		12.0
SW Segment	C.2	14.00	9.00	0.64	HF #2	0.43	Base	10.00	10.0		
SW Segment											
SW Segment											
SW Segment											
SW GRID		**0.00**	-	-	-	-	-	-	-	-	-
SW Segment											
SW Segment											
SW Segment											
SW Segment											
SW Segment											

Shear Wall Loads and Summary

SW Mark		EQ (lb) Wall (ULT)	Wind (lb) Wall (ULT)	Wall DL (lb)	Wall DL (lb) End 1	Wall DL (lb) End 2	Shear Wall Type	MIN. # of End Studs	Holdown
SW GRID	**A**	5800	8500	-	-	-	-	-	-
SW Segment	A.1	1692	2479	3675			**SW-6**	**2**	**No HD**
SW Segment									
SW Segment	A.3	290	425	270			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	A.4	338	496	315			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	A.5	3480	5100	3672			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW GRID	**B**	11500	16900				-	-	-
SW Segment	B.1	2247	3302	765			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	B.2	1190	1748	405			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	B.3	6080	8936	2415			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	B.4	1983	2914	675			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment									
SW GRID	**4**	5800	8500				-	-	-
SW Segment	C.1	2552	3740	1100			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment	C.2	3248	4760	1400			**SW-6**	**2**	**HDU2 (3075DF,2215HF)**
SW Segment									
SW Segment									
SW Segment									
SW GRID							-	-	-
SW Segment									
SW Segment									
SW Segment									
SW Segment									
SW Segment									

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **First Level**

Shear Wall Schedule (LRFD) ϕ_D = 0.8

Shear Wall Type	Sheathing Grade, Sheathing Thickness, & Nail Size	Panel Edge Nail Spacing (in)	Nominal Seismic SW Capacity (plf)	LRFD Seismic SW Capacity (plf)	Nominal Wind SW Capacity (plf)	LRFD Wind SW Capacity (plf)	Sheathing Shear Stiffness, G_a (lb/in)
SW-6	APA Rated, 7/16", 8d Common	6	520	416	730	584	10
SW-4	APA Rated, 7/16", 8d Common	4	760	608	1065	852	13
SW-3	APA Rated, 7/16", 8d Common	3	980	784	1370	1096	15
SW-2	APA Rated, 7/16", 8d Common	2	1280	1024	1790	1432	20
2SW-4	APA Rated, 7/16", 8d Common	4	1520	1216	2130	1704	26
2SW-3	APA Rated, 7/16", 8d Common	3	1960	1568	2740	2192	30
2SW-2	APA Rated, 7/16", 8d Common	2	2560	2048	3580	2864	40

****See SDPWS Table 4.3A Note 2**

Determine Shear Wall Type (LRFD)

SW Segment Mark	Seismic Shear (plf)	Aspect Ratio Reduction	Adjusted Seismic Shear (plf)	Wind Shear (plf)	Adjusted Wind Shear (plf)	Controlling Shear (plf)	Shear Wall Type	Shear Wall Capacity (plf)	Check	Controlling Shear
A.1	97	1.00	104	142	152	**152**	**SW-6**	**584**	**OK**	**Wind**
A.3	97	0.88	119	142	174	**174**	**SW-6**	**584**	**OK**	**Wind**
A.4	97	0.93	112	142	164	**164**	**SW-6**	**584**	**OK**	**Wind**
A.5	97	1.00	104	142	152	**152**	**SW-6**	**584**	**OK**	**Wind**
B.1	264	1.00	284	389	418	**418**	**SW-6**	**584**	**OK**	**Wind**
B.2	264	1.00	284	389	418	**418**	**SW-6**	**584**	**OK**	**Wind**
B.3	264	1.00	284	389	418	**418**	**SW-6**	**584**	**OK**	**Wind**
B.4	264	1.00	284	389	418	**418**	**SW-6**	**584**	**OK**	**Wind**
C.1	232	1.00	249	340	366	**366**	**SW-6**	**584**	**OK**	**Wind**
C.2	232	1.00	249	340	366	**366**	**SW-6**	**584**	**OK**	**Wind**

***NOTE:** CONTROLLING SHEAR IS BASED ON THE DIFFERENCE IN SHEAR WALL CAPACITY BETWEEN WIND & EQ

Determine Shear Wall Overturning Moment Lever Arm

SW Segment Mark	Wall Length Lever Arm (ft)	Calculated Lever Arm (ft)	% Different	Override Wall Length	User Input M_{OT} Lever Arm (ft)
A.1	17.50	17.13	2.19%	**No**	
A.3	3.00	2.52	19.25%	**No**	
A.4	3.50	3.02	16.06%	**No**	
A.5	36.00	35.52	1.36%	**No**	
B.1	8.50	8.02	6.04%	**No**	
B.2	4.50	4.02	12.06%	**No**	
B.3	23.00	22.52	2.15%	**No**	
B.4	7.50	7.02	6.90%	**No**	
C.1	11.00	10.52	4.61%	**No**	
C.2	14.00	13.52	3.58%	**No**	

LIGHT FRAMED WOOD SHEATHED PANEL SHEAR WALL DESIGN

Per IBC 2018, ASCE 7-16, SDPWS 2015 & NDS 2018

Structure: **Headrick Residence**
Floor Level: **First Level**

Shear Wall End Axial Load (ASD)

SW Segment Mark	Seismic Tension (lb)	ASD Seismic Tension Above (lb)	Seismic Tension Total (lb)	Wind Tension (lb)	ASD Wind Tension Above (lb)	Wind Tension Total (lb)	End 1 Dead (lb)	End 2 Dead (lb)
A.1	609	**0**	609	765	**0**	765	1838	1838
A.3	609	**0**	609	765	**0**	765	135	135
A.4	609	**0**	609	765	**0**	765	158	158
A.5	609	**1148**	1757	765	**1075**	1840	1836	1836
B.1	1666	**0**	1666	2098	**0**	2098	383	383
B.2	1666	**0**	1666	2098	**0**	2098	203	203
B.3	1943	**0**	1943	2448	**0**	2448	1208	1208
B.4	1666	**0**	1666	2098	**0**	2098	338	338
C.1	1624	**0**	1624	2040	**0**	2040	550	550
C.2	1624	**0**	1624	2040	**0**	2040	700	700

Determine Required Holdown (ASD)

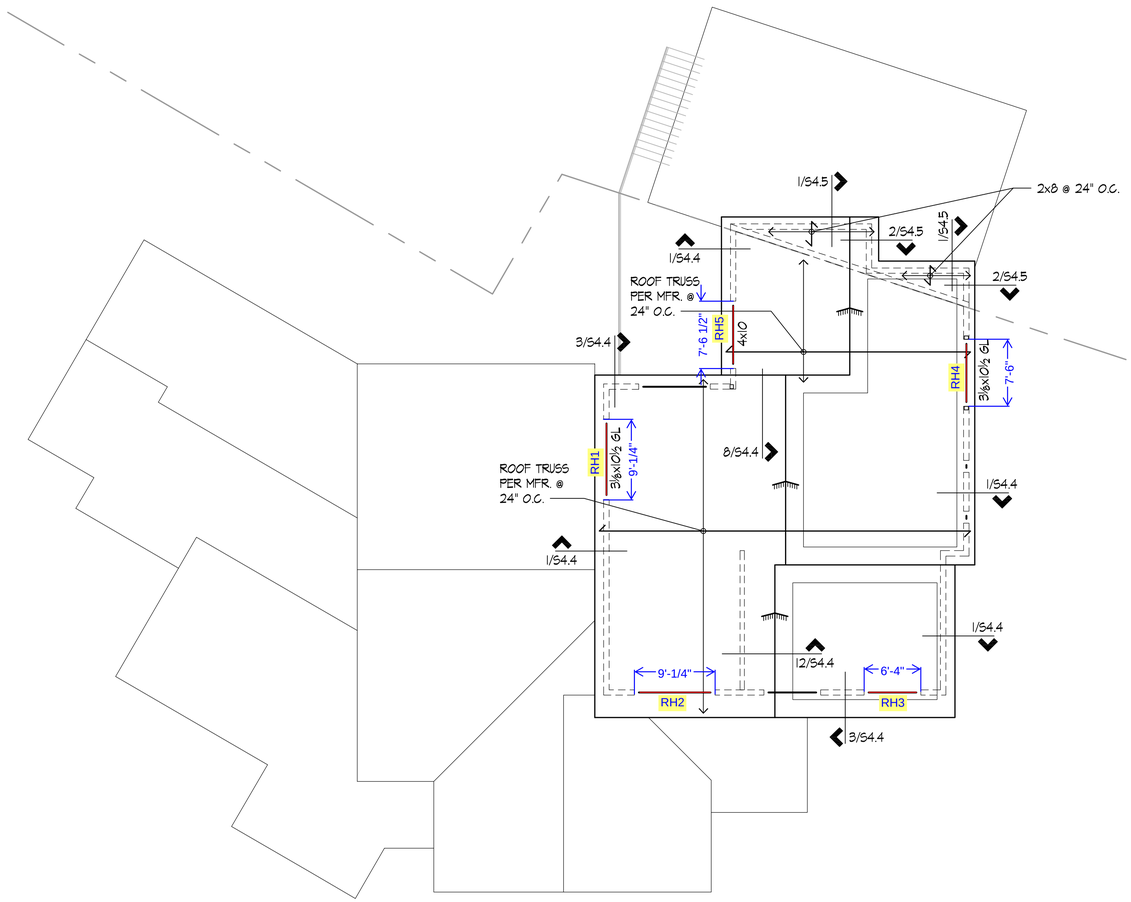
SW Segment Mark	Wind End 1 Eq. 16-15	EQ End 1 Eq. 16-16	Wind End 2 Eq. 16-15	EQ End 2 Eq. 16-16	Controlling Ten. Load (lb)	Holdown	Holdown Capacity (lb)	Status
A.1	338	193	338	193	**193**	**No HD**	**0**	**OK**
A.3	-684	-550	-684	-550	**-684**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
A.4	-671	-540	-671	-540	**-671**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
A.5	-738	-956	-738	-956	**-956**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
B.1	-1868	-1499	-1868	-1499	**-1868**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
B.2	-1916	-1577	-1916	-1577	**-1916**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
B.3	-1361	-1416	-1361	-1416	**-1416**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
B.4	-1895	-1518	-1895	-1518	**-1895**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
C.1	-1710	-1384	-1710	-1384	**-1710**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**
C.2	-1620	-1319	-1620	-1319	**-1620**	**HDU2 (3075DF,2215HF)**	**-2215**	**OK**

QUANTUM | CONSULTING ENGINEERS
1511 Third Avenue, Suite 323
Seattle, WA 98101
TEL 206.957.3900
FAX 206.957.3901

HEADRICK RESIDENCE
8822 SE 62nd Street
Mercer Island, WA 98040

Quantum Job Number: 21271.01

GRAVITY DESIGN



ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"

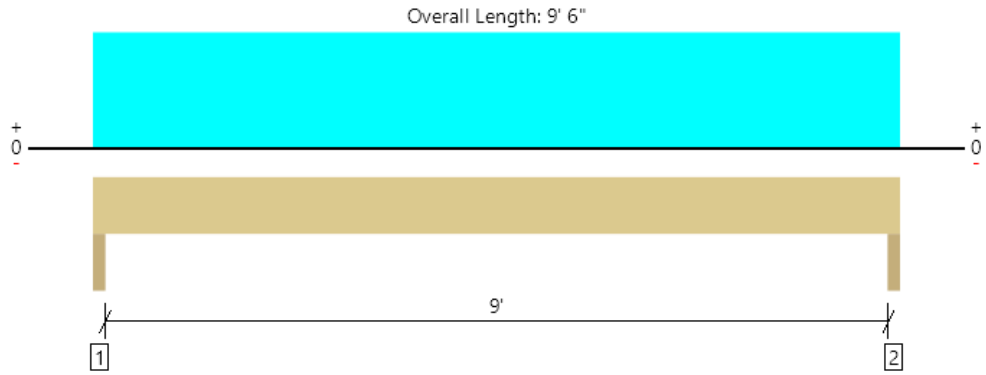
ROOF FRAMING PLAN NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS ARE FOR GENERAL INFORMATION ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR WITH THE ARCHITECTURAL DRAWINGS BEFORE CONSTRUCTION BEGINS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.
2. SEE SHEETS S1.0 AND S1.1 FOR GENERAL STRUCTURAL NOTES AND ABBREVIATIONS. SEE SHEETS S4.0, S4.1 AND S4.3 FOR TYPICAL WOOD DETAILS.
3. TYPICAL ROOF FRAMING CONSISTS OF 15/32" APA RATED SHEATHING (INDEX 32/16), LAID FACE GRAIN PERPENDICULAR OVER PRE-FABRICATED ROOF TRUSSES AND 2x FRAMING @ 24" O.C., U.O.N. (SEE THE STRUCTURAL GENERAL NOTES FOR TRUSS DESIGN CRITERIA).
4. NAIL ROOF SHEATHING TO FRAMING WITH 8d NAILS (0.131"Ø x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
5. PROVIDE SOLID BLOCKING BETWEEN EACH ROOF JOIST OR TRUSS AT SUPPORTS. PROVIDE AN H1 CLIP AT EVERY MEMBER TO TOP PLATE.
6. ALL HEADERS NOT SHOWN ON PLAN SHALL BE (2) 2x10 FOR EXTERIOR BEARING WALLS AND (2) 2x10 FOR INTERIOR BEARING WALLS. SEE 10/S4.1 FOR HEADER DETAIL.
7. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL ROOF BEAMS FOR FULL BEARING.
8. FOR TOP PLATE SPLICE SEE DETAIL 6/S4.1.
9. ATTACH NON-BEARING INTERIOR WALLS TO BOTTOM OF TRUSSES WITH STC CLIPS AT 48" O.C. INSTALL IN ACCORDANCE WITH MFR. RECOMMENDATIONS. SEE DETAIL 9/S4.4.
10. PROVIDE 5 PSF OF ALLOWANCE FOR SOLAR PANEL ON THE ROOF TRUSSES.

LEGEND:

- INDICATES FRAMING DIRECTION
- INDICATES EXTENT OF FRAMING
- INDICATES WOOD BEARING WALL OR SHEAR WALL BELOW
- INDICATES ROOF OVERFRAMING PER DETAIL 4/S4.4
- INDICATES HEADER MEMBER. SEE PLAN NOTE 6

Upper Roof Level., RH1 - 01-18-22.
1 piece(s) 3 1/8" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4327 @ 1 1/2"	6094 (3.00")	Passed (71%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3302 @ 1' 1 1/2"	6666	Passed (50%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	9743 @ 4' 9"	13207	Passed (74%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.159 @ 4' 9"	0.231	Passed (L/697)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.277 @ 4' 9"	0.463	Passed (L/401)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 9' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - HF	3.00"	3.00"	2.13"	1833	2494	4327	None
2 - Trimmer - HF	3.00"	3.00"	2.13"	1833	2494	4327	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 6" o/c	
Bottom Edge (Lu)	9' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 6"	N/A	8.0	--	
1 - Uniform (PSF)	0 to 9' 6"	21'	18.0	25.0	Roof

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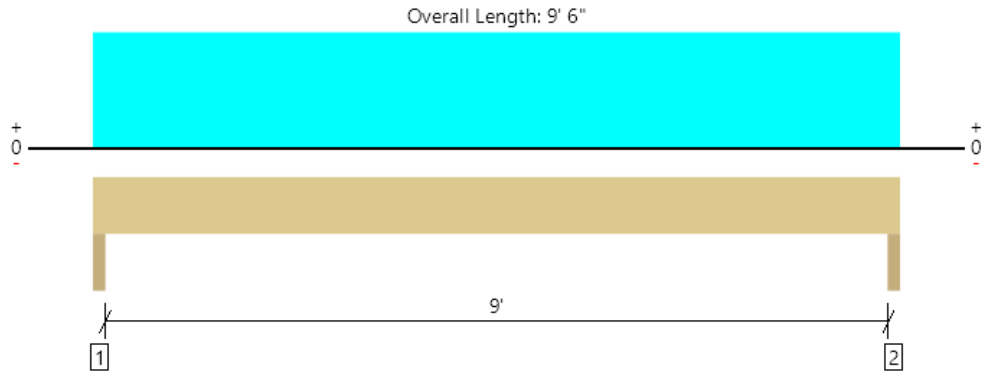
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Upper Roof Level., RH2 - 01-18-22.
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1259 @ 1 1/2"	3645 (3.00")	Passed (35%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	988 @ 1' 1/4"	3191	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2835 @ 4' 9"	3833	Passed (74%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.096 @ 4' 9"	0.231	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.170 @ 4' 9"	0.463	Passed (L/654)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - HF	3.00"	3.00"	1.50"	546	713	1259	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	546	713	1259	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 6" o/c	
Bottom Edge (Lu)	9' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 6"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 9' 6"	6'	18.0	25.0	Roof

Weyerhaeuser Notes

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

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

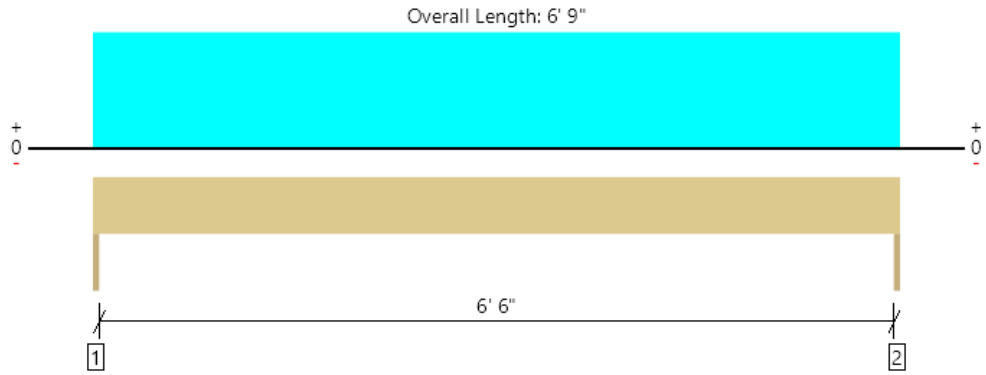
Weyerhaeuser

FORTE WEB

MEMBER REPORT

PASSED

Upper Roof Level., RH3 - 01-24-22
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	894 @ 0	1823 (1.50")	Passed (49%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	657 @ 10 3/4"	3191	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1509 @ 3' 4 1/2"	3833	Passed (39%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.027 @ 3' 4 1/2"	0.169	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.048 @ 3' 4 1/2"	0.338	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - HF	1.50"	1.50"	1.50"	388	506	894	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	388	506	894	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 9" o/c	
Bottom Edge (Lu)	6' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 9"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 6' 9"	6'	18.0	25.0	Roof

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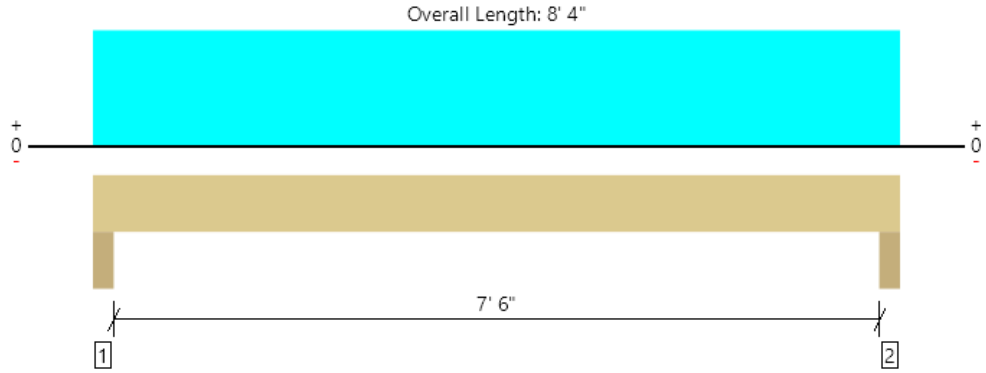
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

1/24/2022 9:54:26 PM UTC
ForteWEB v3.2, Engine: V8.2.0.17, Data: V8.1.0.16
File Name: 21271.01 - Headrick Residence

Upper Roof Level., RH4 - 01-18-22.
1 piece(s) 3 1/8" x 9" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3791 @ 3 1/2"	10156 (5.00")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2730 @ 1' 2"	5714	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	6831 @ 4' 2"	9703	Passed (70%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.125 @ 4' 2"	0.194	Passed (L/746)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.216 @ 4' 2"	0.387	Passed (L/430)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 7' 9".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - HF	5.00"	5.00"	1.87"	1603	2188	3791	None
2 - Trimmer - HF	5.00"	5.00"	1.87"	1603	2188	3791	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 4" o/c	
Bottom Edge (Lu)	8' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 4"	N/A	6.8	--	
1 - Uniform (PSF)	0 to 8' 4"	21'	18.0	25.0	Roof

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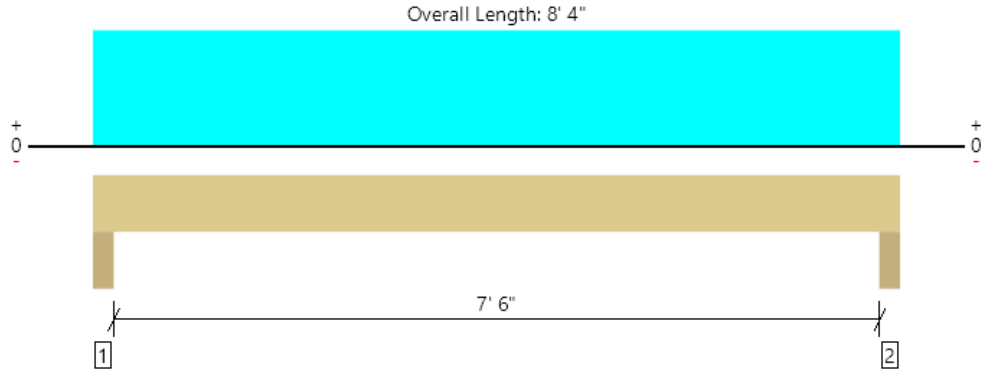
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Upper Roof Level., RH5.
1 piece(s) 4 x 10 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2543 @ 3 1/2"	10938 (5.00")	Passed (23%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1818 @ 1' 2 1/4"	4468	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4581 @ 4' 2"	5166	Passed (89%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.077 @ 4' 2"	0.194	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.134 @ 4' 2"	0.387	Passed (L/694)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - HF	5.00"	5.00"	1.50"	1084	1458	2542	None
2 - Trimmer - HF	5.00"	5.00"	1.50"	1084	1458	2542	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 4" o/c	
Bottom Edge (Lu)	8' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 4"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 8' 4"	14'	18.0	25.0	Roof

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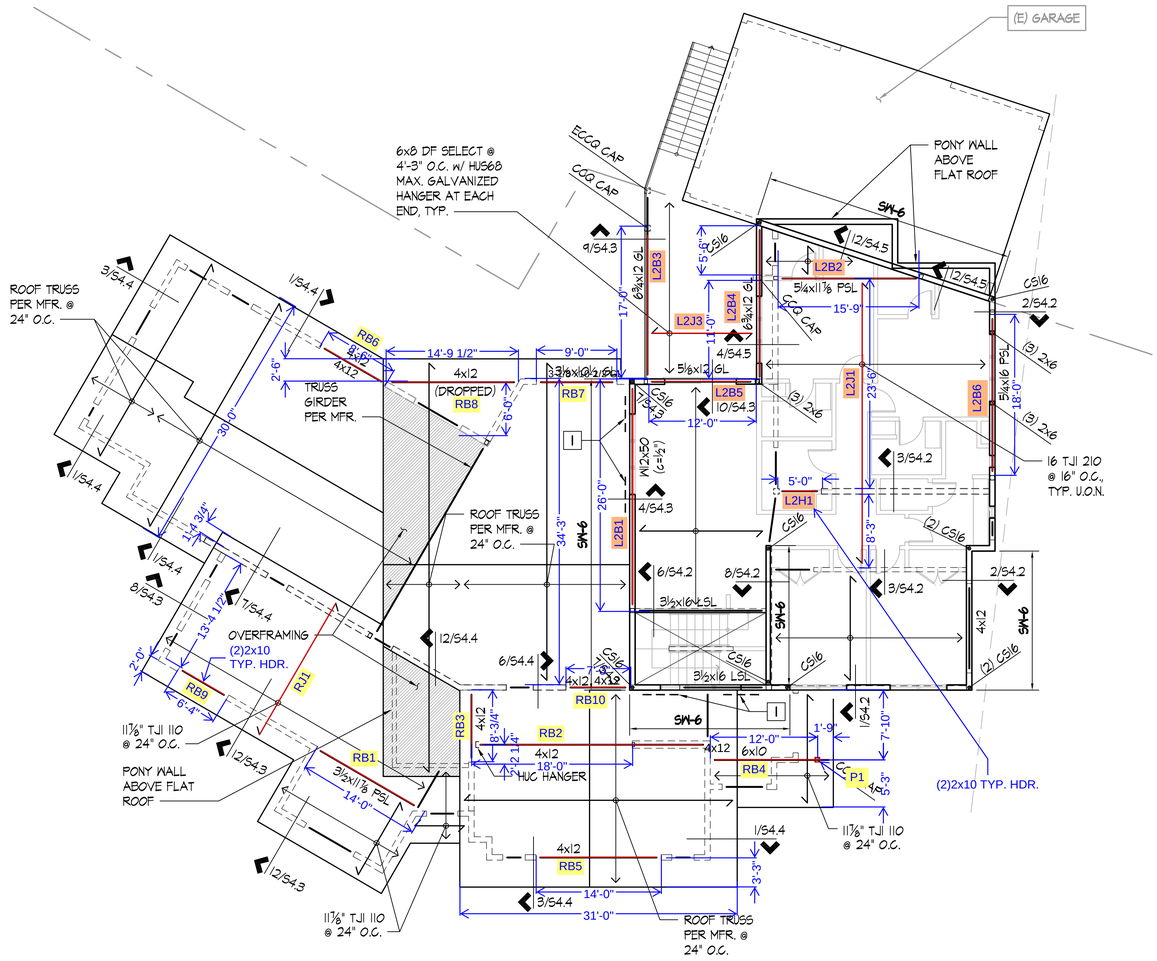
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser



SECOND LEVEL / LOWER ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"

SECOND LEVEL / LOWER ROOF FRAMING PLAN NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS ARE FOR GENERAL INFORMATION ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR WITH THE ARCHITECTURAL DRAWINGS BEFORE CONSTRUCTION BEGINS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.
2. SEE SHEETS S1.0 AND S1.1 FOR GENERAL STRUCTURAL NOTES AND ABBREVIATIONS. SEE SHEETS S4.0, S4.1 AND S4.2 FOR TYPICAL WOOD DETAILS.
3. TYPICAL ROOF FRAMING CONSISTS OF 15/32" APA RATED SHEATHING (INDEX 32/16), LAID FACE GRAIN PERPENDICULAR OVER PRE-FABRICATED ROOF TRUSSES AND 2x FRAMING @ 24" O.C., U.O.N. (SEE THE STRUCTURAL GENERAL NOTES FOR TRUSS DESIGN CRITERIA).
4. NAIL ROOF SHEATHING TO FRAMING WITH 8d NAILS (0.131"Φ x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
5. PROVIDE SOLID BLOCKING BETWEEN EACH ROOF JOIST OR TRUSS AT SUPPORTS. PROVIDE AN H1 CLIP AT EVERY MEMBER TO TOP PLATE.
6. ATTACH NON-BEARING INTERIOR WALLS TO BOTTOM OF TRUSSES WITH STC CLIPS AT 48" O.C. INSTALL IN ACCORDANCE WITH MFR. RECOMMENDATIONS. SEE DETAIL 9/S4.4.
7. TYPICAL FLOOR FRAMING CONSISTS OF 1-1/8" APA RATED T&G SHEATHING (INDEX 48/24), LAID FACE GRAIN PERPENDICULAR OVER 16" TJI 210 JOISTS AT 16" O.C. HANG TJI JOISTS WITH ITS TOP FLANGE HANGERS TYPICAL AT FLUSH BEAMS, U.O.N.
8. NAIL FLOOR SHEATHING TO FRAMING WITH 8d NAILS (0.131"Φ x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
9. ALL BEARING AND SHEAR WALLS SHALL BE 2x4 @ 16" O.C. INTERIOR AND 2x6 @ 16" O.C. EXTERIOR U.O.N.
10. POSTS INDICATED ARE AT THIS LEVEL. ALL POSTS NOT SPECIFIED SHALL BE (2) 2x U.O.N. SOLID SAWN MEMBERS OF EQUIVALENT SIZE MAY BE SUBSTITUTED FOR BUILT-UP MEMBERS (SUCH AS A 4x6 FOR (3) 2x4).
11. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL FLOOR BEAMS AND ALL POSTS ABOVE FOR FULL BEARING. PROVIDE BLKG. AT JOISTS PER DETAIL 7/S4.1.
12. ALL HEADERS NOT SHOWN ON PLAN SHALL BE (2) 2x10 FOR EXTERIOR BEARING WALLS AND (2) 2x10 FOR INTERIOR BEARING WALLS. SEE 10/S4.1 FOR HEADER DETAIL.
13. FOR TOP PLATE SPLICE SEE DETAIL 6/S4.1.
14. ALIGN A JOIST OR JOIST BLOCKING OVER THE FULL LENGTH OF ALL BEARING/SHEAR WALLS. SEE 8/S4.0 FOR SPECIAL SHEAR WALL BLOCKING REQUIREMENTS.
15. SW-x — INDICATES SHEAR WALL AT THIS LEVEL. SEE SHEAR WALL SCHEDULE 8/S4.0 FOR SHEATHING, BLOCKING, NAILING, AND ANCHOR BOLT REQUIREMENTS. ALL EXTERIOR WALLS SHALL BE SHEATHED PER SW-6 CRITERIA, U.O.N.
16. HDUx — INDICATES HOLDOWN TO CONCRETE FOUNDATION WALLS OR FOOTINGS. SEE 12/S4.0 FOR HOLDOWN DETAIL. USE MIN. (2) 2x POST U.O.N.
17. CSxx/CMxx — INDICATES HOLDOWN STRAP TO FRAMING BELOW WALL. SEE 10/S4.0 FOR STRAP HOLDOWN DETAIL AT FLOOR-TO-FLOOR AND BEAM SUPPORTING SHEAR WALL END. USE MIN. (2) 2x POST U.O.N.

KEY NOTES:

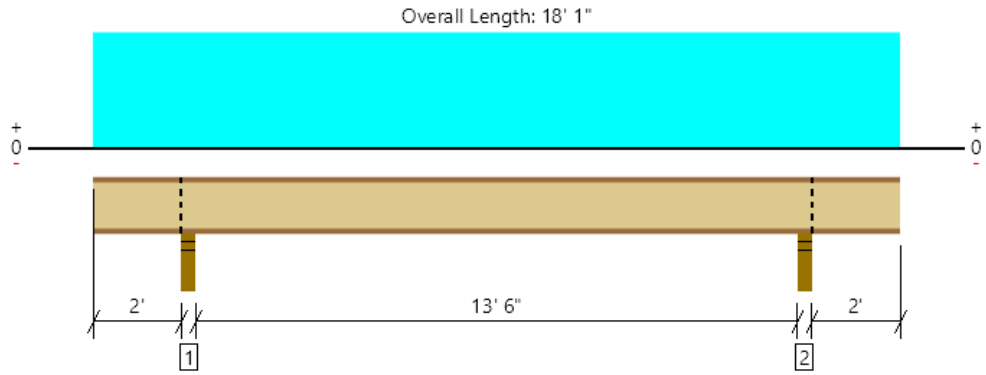
1 — STRAPPING AROUND SHEAR WALL OPENING PER 1/S4.3

LEGEND:

- INDICATES FRAMING DIRECTION
- INDICATES EXTENT OF FRAMING
- SW-x — INDICATES SHEAR WALL TYPE AT THIS LEVEL. SEE PLAN NOTE 15
- INDICATES WOOD BEARING OR SHEAR WALL AT THIS LEVEL. SEE PLAN NOTES 9 & 15
- INDICATES WOOD BEARING WALL OR SHEAR WALL BELOW
- INDICATES NON-BEARING/ NON-SHEAR WALL AT THIS LEVEL. SEE 1 & 2/S4.1 FOR CONNECTION DETAILS
- INDICATES HEADER MEMBER. SEE PLAN NOTE 13
- (#)2x — INDICATES MULTIPLE STUD POST AT THIS LEVEL. SEE PLAN NOTE 12
- HDUx — INDICATES HOLDOWN TYPE AT THIS LEVEL. SEE PLAN NOTES 16 & 17
- INDICATES ROOF OVERFRAMING PER DETAIL 4/S4.4

Lower Roof Level.			
Member Name	Results	Current Solution	Comments
RJ1.	Passed	1 piece(s) 11 7/8" TJI® 110 @ 24" OC	
RB1.	Passed	1 piece(s) 3 1/2" x 11 7/8" 2.0E Parallam® PSL	
RB2.	Passed	1 piece(s) 4 x 12 DF No.2	
RB3.	Passed	1 piece(s) 4 x 12 DF No.2	
RB4.	Passed	1 piece(s) 6 x 10 DF No.1	
P1.	Passed	1 piece(s) 6 x 6 DF No.1	
RB5.	Passed	1 piece(s) 4 x 12 DF No.2	
RB6.	Passed	1 piece(s) 4 x 12 DF No.2	
RB7.	Passed	1 piece(s) 3 1/8" x 10 1/2" 24F-V4 DF Glulam	
RB8.	Passed	1 piece(s) 4 x 12 DF No.2	
RB9.	Passed	2 piece(s) 2 x 10 HF No.2	
RB10.	Passed	1 piece(s) 4 x 12 DF No.2	

Lower Roof Level., RJ1.
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	782 @ 2' 1 3/4"	2225 (3.50")	Passed (35%)	1.15	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	552 @ 2' 3 1/2"	1794	Passed (31%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	1904 @ 9' 1/2"	3634	Passed (52%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.165 @ 9' 1/2"	0.460	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.277 @ 9' 1/2"	0.690	Passed (L/597)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.50"	3.50"	3.50"	326	456	782	Blocking
2 - Stud wall - HF	3.50"	3.50"	3.50"	326	456	782	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 1" o/c	
Bottom Edge (Lu)	7' 4" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 18' 1"	24"	18.0	25.0	Roof

Member Notes

RJ1 - Typical Roof Joist

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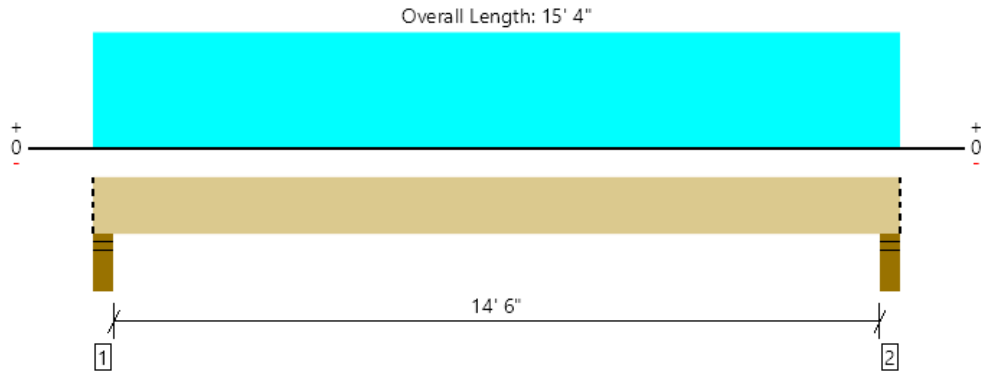
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB1.
1 piece(s) 3 1/2" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3726 @ 3 1/2"	7088 (5.00")	Passed (53%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3042 @ 1' 4 7/8"	9241	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	13216 @ 7' 8"	22888	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.321 @ 7' 8"	0.492	Passed (L/552)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.566 @ 7' 8"	0.738	Passed (L/312)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	5.00"	5.00"	2.63"	1617	2108	3725	Blocking
2 - Stud wall - HF	5.00"	5.00"	2.63"	1617	2108	3725	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 4" o/c	
Bottom Edge (Lu)	15' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 4"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 15' 4" (Front)	11'	18.0	25.0	Roof

Member Notes

RB1 - Beam at Flat Roof

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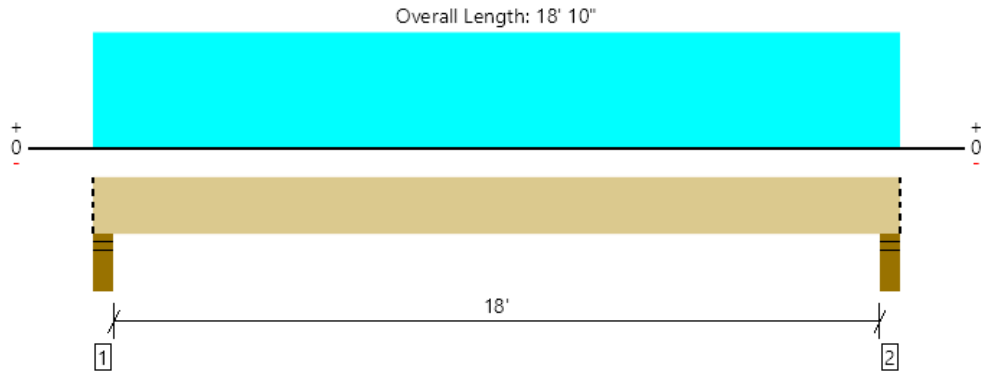
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB2.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	904 @ 3 1/2"	7088 (5.00")	Passed (13%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	774 @ 1' 4 1/4"	5434	Passed (14%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3996 @ 9' 5"	7004	Passed (57%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.188 @ 9' 5"	0.608	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.361 @ 9' 5"	0.913	Passed (L/607)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	5.00"	5.00"	1.50"	433	471	904	Blocking
2 - Stud wall - HF	5.00"	5.00"	1.50"	433	471	904	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 10" o/c	
Bottom Edge (Lu)	18' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 10"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 18' 10" (Front)	2'	18.0	25.0	Roof

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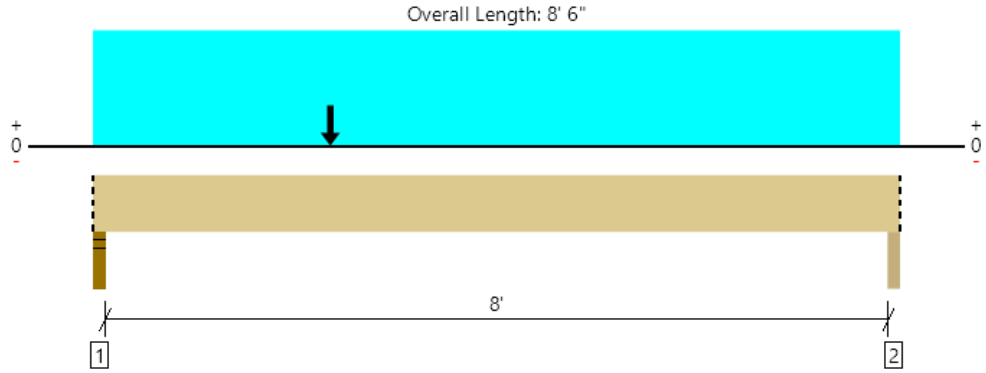
ForteWEB Software Operator

Thanh C. Nguyen
Quantum Consulting Engineers
(626) 248-0917
tnguyen@quantumce.com

Job Notes

Weyerhaeuser

Lower Roof Level., RB3.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3519 @ 1 1/2"	4253 (3.00")	Passed (83%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2715 @ 1' 2 1/4"	5434	Passed (50%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6879 @ 3' 10 3/8"	7004	Passed (98%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.072 @ 4' 2 5/16"	0.275	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.127 @ 4' 2 1/4"	0.412	Passed (L/778)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	2.48"	1536	1982	3518	Blocking
2 - Column - HF	3.00"	3.00"	1.50"	1353	1782	3135	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 7" o/c	
Bottom Edge (Lu)	8' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 6"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 8' 6" (Front)	15' 6"	18.0	25.0	Roof
2 - Point (lb)	2' 6" (Front)	N/A	433	471	Linked from: RB2., Support 1

Member Notes

Beam as Roof Truss Supports

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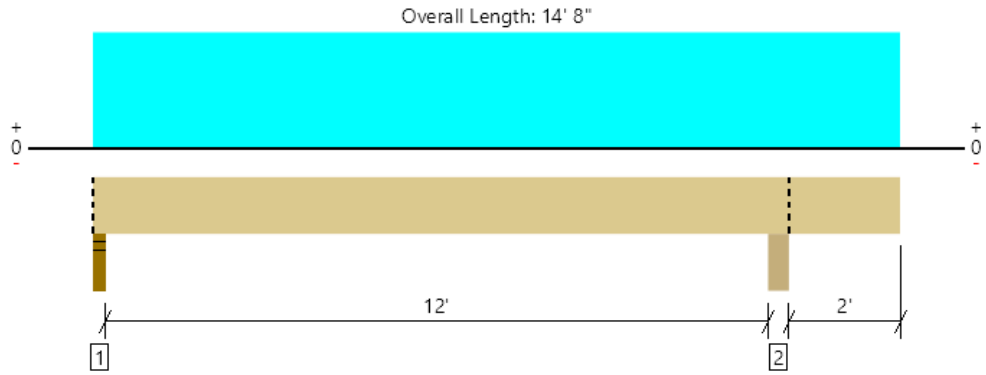
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB4.
1 piece(s) 6 x 10 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2594 @ 1 1/2"	6683 (3.00")	Passed (39%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	2262 @ 11' 5 1/2"	6810	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	7654 @ 6' 1 13/16"	10703	Passed (72%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.189 @ 6' 3 1/8"	0.411	Passed (L/783)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.330 @ 6' 2 15/16"	0.617	Passed (L/449)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	1.50"	1123	1471	2594	Blocking
2 - Column - HF	5.00"	5.00"	1.50"	1579	2036	3615	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 8" o/c	
Bottom Edge (Lu)	14' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 14' 8"	N/A	13.2	--	
1 - Uniform (PSF)	0 to 14' 8" (Front)	9' 6"	18.0	25.0	Roof

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Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., P1.
1 piece(s) 6 x 6 DF No.1

Post Height: 10' 6"

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	23	50	Passed (46%)	--	--
Compression (lbs)	3615	21040	Passed (17%)	1.15	1.0 D + 1.0 S
Base Bearing (lbs)	3615	898425	Passed (0%)	--	1.0 D + 1.0 S
Bending/Compression	0.13	1	Passed (13%)	1.15	1.0 D + 1.0 S

- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Plate	Steel

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Member Type : Free Standing Post
Building Code : IBC 2018
Design Methodology : ASD

Vertical Load	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	1579	2036	Linked from: RB4., Support 2

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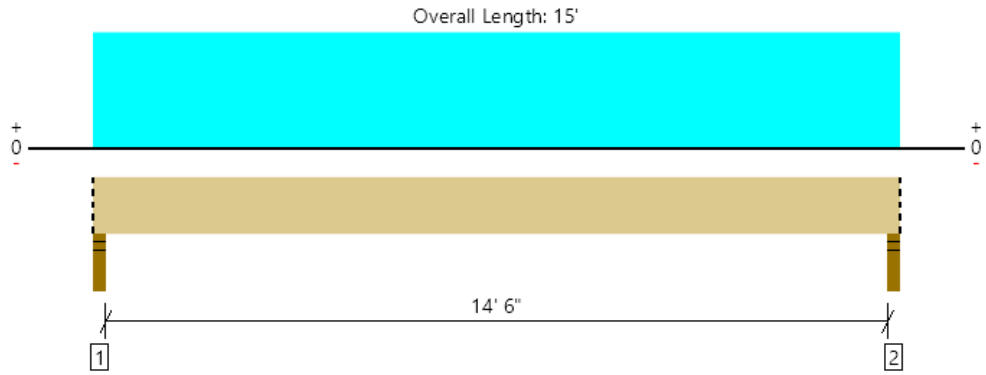
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Lower Roof Level., RB5.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1849 @ 1 1/2"	4253 (3.00")	Passed (43%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1556 @ 1' 2 1/4"	5434	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6703 @ 7' 6"	7004	Passed (96%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.220 @ 7' 6"	0.492	Passed (L/803)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.395 @ 7' 6"	0.738	Passed (L/448)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	1.50"	817	1031	1848	Blocking
2 - Stud wall - HF	3.00"	3.00"	1.50"	817	1031	1848	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 11" o/c	
Bottom Edge (Lu)	15' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15'	N/A	10.0	--	
1 - Uniform (PSF)	0 to 15' (Front)	5' 6"	18.0	25.0	Roof

Member Notes

RB5

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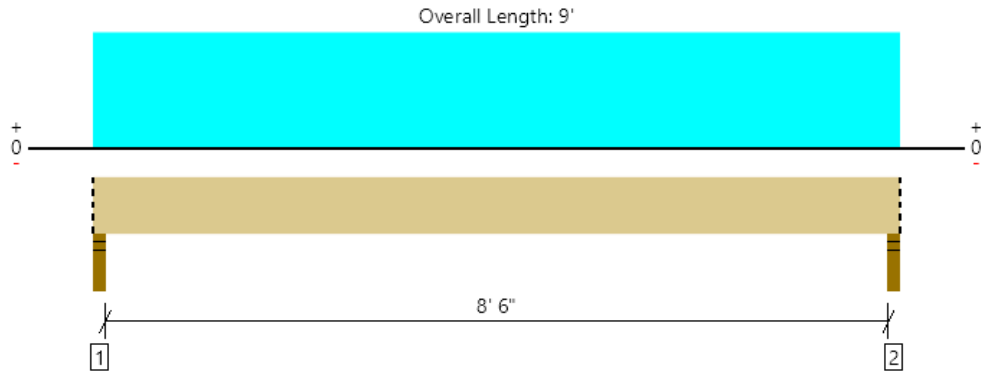
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB6.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2947 @ 1 1/2"	4253 (3.00")	Passed (69%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2170 @ 1' 2 1/4"	5434	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6268 @ 4' 6"	7004	Passed (89%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.074 @ 4' 6"	0.292	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.130 @ 4' 6"	0.438	Passed (L/808)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	2.08"	1260	1687	2947	Blocking
2 - Stud wall - HF	3.00"	3.00"	2.08"	1260	1687	2947	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' o/c	
Bottom Edge (Lu)	9' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9'	N/A	10.0	--	
1 - Uniform (PSF)	0 to 9' (Front)	15'	18.0	25.0	Roof

Member Notes

RB5

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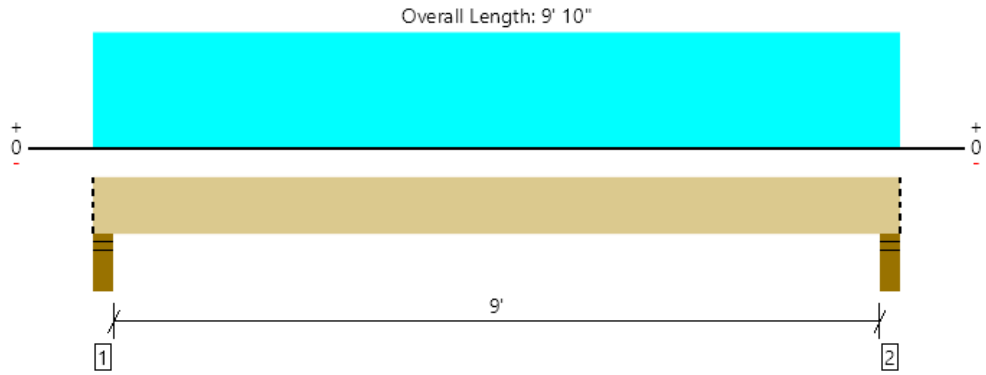
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB7.
1 piece(s) 3 1/8" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4162 @ 3 1/2"	6328 (5.00")	Passed (66%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3068 @ 1' 3 1/2"	6666	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	9053 @ 4' 11"	13207	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.148 @ 4' 11"	0.308	Passed (L/750)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.257 @ 4' 11"	0.463	Passed (L/432)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 9' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	5.00"	5.00"	3.29"	1765	2397	4162	Blocking
2 - Stud wall - HF	5.00"	5.00"	3.29"	1765	2397	4162	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 10" o/c	
Bottom Edge (Lu)	9' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 10"	N/A	8.0	--	
1 - Uniform (PSF)	0 to 9' 10" (Front)	19' 6"	18.0	25.0	Roof

Member Notes

RB5

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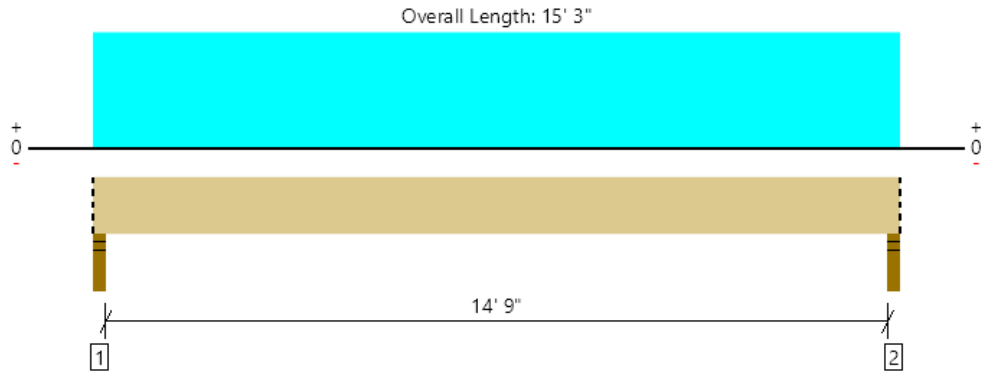
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB8.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1551 @ 1 1/2"	4253 (3.00")	Passed (36%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1310 @ 1' 2 1/4"	5434	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5723 @ 7' 7 1/2"	7004	Passed (82%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.193 @ 7' 7 1/2"	0.500	Passed (L/933)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.349 @ 7' 7 1/2"	0.750	Passed (L/516)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	1.50"	694	858	1552	Blocking
2 - Stud wall - HF	3.00"	3.00"	1.50"	694	858	1552	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 3" o/c	
Bottom Edge (Lu)	15' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 3"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 15' 3" (Front)	4' 6"	18.0	25.0	Roof

Member Notes

RB5

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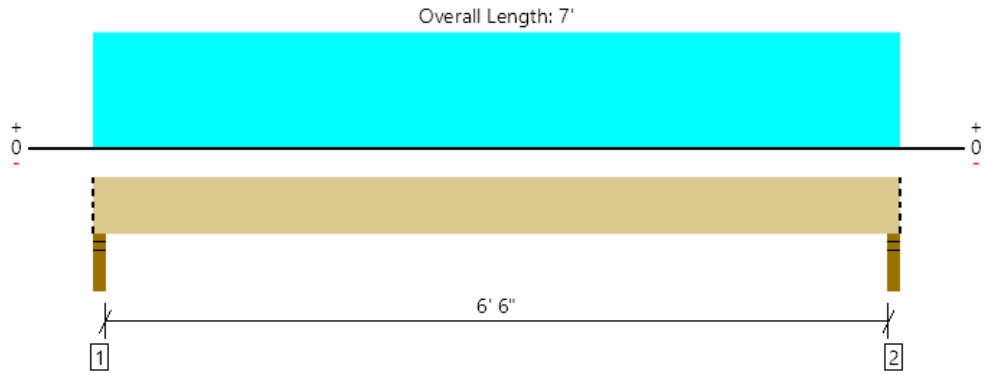
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB9.
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1379 @ 1 1/2"	3645 (3.00")	Passed (38%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	977 @ 1' 1/4"	3191	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2244 @ 3' 6"	3833	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.041 @ 3' 6"	0.225	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.072 @ 3' 6"	0.338	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	1.50"	592	788	1380	Blocking
2 - Stud wall - HF	3.00"	3.00"	1.50"	592	788	1380	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' o/c	
Bottom Edge (Lu)	7' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7'	N/A	7.0	--	
1 - Uniform (PSF)	0 to 7' (Front)	9'	18.0	25.0	Roof

Member Notes

RB5

Weyerhaeuser Notes

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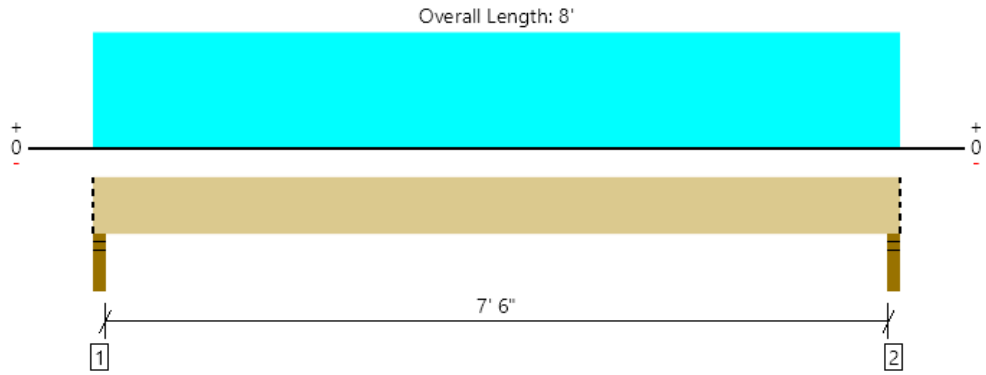
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Lower Roof Level., RB10.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3136 @ 1 1/2"	4253 (3.00")	Passed (74%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2205 @ 1' 2 1/4"	5434	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5886 @ 4'	7004	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.055 @ 4'	0.258	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.096 @ 4'	0.387	Passed (L/971)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - HF	3.00"	3.00"	2.21"	1336	1800	3136	Blocking
2 - Stud wall - HF	3.00"	3.00"	2.21"	1336	1800	3136	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' o/c	
Bottom Edge (Lu)	8' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8'	N/A	10.0	--	
1 - Uniform (PSF)	0 to 8' (Front)	18'	18.0	25.0	Roof

Member Notes

RB5

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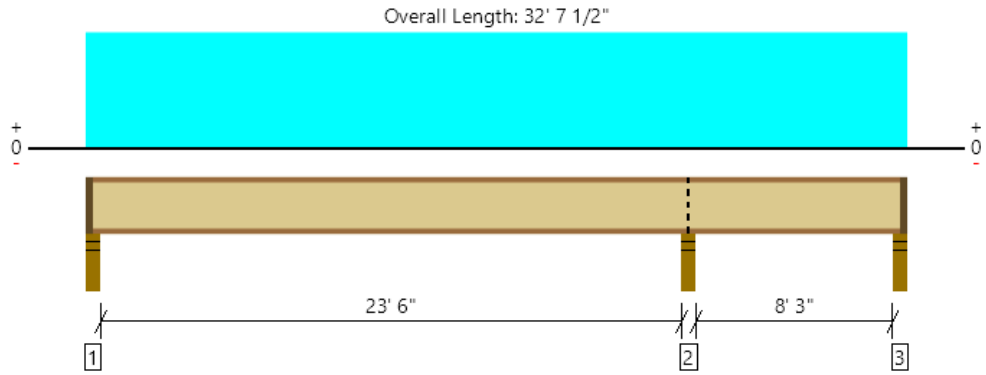
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level			
Member Name	Results	Current Solution	Comments
L2J1.	Passed	1 piece(s) 16" TJI® 210 @ 16" OC	
L2B1.	Passed	1 piece(s) W12X30 (A992) ASTM Steel	
L2B2.	Passed	1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL	
L2B3.	Passed	1 piece(s) 6 3/4" x 12" 24F-V4 DF Glulam	
L2B4.	Passed	1 piece(s) 6 3/4" x 12" 24F-V4 DF Glulam	
L2B5.	Passed	1 piece(s) 5 1/8" x 12" 24F-V4 DF Glulam	
L2H1.	Passed	2 piece(s) 2 x 10 HF No.2	
L2B6.	Passed	1 piece(s) 5 1/8" x 12" 24F-V4 DF Glulam	

Second Level, L2J1.
1 piece(s) 16" TJI® 210 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1817 @ 23' 11 1/4"	2145 (3.50")	Passed (85%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	981 @ 23' 9 1/2"	2190	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-3976 @ 23' 11 1/4"	5140	Passed (77%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.313 @ 10' 11 3/8"	0.593	Passed (L/910)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.427 @ 10' 11 1/8"	1.186	Passed (L/667)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	50	45	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -357 lbs uplift at support located at 32' 5". Strapping or other restraint may be required.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 1 1/8" Panel (48" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 5/8" Gypsum ceiling, Perpendicular Partitions.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - HF	3.50"	1.75"	1.75"	196	527	723	1 3/4" Rim Board
2 - Stud wall - HF	3.50"	3.50"	3.50"	496	1322	1818	Blocking
3 - Stud wall - HF	3.50"	1.75"	1.75"	-39	222/-318	222/-357	1 3/4" 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 8" o/c	
Bottom Edge (Lu)	4' 3" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 32' 7 1/2"	16"	15.0	40.0	Floor

Member Notes
RJ1

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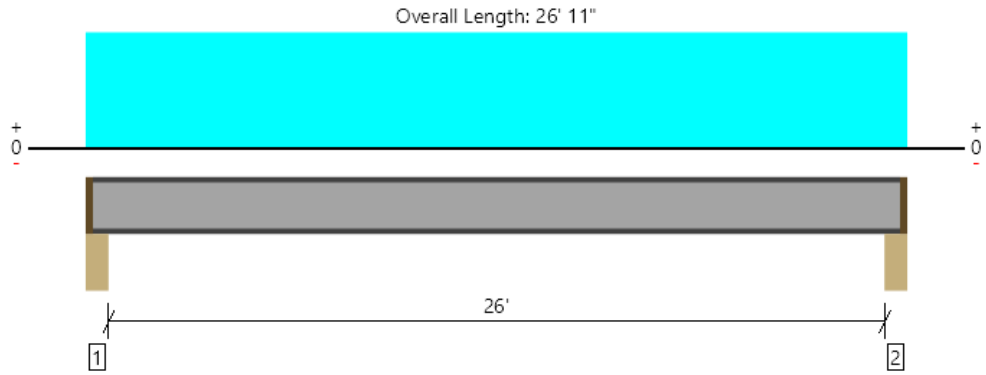
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2B1 - 01-18-22.
1 piece(s) W12X50 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	17603 @ 4"	23483 (3.75")	Passed (75%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	17011 @ 5 1/2"	90280	Passed (19%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	112705 @ 13' 5 1/2"	179391	Passed (63%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.615 @ 13' 5 1/2"	0.656	Passed (L/512)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	1.233 @ 13' 5 1/2"	1.313	Passed (L/256)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (C_b) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Column - DF	5.50"	3.75"	3.75"	8821	4307	7402	20530	1 3/4" Rim Board
2 - Column - DF	5.50"	3.75"	3.75"	8821	4307	7402	20530	1 3/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	Continuous	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 3/4" to 26' 9 1/4"	N/A	50.0	--	--	
1 - Uniform (PSF)	0 to 26' 11"	8'	15.0	40.0	-	Floor
2 - Uniform (PSF)	0 to 26' 11"	22'	18.0	-	25.0	Roof
3 - Uniform (PSF)	0 to 26' 11"	9'	10.0	-	-	Wall

Member Notes

L2B1

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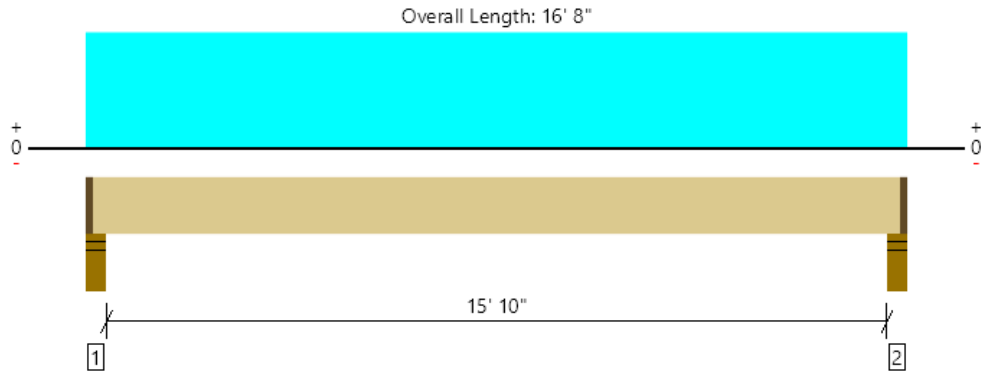
ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2B2.
1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4663 @ 3 1/2"	10664 (3.25")	Passed (44%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3945 @ 1' 4 7/8"	12053	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	18414 @ 8' 4"	29854	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.435 @ 8' 4"	0.536	Passed (L/444)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.619 @ 8' 4"	0.804	Passed (L/312)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	5.00"	3.25"	1.50"	1410	3333	4743	1 3/4" Rim Board
2 - Stud wall - DF	5.00"	3.25"	1.50"	1410	3333	4743	1 3/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 5" o/c	
Bottom Edge (Lu)	16' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 3/4" to 16' 6 1/4"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 16' 8" (Front)	10'	15.0	40.0	Floor

Member Notes

L2B2

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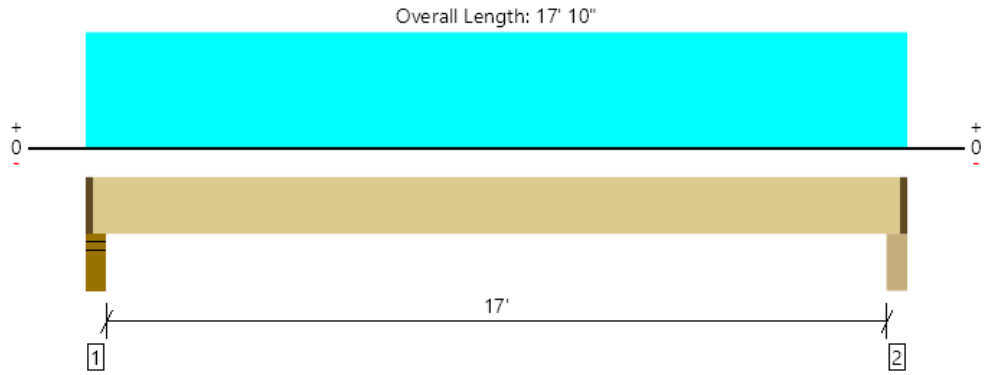
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2B3.
1 piece(s) 6 3/4" x 12" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4284 @ 3 1/2"	8885 (3.25")	Passed (48%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3663 @ 1' 5"	14310	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	18168 @ 8' 11"	32146	Passed (57%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.427 @ 8' 11"	0.431	Passed (L/485)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.556 @ 8' 11"	0.863	Passed (L/372)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 0.99 that was calculated using length L = 17' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - HF	5.00"	3.25"	1.57"	1009	3344	4353	1 3/4" Rim Board
2 - Column - HF	5.00"	3.25"	1.50"	1009	3344	4353	1 3/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 7" o/c	
Bottom Edge (Lu)	17' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 3/4" to 17' 8 1/4"	N/A	19.7	--	
1 - Uniform (PSF)	0 to 17' 10" (Front)	6' 3"	15.0	60.0	Deck

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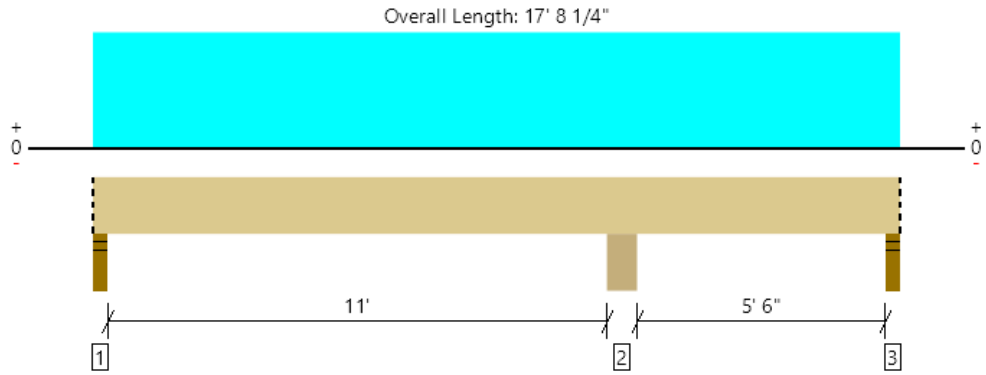
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2B4.
1 piece(s) 6 3/4" x 12" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5079 @ 2"	9568 (3.50")	Passed (53%)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Shear (lbs)	5726 @ 10' 3 1/2"	16457	Passed (35%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Pos Moment (Ft-lbs)	11520 @ 4' 10 3/8"	37260	Passed (31%)	1.15	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Neg Moment (Ft-lbs)	-12789 @ 11' 7 1/8"	28721	Passed (45%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.075 @ 5' 5"	0.286	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Total Load Defl. (in)	0.133 @ 5' 4 9/16"	0.571	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 9' 4 3/4".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 6' 3 5/16".
- -252 lbs uplift at support located at 17' 6 1/4". Strapping or other restraint may be required.
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Stud wall - HF	3.50"	3.50"	1.86"	2262	2050/-54	1706	6018/-54	Blocking
2 - Column - DF	7.25"	7.25"	2.81"	5558	4903	4135	14596	None
3 - Stud wall - HF	3.50"	3.50"	1.50"	500	1194/-753	690/-131	2384/-884	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 8" o/c	
Bottom Edge (Lu)	17' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17' 8 1/4"	N/A	19.7	--	--	
1 - Uniform (PSF)	0 to 17' 8 1/4" (Front)	6' 3"	15.0	60.0	-	Deck
2 - Uniform (PSF)	0 to 17' 8 1/4" (Front)	1'	15.0	40.0	-	Floor
3 - Uniform (PSF)	0 to 17' 8 1/4" (Front)	9'	10.0	-	-	Wall
4 - Uniform (PSF)	0 to 17' 8 1/4" (Front)	14'	18.0	-	25.0	Roof

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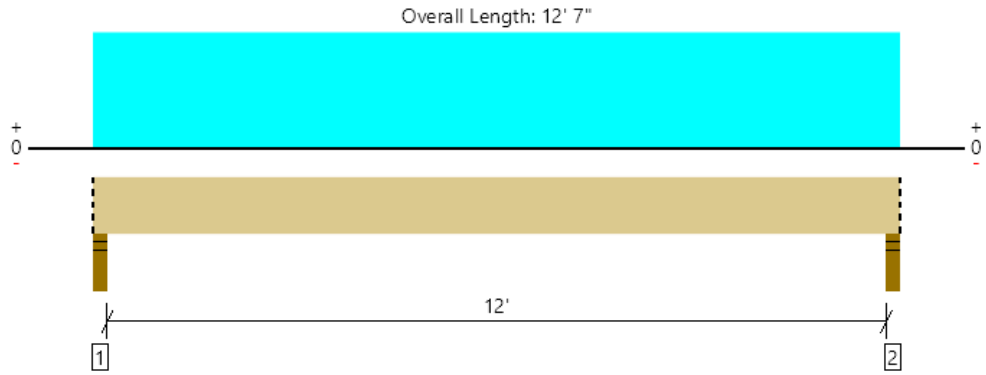
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2B5.
1 piece(s) 5 1/8" x 12" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6070 @ 2"	7265 (3.50")	Passed (84%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4824 @ 1' 3 1/2"	12495	Passed (39%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Pos Moment (Ft-lbs)	18098 @ 6' 3 1/2"	28290	Passed (64%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.182 @ 6' 3 1/2"	0.306	Passed (L/806)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.368 @ 6' 3 1/2"	0.613	Passed (L/399)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 12' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Stud wall - HF	3.50"	3.50"	2.92"	3062	1101	2910	7073	Blocking
2 - Stud wall - HF	3.50"	3.50"	2.92"	3062	1101	2910	7073	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 7" o/c	
Bottom Edge (Lu)	12' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 7"	N/A	14.9	--	--	
1 - Uniform (PSF)	0 to 12' 7" (Front)	1'	15.0	40.0	-	Floor
2 - Uniform (PSF)	0 to 12' 7" (Front)	2' 3"	15.0	60.0	-	Deck
3 - Uniform (PSF)	0 to 12' 7" (Front)	9'	10.0	-	-	Wall
4 - Uniform (PSF)	0 to 12' 7" (Front)	18' 6"	18.0	-	25.0	Roof

Weyerhaeuser Notes

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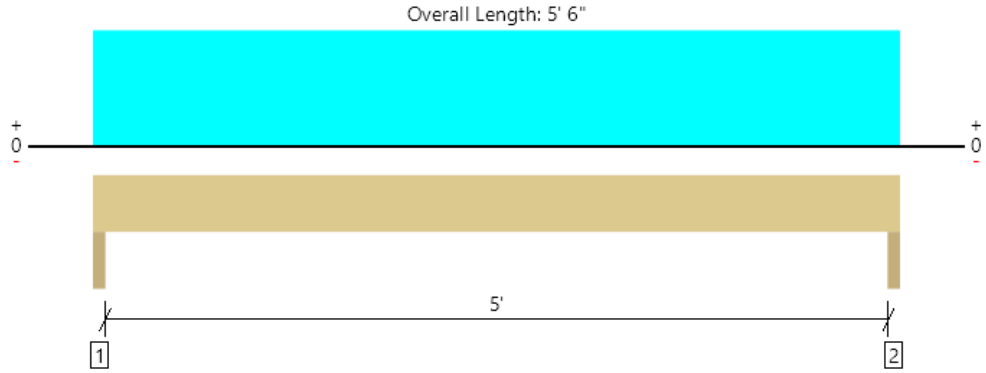
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2H1.
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2439 @ 1 1/2"	3645 (3.00")	Passed (67%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1534 @ 1' 1/4"	2775	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3056 @ 2' 9"	3333	Passed (92%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.043 @ 2' 9"	0.131	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.059 @ 2' 9"	0.262	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Trimmer - HF	3.00"	3.00"	2.01"	679	1760	2439	None
2 - Trimmer - HF	3.00"	3.00"	2.01"	679	1760	2439	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 6" o/c	
Bottom Edge (Lu)	5' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 5' 6"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 5' 6"	16'	15.0	40.0	Floor

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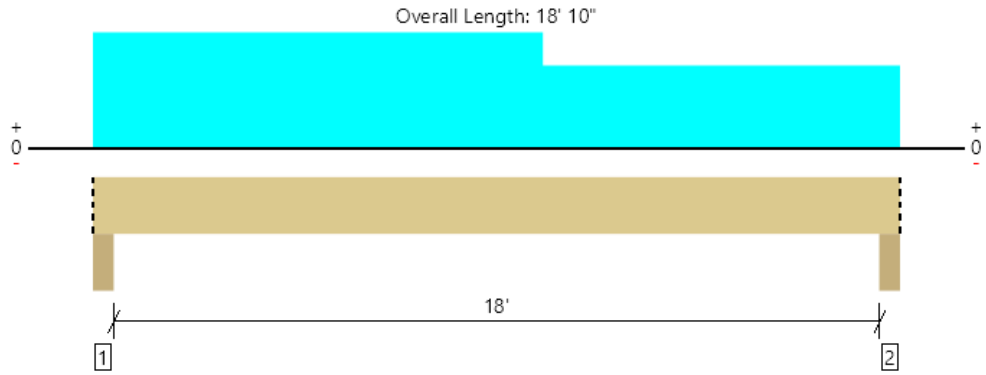
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Second Level, L2B6 - 01-18-22.
1 piece(s) 5 1/4" x 16" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	9206 @ 3 1/2"	16406 (5.00")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	7396 @ 1' 9"	18676	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	38331 @ 8' 10 13/16"	60297	Passed (64%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.342 @ 9' 3 7/16"	0.456	Passed (L/640)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.688 @ 9' 3 5/8"	0.913	Passed (L/318)	--	1.0 D + 1.0 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Column - HF	5.00"	5.00"	2.81"	4572	377	4634	9583	Blocking
2 - Column - HF	5.00"	5.00"	2.37"	3969	377	3795	8141	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 10" o/c	
Bottom Edge (Lu)	18' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 10"	N/A	26.3	--	--	
1 - Uniform (PSF)	0 to 18' 10" (Front)	1'	15.0	40.0	-	Floor
2 - Uniform (PSF)	0 to 10' 6" (Front)	21'	18.0	-	25.0	Roof
3 - Uniform (PSF)	10' 6" to 18' 10" (Front)	14'	18.0	-	25.0	Roof
4 - Uniform (PSF)	0 to 18' 10" (Front)	9'	10.0	-	-	Wall

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

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Weyerhaeuser

Wood Beam

Description : L2J3 - Deck Joist

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

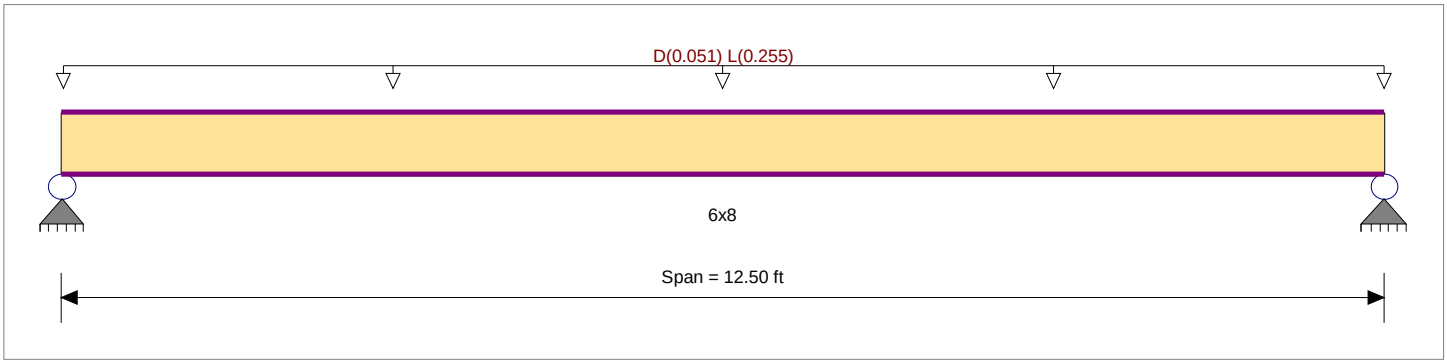
Wood Species : Douglas Fir - Larch
Wood Grade : Select structural

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

Fb +	1,600.0 psi
Fb -	1,600.0 psi
Fc - Prll	1,100.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	950.0 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 = 0.0120, L = 0.060 ksf, Tributary Width = 4.250 ft, (Deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.895 : 1	Maximum Shear Stress Ratio	=	0.381 : 1
Section used for this span		6x8	Section used for this span		6x8
fb : Actual	=	1,431.53 psi	fv : Actual	=	64.78 psi
FB : Allowable	=	1,600.00 psi	Fv : Allowable	=	170.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	6.250 ft	Location of maximum on span	=	11.907 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.455 in	Ratio =	329 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.562 in	Ratio =	266 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.968	1.968
Overall MINimum	0.225	0.225
+D+H	0.375	0.375
+D+L+H	1.968	1.968
+D+Lr+H	0.375	0.375
+D+S+H	0.375	0.375
+D+0.750Lr+0.750L+H	1.570	1.570
+D+0.750L+0.750S+H	1.570	1.570
+D+0.60W+H	0.375	0.375
+D+0.70E+H	0.375	0.375
+D+0.750Lr+0.750L+0.450W+H	1.570	1.570
+D+0.750L+0.750S+0.450W+H	1.570	1.570

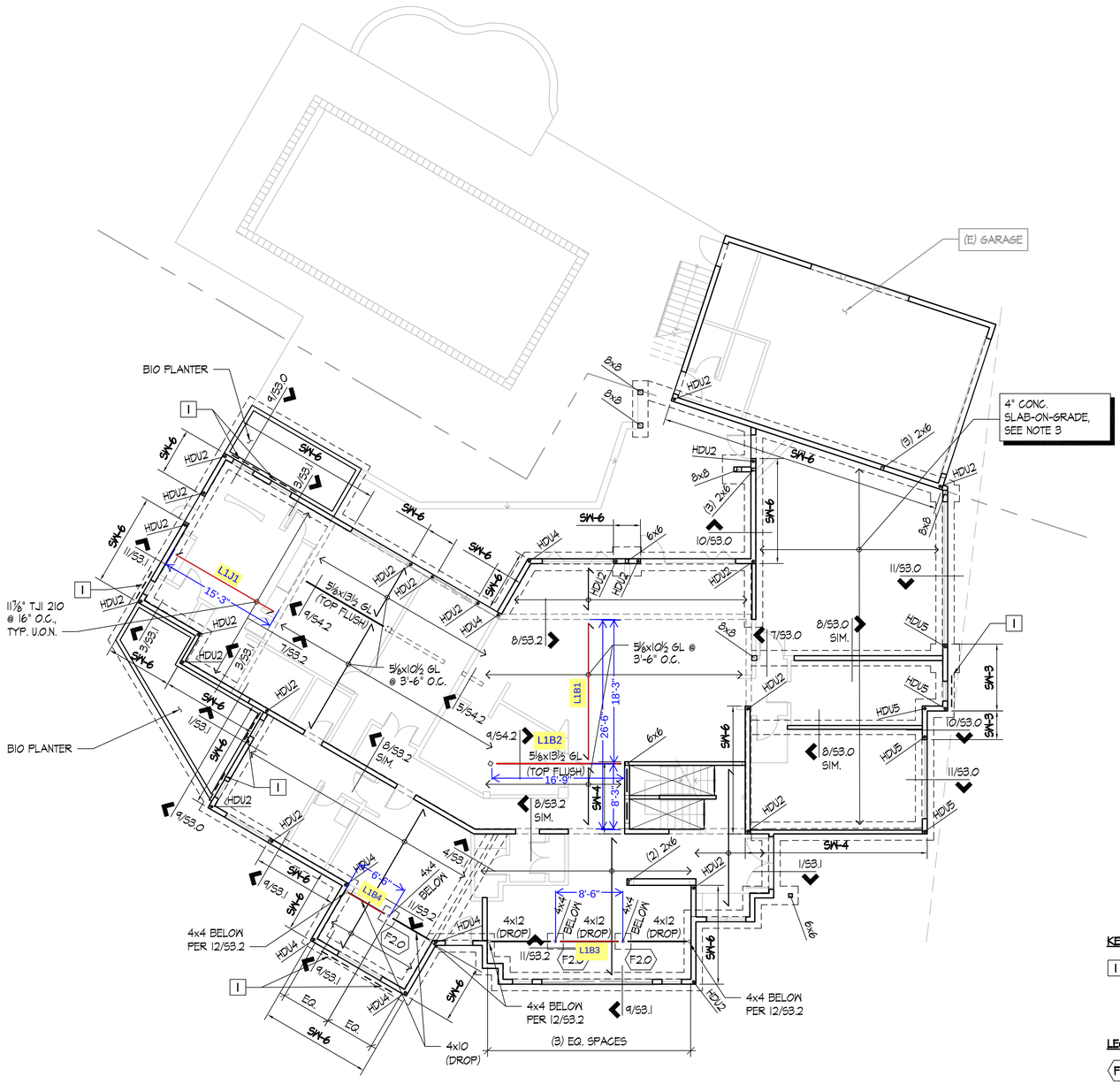
Wood Beam

Description : L2J3 - Deck Joist

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	1.570	1.570
+0.60D+0.60W+0.60H	0.225	0.225
+0.60D+0.70E+0.60H	0.225	0.225
D Only	0.375	0.375
Lr Only		
L Only	1.594	1.594
S Only		
W Only		
E Only		
H Only		



FOUNDATION / FIRST LEVEL FRAMING PLAN

SCALE: 1/8" = 1'-0"

FOUNDATION / FIRST LEVEL FRAMING PLAN NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ON THE STRUCTURAL PLANS ARE FOR GENERAL INFORMATION ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR WITH THE ARCHITECTURAL DRAWINGS BEFORE CONSTRUCTION BEGINS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER IMMEDIATELY.
2. SEE SHEETS S1.0 AND S1.1 FOR GENERAL STRUCTURAL NOTES AND ABBREVIATIONS. SEE SHEET S3.0 FOR TYPICAL CONCRETE AND FOUNDATION DETAILS. SEE SHEET S4.0 FOR TYPICAL WOOD DETAILS.
3. SLAB-ON-GRADE SHALL BE 4" THICK CONCRETE REINFORCED WITH #4 @ 16" O.C. EACH WAY AT MID-DEPTH, U.O.N. SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION REGARDING SUB-GRADE MOISTURE BARRIER AND ELEVATIONS, ETC.
4. FOR SLAB-ON-GRADE JOINTS, SEE DETAIL 2/S3.0.
5. WHERE NEW CONCRETE IS CAST AGAINST EXISTING CONCRETE FOUNDATIONS, DRILL AND EPOXY #4 DOWELS x 3'-0" LONG TO LAP WITH THE NEW FOOTING LONGITUDINAL REINFORCING (5" MINIMUM EMBEDMENT).
6. ALL WOOD BEARING ON UNPROTECTED CONCRETE, EXPOSED TO WEATHER, OR WITHIN 8" OF FINISHED GRADE SHALL BE PRESSURE-TREATED, U.O.N.
7. FOR SILL PLATE ANCHOR BOLT LAYOUT TO CONCRETE FOUNDATION WALLS AND SLABS, SEE DETAIL 1/S4.0.
8. TYPICAL FLOOR FRAMING CONSISTS OF 1-1/8" APA RATED T&G SHEATHING (INDEX 48/24), LAID FACE GRAIN PERPENDICULAR OVER JOISTS AT 16" O.C. HANG TJI JOISTS WITH ITS TOP FLANGE HANGERS AND GLULAM WITH BA TOP FLANGE HANGERS TYPICAL AT FLUSH BEAMS, U.O.N.
9. NAIL FLOOR SHEATHING TO FRAMING WITH 8d NAILS (0.131"Φ x 2.5" LONG) AT 6" O.C. AT ALL PANELS EDGES AND 8d NAILS AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS (UNBLOCKED). SEE DETAIL 6/S4.0.
10. ALL BEARING AND SHEAR WALLS SHALL BE 2x4 @ 16" O.C. INTERIOR AND 2x6 @ 16" O.C. EXTERIOR U.O.N.
11. POSTS INDICATED ARE AT THIS LEVEL. ALL POSTS NOT SPECIFIED SHALL BE (2) 2x U.O.N. SOLID SAWN MEMBERS OF EQUIVALENT SIZE MAY BE SUBSTITUTED FOR BUILT-UP MEMBERS (SUCH AS A 4x6 FOR (3) 2x4).
12. PROVIDE SOLID OR BUILT-UP WOOD POSTS BENEATH THE ENDS OF ALL FLOOR BEAMS AND ALL POSTS ABOVE FOR FULL BEARING. PROVIDE BLKG. AT JOISTS PER DETAIL 7/S4.1.
13. ALL HEADERS NOT SHOWN ON PLAN SHALL BE (2) 2x10 FOR EXTERIOR BEARING WALLS AND (2) 2x10 FOR INTERIOR BEARING WALLS. SEE 10/S4.1 FOR HEADER DETAIL.
14. FOR TOP PLATE SPLICE SEE DETAIL 6/S4.1.
15. ALIGN A JOIST OR JOIST BLOCKING OVER THE FULL LENGTH OF ALL BEARING/SHEAR WALLS. SEE 8/S4.0 FOR SPECIAL SHEAR WALL BLOCKING REQUIREMENTS.
16. SW-x — INDICATES SHEAR WALL AT THIS LEVEL. SEE SHEAR WALL SCHEDULE 8/S4.0 FOR SHEATHING, BLOCKING, NAILING, AND ANCHOR BOLT REQUIREMENTS. ALL EXTERIOR WALLS SHALL BE SHEATHED PER SW-6 CRITERIA, U.O.N.
17. HDUx — INDICATES HOLDOWN TO CONCRETE FOUNDATION WALLS OR FOOTINGS. SEE 12/S4.0 FOR HOLDOWN DETAIL. USE MIN. (2) 2x POST U.O.N.

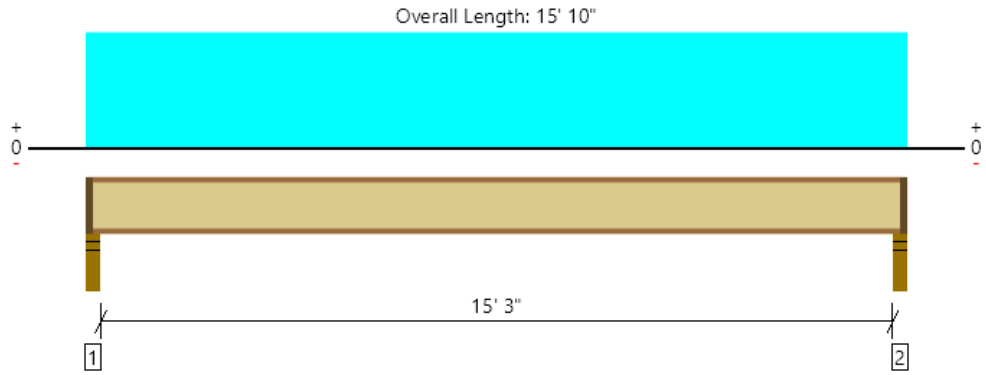
KEY NOTES:

I	STRAPPING AROUND SHEAR WALL OPENING PER 1/S4.3

LEGEND:

Fx.x	INDICATES SPREAD FOOTING. SEE 12/S3.0 FOR SCHEDULE
	INDICATES FOOTING
	INDICATES FOUNDATION WALL, WOOD BEARING WALL OR SHEAR WALL
	INDICATES FRAMING DIRECTION
	INDICATES EXTENT OF FRAMING
SW-x	INDICATES SHEAR WALL TYPE AT THIS LEVEL. SEE PLAN NOTE 16
	INDICATES WOOD BEARING OR SHEAR WALL AT THIS LEVEL. SEE PLAN NOTES 10 & 16
	INDICATES WOOD BEARING WALL OR SHEAR WALL BELOW
	INDICATES NON-BEARING/ NON-SHEAR WALL AT THIS LEVEL. SEE 1 & 2/S4.1 FOR CONNECTION DETAILS
	INDICATES HEADER MEMBER. SEE PLAN NOTE 13
8"/24"	INDICATES MULTIPLE STUD POST AT THIS LEVEL. SEE PLAN NOTE 12
HX	INDICATES HOLDOWN TYPE AT THIS LEVEL. SEE PLAN NOTE 17

Main Level., L1J1.
1 piece(s) 11 7/8" TJI® 210 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	591 @ 2 1/2"	1005 (1.75")	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	580 @ 3 1/2"	1655	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2258 @ 7' 11"	3795	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.204 @ 7' 11"	0.385	Passed (L/909)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.290 @ 7' 11"	0.771	Passed (L/638)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	48	48	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - HF	3.50"	1.75"	1.75"	179	422	601	1 3/4" Rim Board
2 - Stud wall - HF	3.50"	1.75"	1.75"	179	422	601	1 3/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 10" o/c	
Bottom Edge (Lu)	15' 7" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 15' 10"	16"	17.0	40.0	Floor

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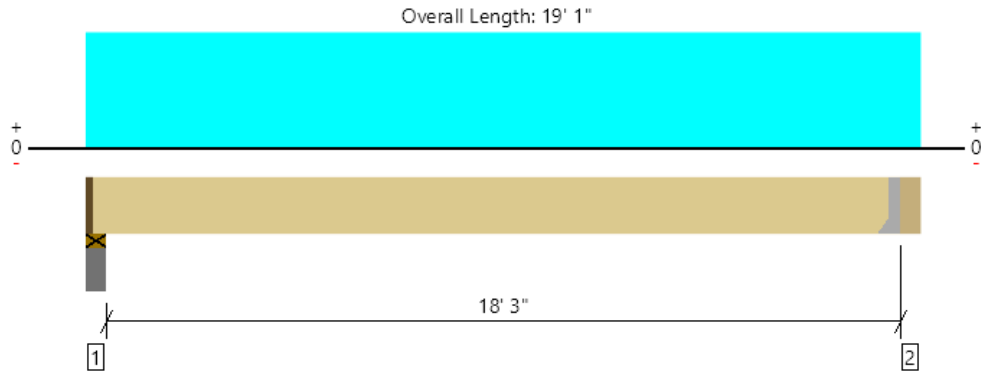
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Level., L1B1.
1 piece(s) 5 1/8" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1889 @ 18' 8"	4997 (1.50")	Passed (38%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1709 @ 17' 9 1/2"	9507	Passed (18%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	8676 @ 9' 5 3/4"	18834	Passed (46%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.404 @ 9' 5 3/4"	0.613	Passed (L/546)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.593 @ 9' 5 3/4"	0.919	Passed (L/372)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 18' 4 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Plate on concrete - HF	5.00"	3.25"	1.50"	620	1327	1947	1 3/4" Rim Board
2 - Hanger on 10 1/2" DF beam	5.00"	Hanger[1]	1.50"	624	1345	1969	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 6" o/c	
Bottom Edge (Lu)	18' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HUC310-2	2.50"	N/A	14-16d	6-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 3/4" to 18' 8"	N/A	13.1	--	
1 - Uniform (PSF)	0 to 19' 1" (Front)	3' 6"	15.0	40.0	Floor

Member Notes
Glulam Purlin

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Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

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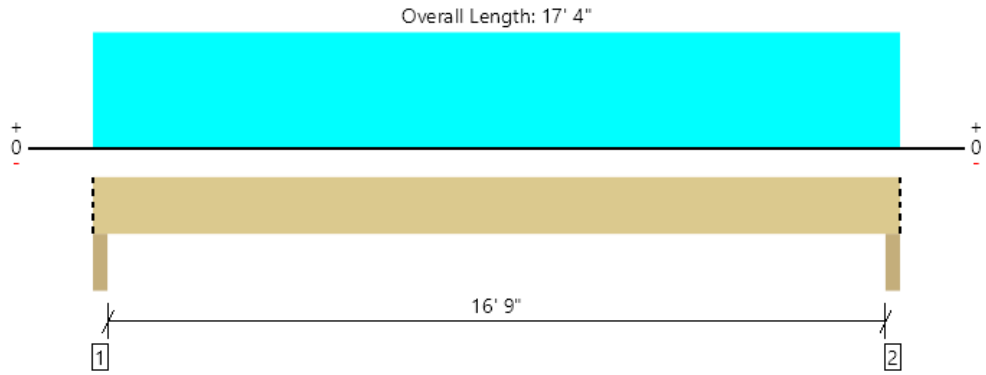
Main Level., L1B2.
1 piece(s) 5 1/8" x 13 1/2" 24F-V8 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6815 @ 2"	11659 (3.50")	Passed (58%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	5701 @ 1' 5"	12223	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	28406 @ 8' 8"	31134	Passed (91%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.537 @ 8' 8"	0.567	Passed (L/380)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.781 @ 8' 8"	0.850	Passed (L/261)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 17'.
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Column - HF	3.50"	3.50"	2.05"	2135	4680	6815	Blocking
2 - Column - HF	3.50"	3.50"	2.05"	2135	4680	6815	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 4" o/c	
Bottom Edge (Lu)	17' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 17' 4"	N/A	16.8	--	
1 - Uniform (PSF)	0 to 17' 4" (Front)	13' 6"	17.0	40.0	Floor

Member Notes

Glulam Beam with Decking Floor

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

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Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

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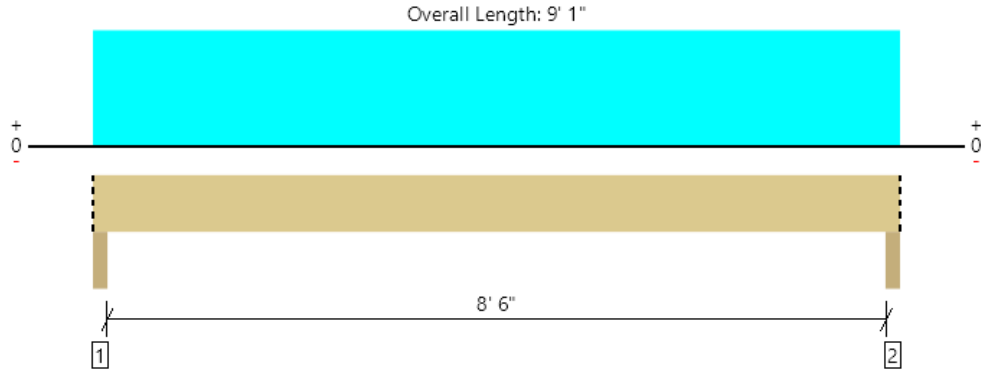
Main Level., L1B3.
1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2418 @ 2"	7656 (3.50")	Passed (32%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1764 @ 1' 2 3/4"	4725	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	5096 @ 4' 6 1/2"	6091	Passed (84%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.075 @ 4' 6 1/2"	0.219	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.106 @ 4' 6 1/2"	0.438	Passed (L/993)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Column - HF	3.50"	3.50"	1.50"	692	1726	2418	Blocking
2 - Column - HF	3.50"	3.50"	1.50"	692	1726	2418	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 1" o/c	
Bottom Edge (Lu)	9' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 9' 1"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 9' 1" (Front)	9' 6"	15.0	40.0	Floor

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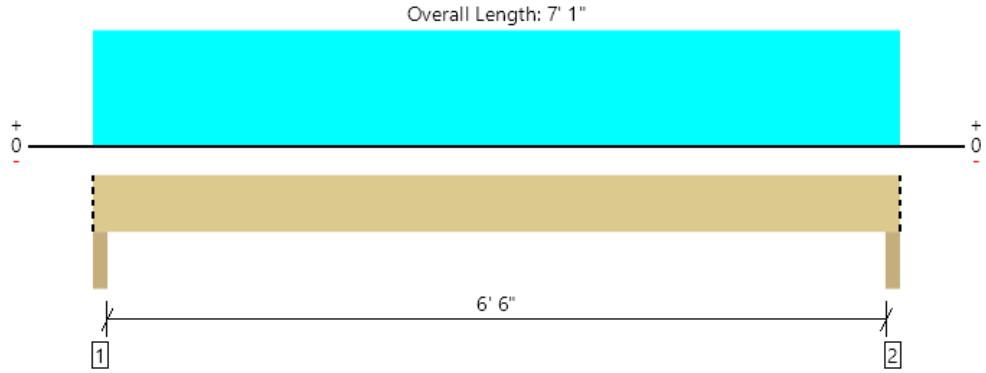
Thanh C. Nguyen Quantum Consulting Engineers (626) 248-0917 tnguyen@quantumce.com	

Weyerhaeuser

Main Level., L1B4.
1 piece(s) 4 x 10 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2172 @ 2"	7656 (3.50")	Passed (28%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1520 @ 1' 3/4"	3885	Passed (39%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3492 @ 3' 6 1/2"	4492	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.056 @ 3' 6 1/2"	0.169	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.078 @ 3' 6 1/2"	0.338	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Column - HF	3.50"	3.50"	1.50"	613	1558	2171	Blocking
2 - Column - HF	3.50"	3.50"	1.50"	613	1558	2171	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 1" o/c	
Bottom Edge (Lu)	7' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 7' 1"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 7' 1" (Front)	11'	15.0	40.0	Floor

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