CK Engineering LLC.

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STRUCTURAL CALCULATIONS

Lateral & Gravity Design
19-061

1/13/2020

TIMBERLAND
9027 SE 60th ST.
Mercer Island, WA 98040
January 13, 2020

Hazards by Location

Search Information

Address: 9027 se 60th mercer island

Coordinates: 47.5489591, -122.2176389

Elevation: ft

Timestamp: 2019-12-10T01:33:58.510Z

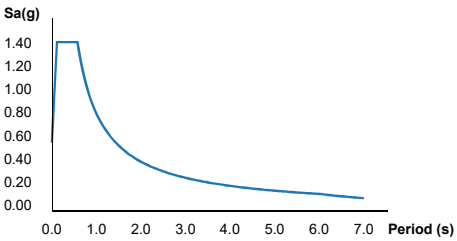
Hazard Type: Seismic

Reference Document: IBC-2015

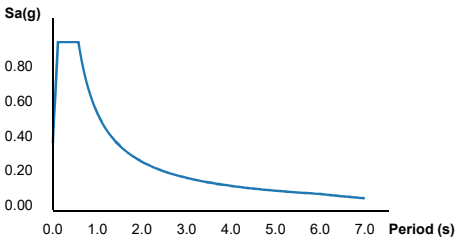
Risk Category: II

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.451	MCE_R ground motion (period=0.2s)
S_1	0.556	MCE_R ground motion (period=1.0s)
S_{MS}	1.451	Site-modified spectral acceleration value
S_{M1}	0.835	Site-modified spectral acceleration value
S_{DS}	0.968	Numeric seismic design value at 0.2s SA
S_{D1}	0.556	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.948	Coefficient of risk (0.2s)
CR_1	0.928	Coefficient of risk (1.0s)
PGA	0.603	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.603	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.451	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.53	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.588	Factored deterministic acceleration value (0.2s)
S1RT	0.556	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.6	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.308	Factored deterministic acceleration value (1.0s)
PGAd	1.37	Factored deterministic acceleration value (PGA)

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

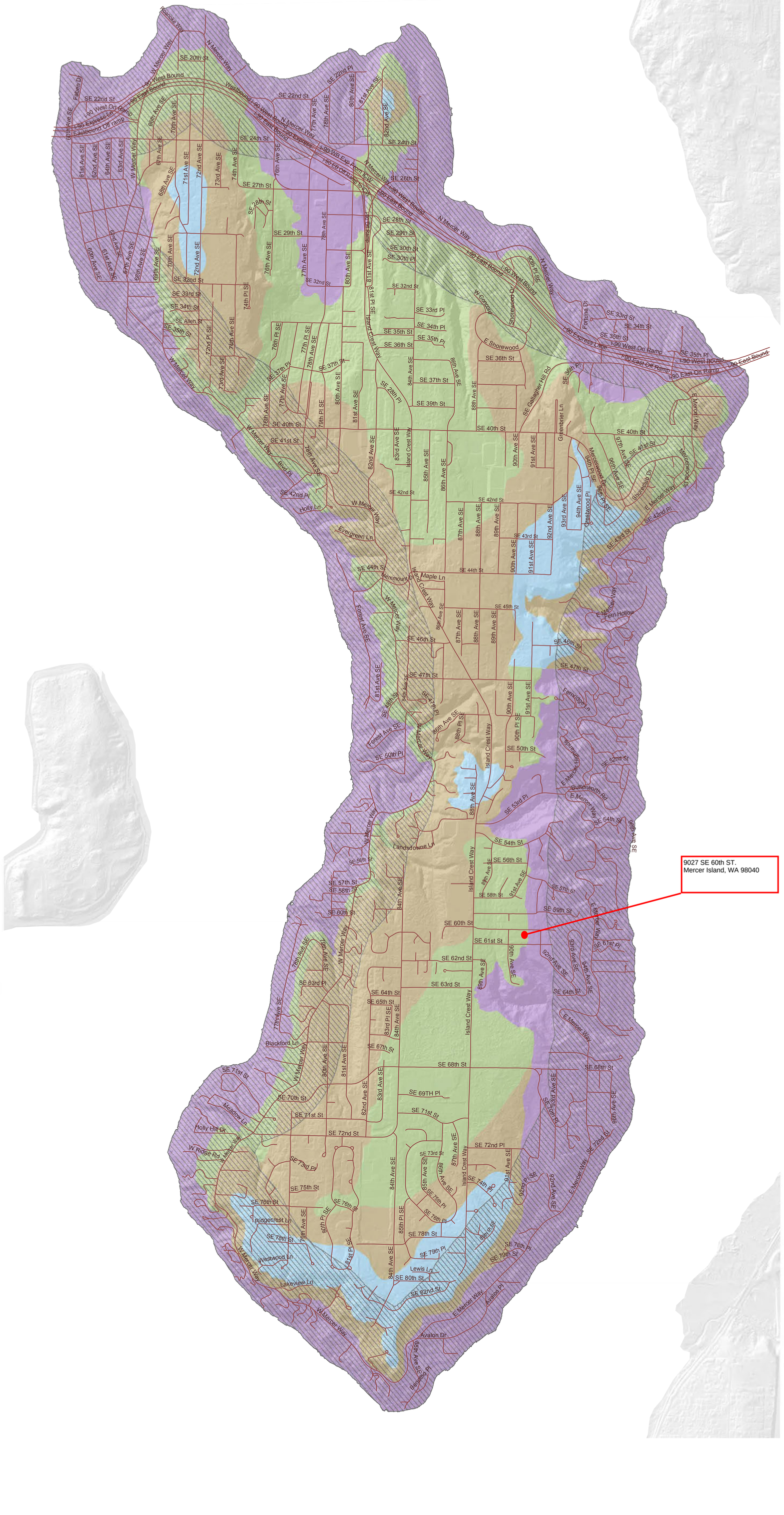
Disclaimer

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.

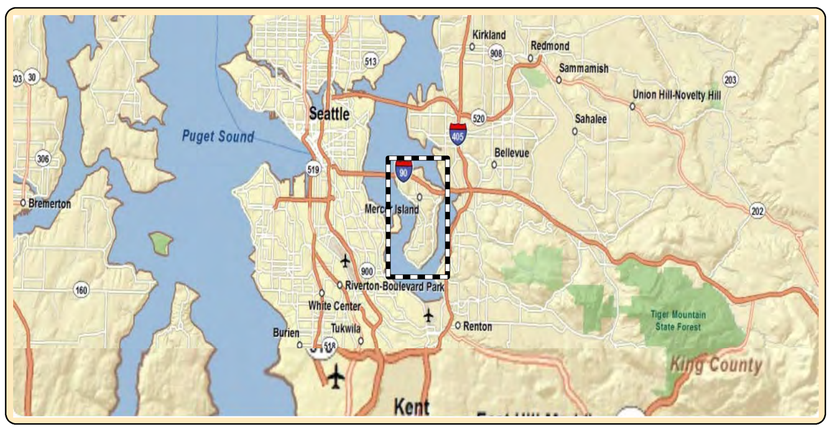
DEFINITIONS:

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)



Design Criteria

Scope of Work:	Lateral & Gravity Design		
Site Address:	9027 SE 60th ST. Mercer Island, WA 98040		
Number of Stories:	2	Engineer:	PK

Roof Loading

Roofing	Composition	3.0
Sheathing	5/8" Plywood	1.8
Insulation	Roll/Batt	3.0
Ceiling	5/8" GWB	2.8
Framing	Trusses	2.2
Miscellaneous	fixtures, mechanical, electrical, etc.	2.2
	TOTAL DEAD LOAD:	15.0 psf
	ROOF SNOW LOAD:	25.0 psf

Upper Floor Loading

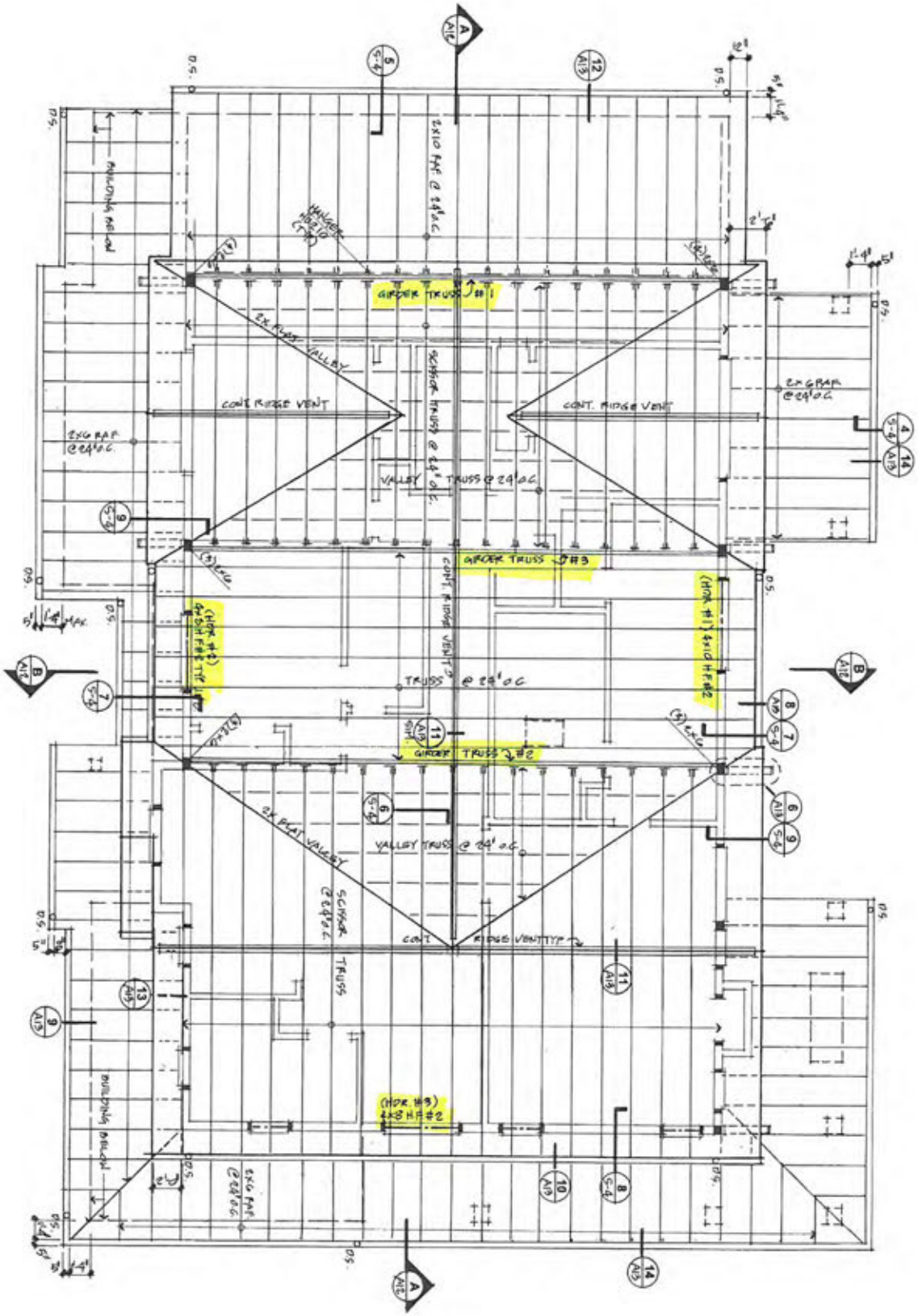
Floor Covering	Carpet/Hardwood/Tile	3.0
Sheathing	3/4" T&G	2.3
Ceiling	1/2" GWB	2.2
Joists	Solid Sawn @ 16" o/c	3.3
Beams		2.8
Miscellaneous	fixtures, mechanical, electrical, etc.	1.4
	TOTAL DEAD LOAD:	15.0 psf
	FLOOR LIVE LOAD:	40.0 psf

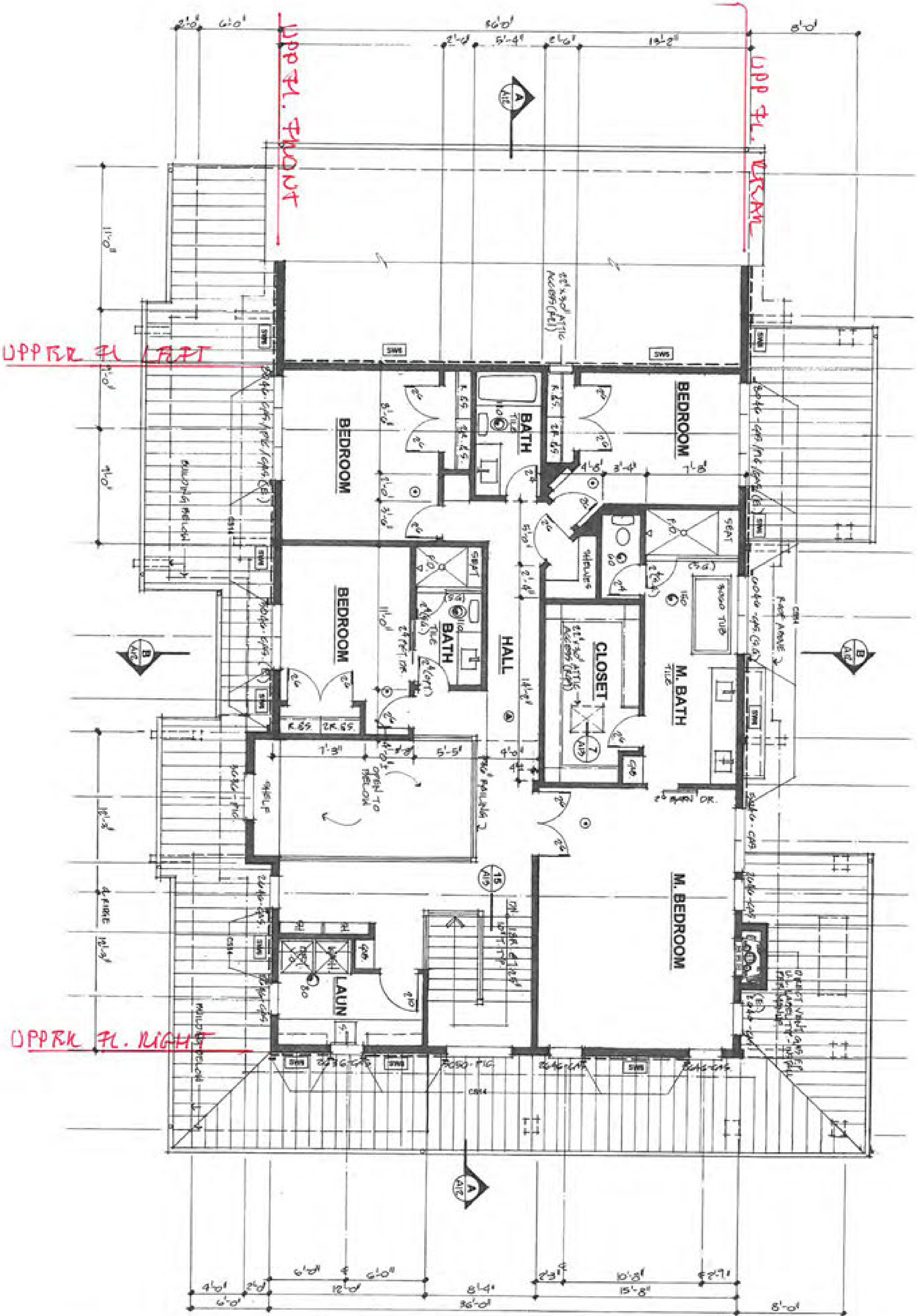
Main Floor Loading

Floor Covering	Carpet/Hardwood/Tile	3.0
Sheathing	3/4" T&G	2.3
Ceiling	5/8" GWB	2.8
Joists	I-Joists	2.1
Beams		4.2
Miscellaneous	fixtures, mechanical, electrical, etc.	0.6
	TOTAL DEAD LOAD:	15.0 psf
	FLOOR LIVE LOAD:	40.0 psf

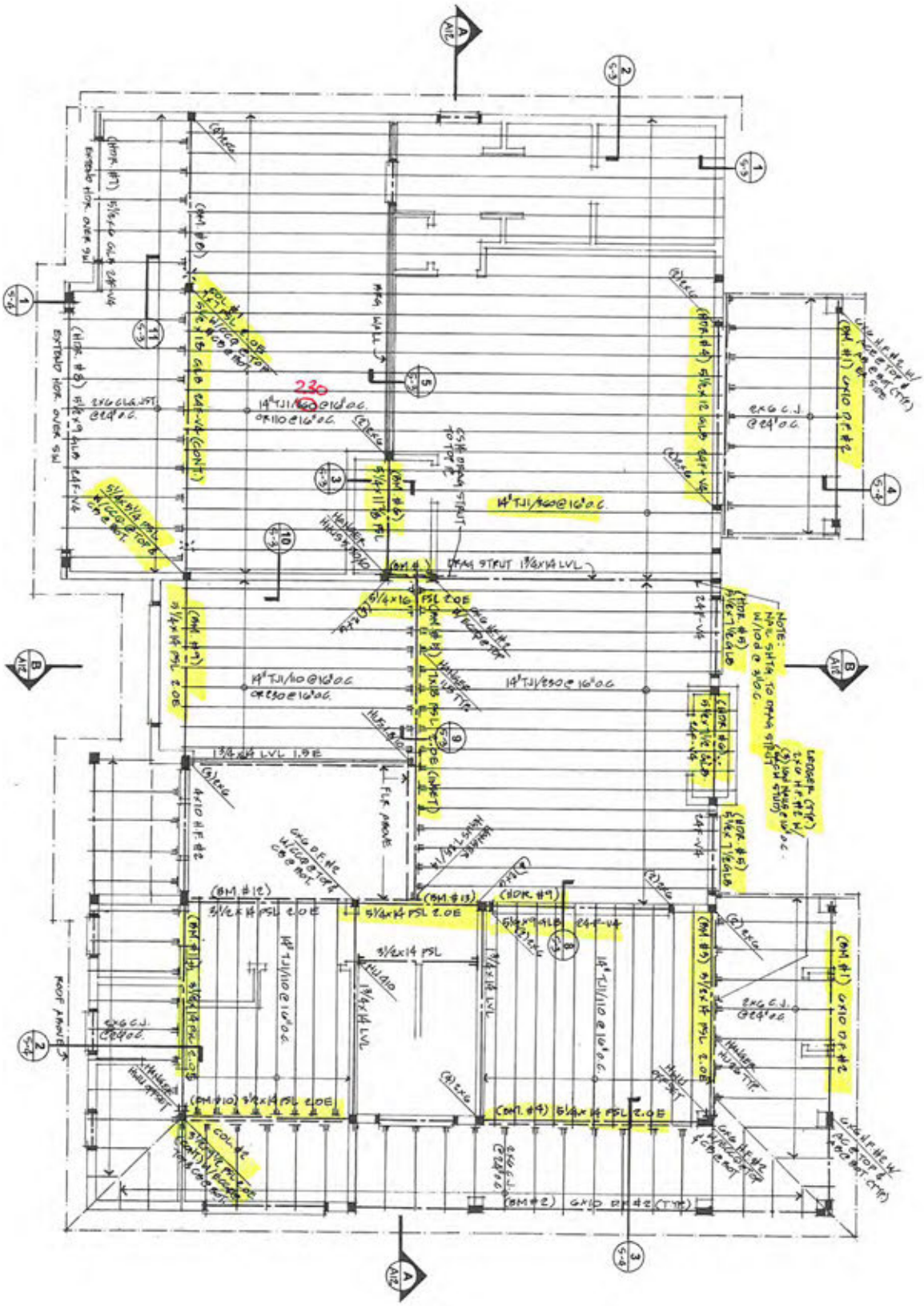
Soil Bearing Capacity:	1500 psf
Frost Depth:	18 in

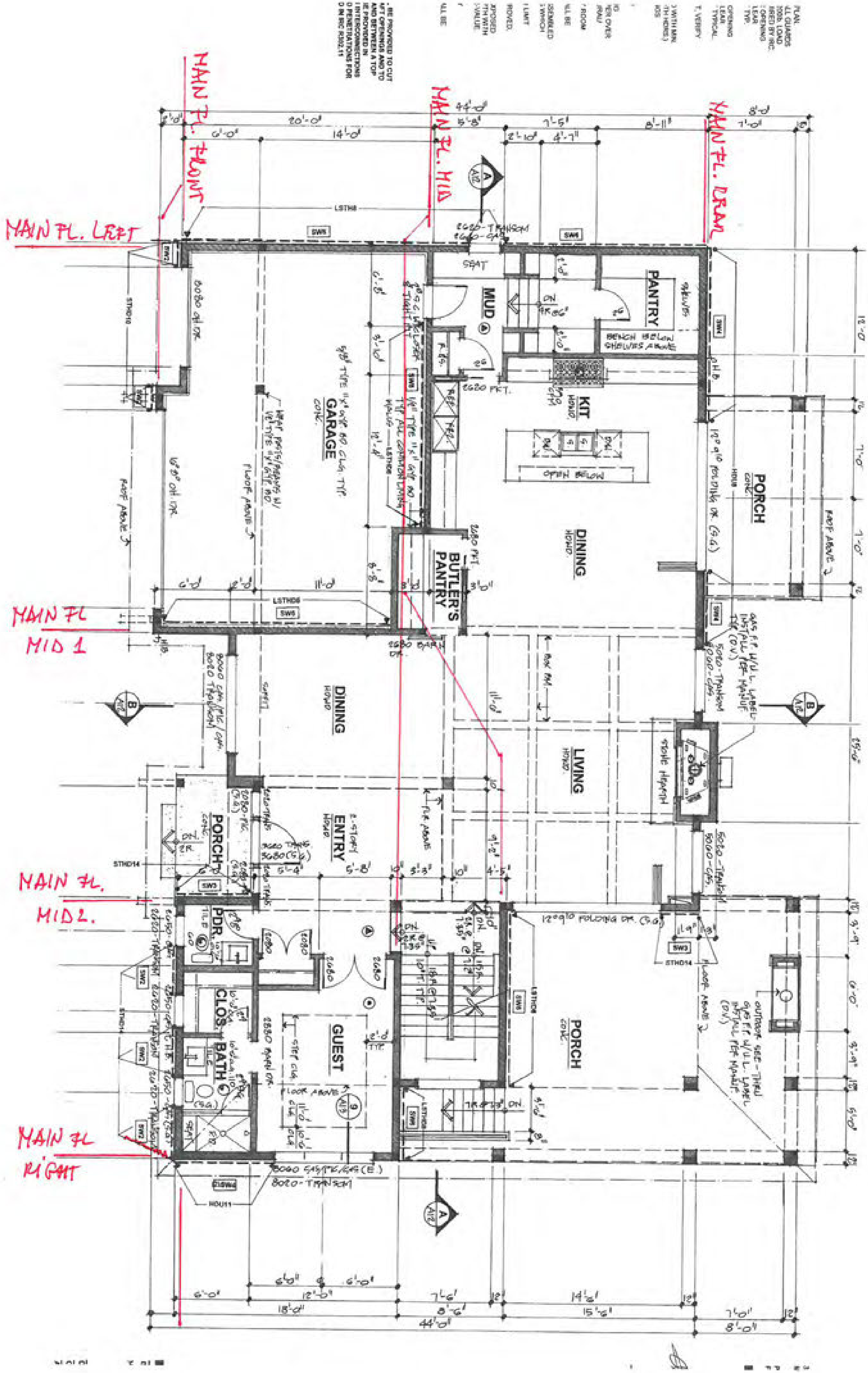
LATERAL & GRAVITY DESIGN
ROOF PLANS



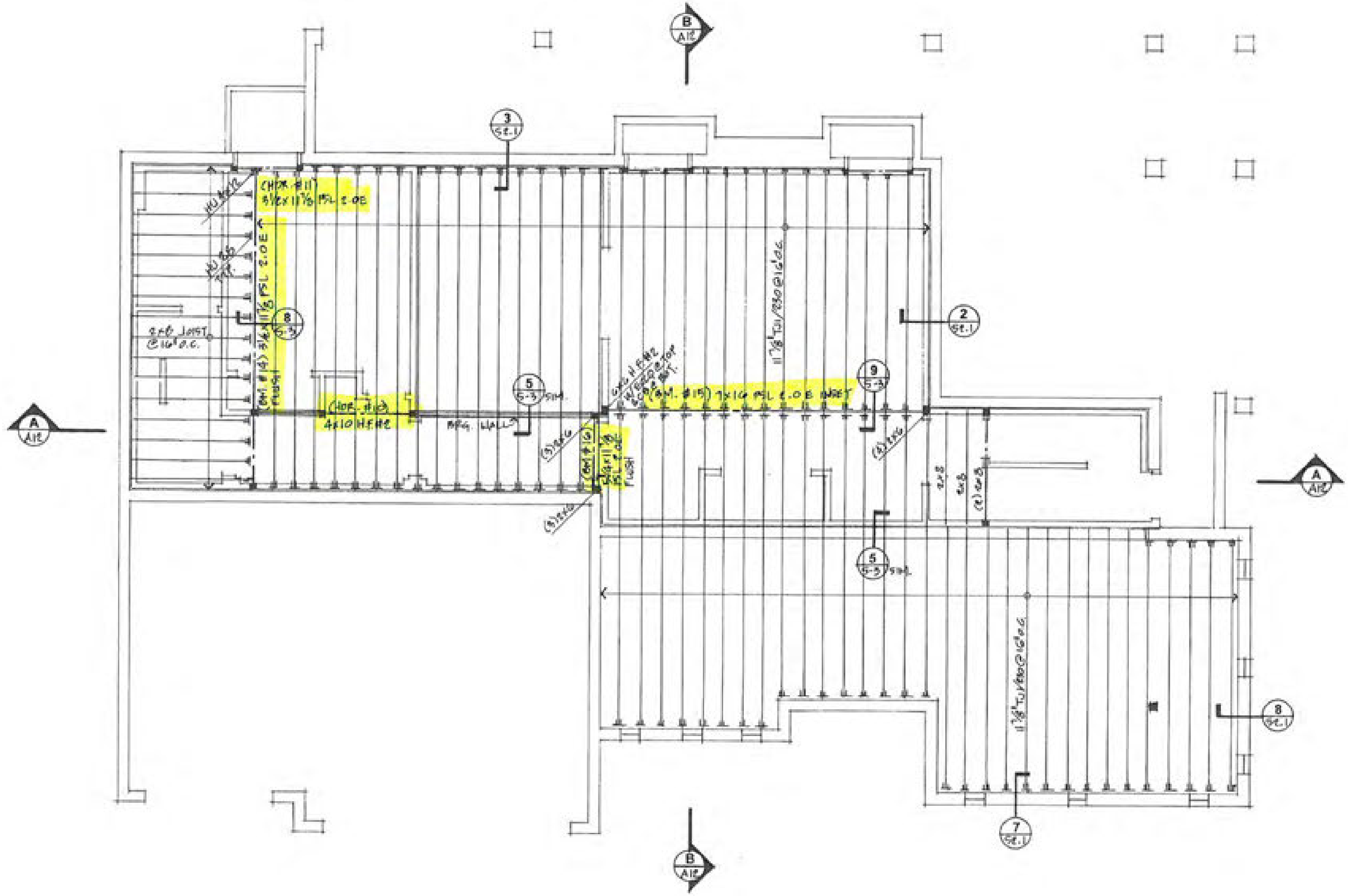


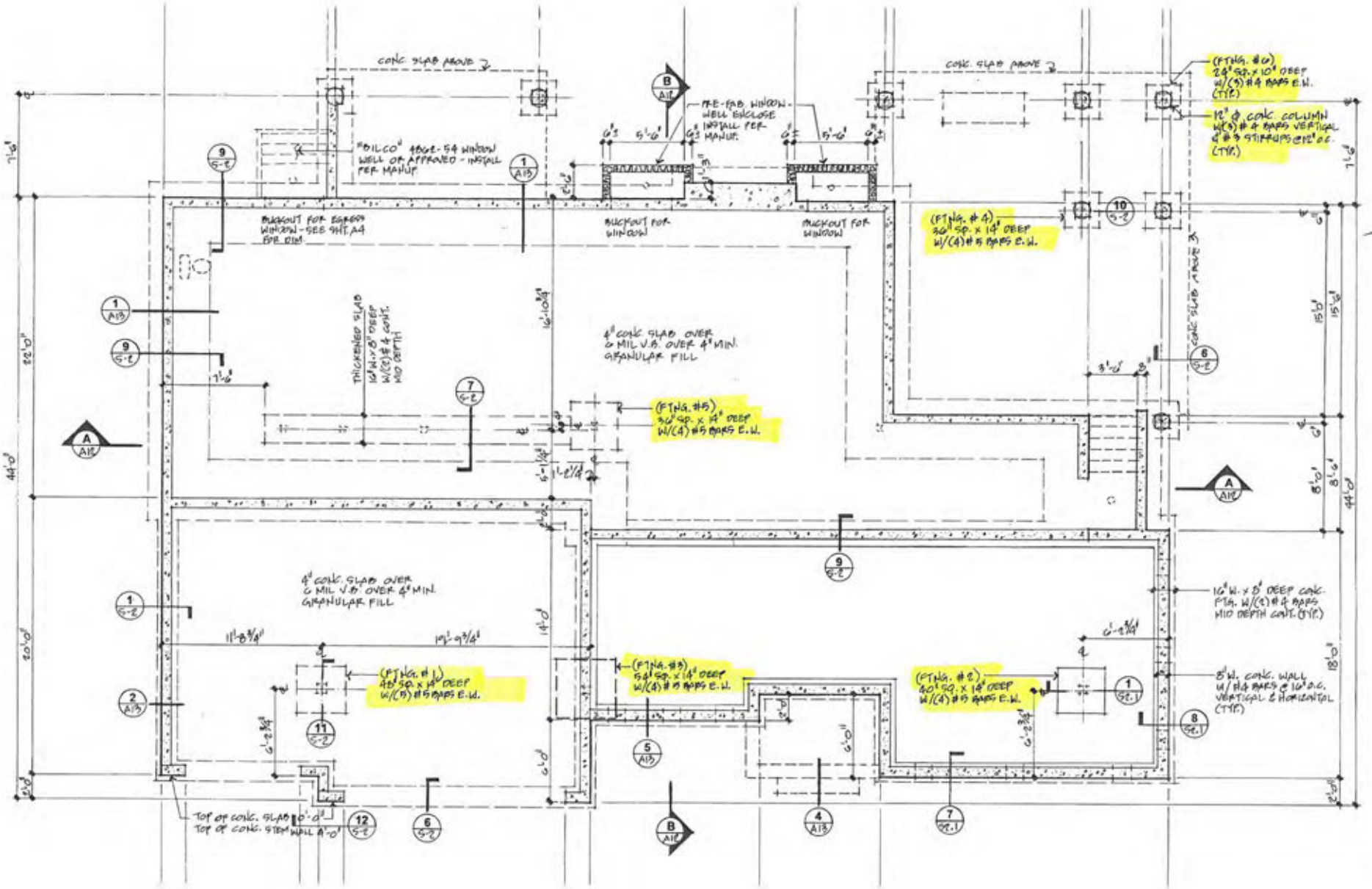
UPPER FL LEFT
UPPER FL. RIGHT
UPP FL. FRONT
UPP FL. REAR
BEDROOM
BATH
BEDROOM
BEDROOM
BATH
HALL
CLOSET
M. BATH
M. BEDROOM
LAUN
36'-0"
8'-0"





MAIN FL. LEFT
MAIN FL. FRONT
MAIN FL. MID
MAIN FL. REAR
MAIN FL MID 1
MAIN FL. MID 2.
MAIN FL RIGHT
GARAGE
MUD
PANTRY
KIT
DINING
PORCH
BUTLER'S PANTRY
DINING
LIVING
ENTRY
PORCH
PDR.
CLOS.
BATH
GUEST
PORCH


(HDR. #11) 3 1/2x11 7/8 PSL 2.0E
(BM. #14) 3 1/2x11 7/8 PSL 2.0E FLUSH
(HDR. #12) 4x10 HF#2
BRG. WALLS
2x6 JOIST @16" O.C.
(BM. #16) 5 1/4x11 7/8 PSL 2.0E FLUSH
(BM. #15) 7x16 PSL 2.0E DROP
11 7/8" TJI/230 @16" O.C.
11 7/8" TJI/230 @16" O.C.
2x8
2x8
(2) 2x8
(3) 2x6
(3) 2x6
(4) 2x6
A
A12
B
A12
S-3
St.1


CONC. SLAB ABOVE
"DILCO" 4BGE-54 WINDOW WELL OR APPROVED - INSTALL PER MANUF.
PRE-FAB WINDOW WELL ENCLOSE INSTALL PER MANUF.
BUCKOUT FOR EGRESS WINDOW - SEE SHT. A4 FOR DIM.
BUCKOUT FOR WINDOW
THICKENED SLAB 16"W. x 8" DEEP W/(2) #4 CONT. MID DEPTH
4" CONC. SLAB OVER 6 MIL V.B. OVER 4" MIN. GRANULAR FILL
(FTNG. #5) 30" SQ. x 14" DEEP W/(4) #5 BARS E.W.
(FTNG. #4) 36" SQ. x 14" DEEP W/(4) #5 BARS E.W.
(FTNG. #6) 28" SQ. x 10" DEEP W/(3) #4 BARS E.W. (TYP.)
12" ø CONC. COLUMN W/(8) #4 BARS VERTICAL & #3 STIRRUPS @12" o.c. (TYP.)
(FTNG. #1) 48" SQ. x 14" DEEP W/(5) #5 BARS E.W.
(FTNG. #3) 54" SQ. x 14" DEEP W/(4) #5 BARS E.W.
(FTNG. #2) 40" SQ. x 14" DEEP W/(4) #5 BARS E.W.
16"W. x 8" DEEP CONC. FTG. W/(2) #4 BARS MID DEPTH CONT. (TYP.)
8" W. CONC. WALL W/#4 BARS @ 16" O.C. VERTICAL & HORIZONTAL (TYP.)
TOP OF CONC. SLAB 0'-0" TOP OF CONC. STEM WALL 1'-0"

Type of construction: New
Applicable Building Codes: IBC 2015, ASCE 7/SEI 7-10
Location: 9027 SE 60th ST. Mercer Island, WA 98040

Work performed :

Lateral & Gravity Design

WIND DESIGN:

$P_s = \lambda I_w P_{s30} K_{zt}$

Exposure :	B	Wind Exposure Category as set forth in Section 26.7 of ASCE 7-10
Wind Speed =	85 MPH	Basic Wind Speed (LRFD) as used in Figure 28.6 of ASCE 7-10 and converted to (ASD)
P_{s30} =		Simplified design wind pressure for Exposure B, at h = 30 feet and for I = 1.0, from Figure 28.6-1
I_w =	1	Importance factor as defined in Table 1.5-2 of ASCE 7-10
λ =	1.00	Adjustment factor for building height and exposure from Figure 28.6-1 of ASCE 7-10
K_{ZT} =	1.30	Adjustment factor for increased wind speed due to a hill or escarpment from Section 26.8 of ASCE 7-10

Roof slope :

		rise		run		
Front/Rear	$\tan^{-1}$ (	5	/	12	)	= 22.6 degrees
Left/Right	$\tan^{-1}$ (	8	/	12	)	= 33.7 degrees

Number of floors: 2

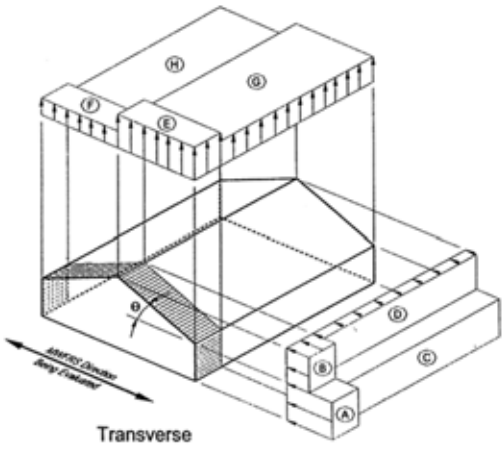
26 ft Mean Elevation

0

Average uplift (F/R)= -9.2 psf Based on wind zones 'G' and 'H'
Average uplift (R/L)= -1.6 psf Based on wind zones 'G' and 'H'

	End zone of wall		End zone of roof	
	Front/Rear	Left/Right	Front/Rear	Left/Right
P_{s30} =	A = 15.1 psf	12.9 psf	B = -0.8 psf	8.8 psf
P_s =	19.6 psf	16.8 psf	-1.0 psf	11.4 psf

	Interior zone of wall		Interior zone of roof	
	Front/Rear	Left/Right	Front/Rear	Left/Right
P_{s30} =	C = 10.5 psf	10.2 psf	D = 0.2 psf	7.0 psf
P_s =	13.6 psf	13.3 psf	0.2 psf	9.1 psf



WIND LOAD CALCULATIONS

FRONT ⟶ REAR

ΣV 2ND FLOOR =

WIND ZONE	B	B	B	A	A	C	C	C	D	C		
AVE. HEIGHT	2.5	7	6.5	7	4	2.5	6.5	10	9	3.5		
AVE. WIDTH	14	4.5	5	5	13	4.5	4.5	20	25	55		
Ps	0.00	0.00	0.00	19.65	19.65	13.64	13.64	13.64	0.21	13.64	0.00	0.00
SUBTOTAL	0	0	0	688	1022	153	399	2729	48	2626	0	0

TOTAL 8,440 lbs Minimum net pressure controls. The calc. pressure is less than the min. net pressure, equal to 16psf(A-C), and 8psf(B-D) applied over the entire area. (ASCE 7-10 28.6.4)

ΣV 1ST FLOOR =

WIND ZONE	A	A	C	D	C	C						
AVE. HEIGHT	4	10.5	2.5	4	4.5	3						
AVE. WIDTH	4	13	55	55	63	4						
Ps	19.65	19.65	13.64	0.21	13.64	13.64	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	314	2682	1876	47	3868	164	0	0	0	0	0	0

TOTAL 8,951 lbs

NOT USED

WIND ZONE												
AVE. HEIGHT												
AVE. WIDTH												
Ps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL 0 lbs

WIND LOAD CALCULATIONS

LEFT ⟶ RIGHT

ΣV 2ND FLOOR =

WIND ZONE	B	B	A	A	D	C	C	C	D	C		
AVE. HEIGHT	5	4.5	4	4.25	5	5.5	8	10	10	4		
AVE. WIDTH	11	5.5	5.5	11	5	5	10	10	11	19		
Ps	11.44	11.44	16.77	16.77	9.10	13.26	13.26	13.26	9.10	13.26	0.00	0.00
SUBTOTAL	629	283	369	784	228	365	1061	1326	1001	1008	0	0
TOTAL	7,053 lbs											

ΣV 1ST FLOOR =

WIND ZONE	A	A	A	C	D	C						
AVE. HEIGHT	3.5	4.5	11	10.75	8	2.75						
AVE. WIDTH	5.5	1.25	10	28	10	9						
Ps	16.77	16.77	16.77	13.26	9.10	13.26	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	323	94	1845	3991	728	328	0	0	0	0	0	0
TOTAL	7,309 lbs											

NOT USED

WIND ZONE												
AVE. HEIGHT												
AVE. WIDTH												
Ps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0 lbs											

ρ CALCS:

2ND FLOOR CALCULATIONS:

Plate Height:	8.00 ft
Total length of Shearwall in Shortest Line:	11.00 ft
Length of Shortest Segment within Shear Line:	3.50 ft
Length of Longest Segment in Shear Line:	4.00 ft

Tributary Area: 1.0
Total Area: 2.0

ρ = 1.00
ASCE 7-10 12.3.4.2 b

MAIN FLOOR CALCULATIONS:

Plate Height:	11.00 ft
Total length of Shearwall in Shortest Line:	6.00 ft
Length of Shortest Shearwall within Shear Line:	6.00 ft
Length of Longest Wall in Shear Line:	6.00 ft

Tributary Area: 21.5
Total Area: 74.0

ρ = 1.00
ASCE 7-10 12.3.4.2 a

NOT USED:

Plate Height:	8.00 ft
Total length of Shearwall in Shortest Line:	8.00 ft
Length of Shortest Shearwall within Shear Line:	8.00 ft
Length of Longest Wall in Shear Line:	8.00 ft

Tributary Area: 1.0
Total Area: 2.0

ρ = NA

All loads in pounds per square foot

WALL DEAD LOAD =	10 psf	ROOF DEAD LOAD =	15.0 psf
FLAT ROOF SNOW LOAD =	25 psf	UPPER FLOOR D.L. =	15.0 psf
RED. S.L. (20%*S.L.) =	0	LOWER FLOOR D.L. =	15.0 psf
		FLOOR LIVE LOAD =	40.0 psf

SEISMIC DESIGN:

$E = E_h + E_v$

$E = \rho Q_{E+.2S_{DS}D}$ $\quad Q_E = V = C_sW$

ρ =	1.00	
Site Class =	D	When the Site Class is not specified by Geotech, D will be assumed
I_E =	1	Importance factor as defined in Table 11.5-1
R =	6.5	
h_n =	30.25	Total height of structure

$V = 0.7S_{DS}I_EW / R$ $\quad S_{DS} = 2/3\ S_{MS}$ $\quad Ss =$ 145.1% $\quad S_{MS} = 145.1\%$ $\quad V =$ 0.104 W

$V_{max} = S_{D1}I_EW / T_aR$ $\quad S_{MS} = (Fa)(Ss)$ $\quad Fa =$ 1.00 $\quad S_{DS} = 96.7\%$ $\quad E =$ 0.104 W

$T_a = 0.02h_n^{0.75}$ $\quad S_{D1} = 2/3\ S_{M1}$ $\quad S_1 =$ 55.6% $\quad S_{M1} = 83.4\%$

$T_a =$ 0.26 s $\quad S_{M1} = (Fv)(S_1)$ $\quad Fv =$ 1.50 $\quad S_{D1} = 55.6\%$ $\quad Cs =$ 0.104

2ND FLOOR DIAPHRAGM LOADING:

W (ROOF) =

LENGTH	WIDTH	LOAD	TOTAL
72	43	15.0	46440
		15.0	0
		15.0	0
		15.0	0
		15.0	0

Area = 3096 Sub-Total= 46440

W (FLOOR) =

LENGTH	WIDTH	LOAD	TOTAL
		15.0	0
		15.0	0
		15.0	0
		15.0	0
		15.0	0

Area = 0 Sub-Total= 0

W (WALL) =

LENGTH	TRIB. HT.	LOAD	TOTAL
136	4	10.0	5440
62	4	10.0	2480
		10.0	0
		10.0	0
		10.0	0

Area = 792 Sub-Total= 7920

TOTAL = 54360 lb

1ST FLOOR DIAPHRAGM LOADING:

W (ROOF) =

LENGTH	WIDTH	LOAD	TOTAL
10	56.5	15.0	8475
24	10.5	15.0	3780
46	8.5	15.0	5865
21	8	15.0	2520
		15.0	0

Area = 1376 Sub-Total= 20640

W (FLOOR) =

LENGTH	WIDTH	LOAD	TOTAL
2400	1	15.0	36000
		15.0	0
		15.0	0
		15.0	0
		15.0	0

Area = 2400 Sub-Total= 36000

W (WALL) =

LENGTH	TRIB. HT.	LOAD	TOTAL
136	4	10.0	5440
62	4	10.0	2480
148	5.5	10.0	8140
88	5.5	10.0	4840
		10.0	0

Area = 2090 Sub-Total= 20900

TOTAL = 77540 lb

NOT APPLICABLE

W (ROOF) =

LENGTH	WIDTH	LOAD	TOTAL
		15.0	0
		15.0	0
		15.0	0
		15.0	0
		15.0	0

Area = 0 Sub-Total= 0

W (FLOOR) =

LENGTH	WIDTH	LOAD	TOTAL
		15.0	0
		15.0	0
		15.0	0
		15.0	0
		15.0	0

Area = 0 Sub-Total= 0

W (WALL) =

LENGTH	TRIB. HT.	LOAD	TOTAL
		10.0	0
		10.0	0
		10.0	0
		10.0	0
		10.0	0

Area = 0 Sub-Total= 0

TOTAL = lb

V (2ND FLOOR) = .104 x 54360 lb = 5663 lbs

V (1ST FLOOR) = .104 x 77540 lb = 8078 lbs

V ( ) = .104 x lb = lbs

REDISTRIBUTE:

ΣV x ρ	height	ΣV x height
5663 lb	20	113258
8078 lb	11	88854
lb		0
TOTAL = 13741 lb		TOTAL = 202113

$$E\ (2ND) = \frac{\Sigma V \times height \times \Sigma V\ TOTAL}{\Sigma V \times height\ TOTAL} = 7700\ lbs$$

$$E\ (1ST) = \frac{\Sigma V \times height \times \Sigma V\ TOTAL}{\Sigma V \times height\ TOTAL} = 6041\ lbs$$

$$E\ () = \frac{NOT\ USED}{} = 0\ lbs$$

SUMMARY:

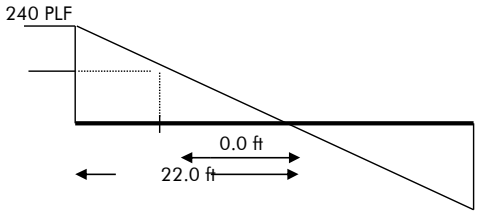
	WIND (front-rear)	WIND (left-right)	SEISMIC
ΣV (2ND) =	8440 lbs	7053 lbs	7700 lbs
ΣV (MAIN) =	8951 lbs	7309 lbs	6041 lbs
NOT APPLICABLE	0 lbs	0 lbs	0 lbs
TOTAL =	17391 lbs	14362 lbs	13741 lbs

DIAPHRAGM SHEAR:

Total diaphragm length = 74.0 ft Sub-diaphragm length = 53.0 ft
Diaphragm width = 44.0 ft ΣV (MAIN) = 8,951 lbs

$$v = \frac{\Sigma V(2nd)}{(2)(width)} = \frac{6411\ lb}{88\ ft} = 73\ PLF$$

IBC Table 2306.3.1 → 240 PLF



USE 15/32 CDX ROOF SHEATHING OR 3/4 T&G CDX SUBFLOORING w/8d AT 6 in o/c(PANEL EDGE), END 8d AT 12in o/c(PANEL FIELD)

CHORD:

Sub-diaphragm length = 53.0 ft Total-diaphragm length = 74.0 ft
Sub-diaphragm width = 21.0 ft

$$T = \frac{M}{B} = \frac{\Sigma V \times (diaphragm\ length)}{8 \times (diaphragm\ width)} = \frac{6411 \times 53\ ft}{8 \times 21\ ft} = 2022\ lbs$$

Top Plate Size: 2x6 Species/Grade: HF #2

Area = 8.25 in^2 F_t = 525 psi
Load duration (C_D) = 1.33 $T_{allowable}$ = Area x C_D x F_t = 5,761 lbs

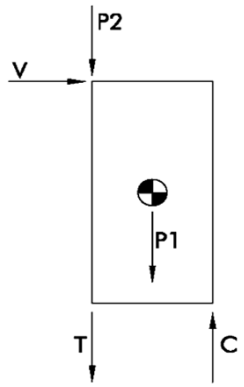
Since T allowable is greater than T applied, OK.

SHEAR CAPACITY OF 10d COMMON NAIL = 102 lbs 102 x Cd x p = 136 lbs 2015 NDS

$$\#\ OF\ NAILS\ PER\ 4\ FT\ SPLICE = \frac{2022\ lbs}{136\ lbs} = 15$$

USE 2x6 HF #2 TOP PLATE W/ (2) 10d NAILS @ 6 in O/C.

Lateral Calculation Key



V = Shear, plf
H = Height of shearwall
L = Length of shearwall
P1 = Weight of shearwall and connected framing
P2 = Weight of adjacent wall

T = V x H - 0.5P1 - P2 = Tension reaction to be resisted by holdown
C = V x H + 0.5P1 = Compression reaction

ASD Basic Load Combinations

For calculation of tension and compression forces in compliance with ASCE 7-10 2.4.1

Tension Equations (Uplift)

7. 0.6D + W
8. $(0.6 - 0.14S_{DS})D + E$ → 0.46 D + E

*8. $(0.6 - 0.14S_{DS})D + 2.5\ E$ → 0.46 D + 2.5 E

Compression Equations

5. D + W
5. $(1 + 0.14S_{DS})D + E$ → 1.14 D + E
6. D + 0.75W + 0.75L + 0.75S
6. $(1.0 + 0.105S_{DS})D + 0.75E + 0.75L + 0.75S$ → 1.10 D + 0.75 E + 0.75 L + 0.75 S

*5. $(1 + 0.14S_{DS})D + 2.5E$ → 1.14 D + 2.5 E
*6. $(1.0 + 0.105S_{DS})D + 1.875E + 0.75L + 0.75S$ → 1.10 D +1.875 E + 0.75 L + 0.75 S

** Equations include overstrength factor.*

Note: The 0.7 factor for Earthquake loading has already been incorporated into the calculation of the lateral design force E_h, but not E_v. Therefore this factor has been omitted from equations 5, 6 and 8 where appropriate.

UPPER FLOOR REAR (MASTER SUITE)

SHEARWALL

Floor Info

Upper	Floor Level, e.g. Upper, Main, Lower
Lt-Rt	Load Direction, e.g. Left-Right, Front-Rear
	(For Left Wall, Use Front-Rear Load Direction)
CDX	Sheathing type
	Values in accordance with AF&PA SDPWS-2015
Roof	Resisting Dead Load
	(e.g. Roof, Upper Floor, Main Floor)
28.00 ft	Total Length of Shearwalls

WIND

Tributary Width (Upper Floor)

1.0	tributary width
2.0	total width

Tributary Width (Main Floor)

1.0	tributary width
2.0	total width

Not Used

1.0	tributary width
2.0	total width

SEISMIC

Tributary Area (Upper Floor)

1.0	tributary area
2.0	total area

Tributary Area (Main Floor)

1.0	tributary area
2.0	total area

Not Used

1.0	tributary area
2.0	total area

V(from upper)=	7053 lb	7700 lb
V(from main)=	0 lb	0 lb
V(from lower)=	0 lb	0 lb
Σ (Wind) =	7,053 lb	Σ (Smc) = 7,700 lb
v =	126 PLF	v = 137 PLF

Height of Shearwall = 8.0 ft
Length of Shearwall = 6.5 ft
Aspect Ratio OK
Use alternate R factor for seismic? No

Weight of Shearwall = 10.0 lbs
Tributary width for dead load = 2.0 ft
Length of adjoining wall = 1.0 ft

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF → USE SW6

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+	1008 lbs	=	1008 lbs Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+	883 lbs	=	883 lbs Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1100 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14
OR AT FOUNDATION / INTERIOR WALLS USE: LSTHD8/RJ

UPPER FLOOR FRONT (BEDROOMS/LAUN)

SHEARWALL

Floor Info

Upper	Floor Level, e.g. Upper, Main, Lower
Lt-Rt	Load Direction, e.g. Left-Right, Front-Rear
	(For Left Wall, Use Front-Rear Load Direction)
CDX	Sheathing type
	Values in accordance with AF&PA SDPWS-2015
Roof	Resisting Dead Load
	(e.g. Roof, Upper Floor, Main Floor)
28.00 ft	Total Length of Shearwalls

WIND

Tributary Width (Upper Floor)

1.0	tributary width
2.0	total width

Tributary Width (Main Floor)

1.0	tributary width
2.0	total width

Not Used

1.0	tributary width
2.0	total width

SEISMIC

Tributary Area (Upper Floor)

1.0	tributary area
2.0	total area

Tributary Area (Main Floor)

1.0	tributary area
2.0	total area

Not Used

1.0	tributary area
2.0	total area

V(from upper)=	7053 lb	7700 lb
V(from main)=	0 lb	0 lb
V(from lower)=	0 lb	0 lb
Σ (Wind) =	7,053 lb	Σ (Smc) = 7,700 lb
v =	126 PLF	v = 137 PLF

Height of Shearwall = 8.0 ft
Length of Shearwall = 4.5 ft
Aspect Ratio OK
Use alternate R factor for seismic? No

Weight of Shearwall = 10.0 lbs
Tributary width for dead load = 2.0 ft
Length of adjoining wall = 2.0 ft

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF → USE SW6

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+	1008 lbs	=	1008 lbs Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+	883 lbs	=	883 lbs Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1100 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14
OR AT FOUNDATION / INTERIOR WALLS USE: LSTHD8/RJ

UPPER FLOOR LEFT (BEDROOMS)

SHEARWALL

Floor Info

Upper	Floor Level, e.g. Upper, Main, Lower
Ft-Rr	Load Direction, e.g. Left-Right, Front-Rear
	(For Left Wall, Use Front-Rear Load Direction)
CDX	Sheathing type
	Values in accordance with AF&PA SDPWS-2015
Roof	Resisting Dead Load
	(e.g. Roof, Upper Floor, Main Floor)
32.00 ft	Total Length of Shearwalls

WIND

Tributary Width (Upper Floor)

1.0	tributary width
2.0	total width

Tributary Width (Main Floor)

1.0	tributary width
2.0	total width

Not Used

1.0	tributary width
2.0	total width

SEISMIC

Tributary Area (Upper Floor)

1.0	tributary area
2.0	total area

Tributary Area (Main Floor)

1.0	tributary area
2.0	total area

Not Used

1.0	tributary area
2.0	total area

V(from upper)=	8440 lb	7700 lb
V(from main)=	0 lb	0 lb
V(from lower)=	0 lb	0 lb
Σ (Wind) =	8,440 lb	Σ (Smc) = 7,700 lb
v =	132 PLF	v = 120 PLF

Height of Shearwall = 8.0 ft
Length of Shearwall = 12.5 ft
Aspect Ratio OK
Use alternate R factor for seismic? No

Weight of Shearwall = 10.0 lbs
Tributary width for dead load = 6.0 ft
Length of adjoining wall = 2.0 ft

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF → USE SW6

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+	1055 lbs	=	1055 lbs Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+	311 lbs	=	311 lbs Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 962 lbs

NO HOLDOWNS REQUIRED: OK

UPPER FLOOR RIGHT (MASTER/LAUN)

SHEARWALL

Floor Info

Upper	Floor Level, e.g. Upper, Main, Lower
Ft-Rr	Load Direction, e.g. Left-Right, Front-Rear
	(For Left Wall, Use Front-Rear Load Direction)
CDX	Sheathing type
	Values in accordance with AF&PA SDPWS-2015
Roof	Resisting Dead Load
	(e.g. Roof, Upper Floor, Main Floor)
18.00 ft	Total Length of Shearwalls

WIND

Tributary Width (Upper Floor)
1.0 tributary width
2.0 total width

Tributary Width (Main Floor)
1.0 tributary width
2.0 total width

Not Used
1.0 tributary width
2.0 total width

SEISMIC

Tributary Area (Upper Floor)
1.0 tributary area
2.0 total area

Tributary Area (Main Floor)
1.0 tributary area
2.0 total area

Not Used
1.0 tributary area
2.0 total area

V(from upper)=	8440 lb		7700 lb
V(from main)=	0 lb		0 lb
V(from lower)=	0 lb		0 lb
Σ (Wind) =	8,440 lb	Σ (Smc) =	7,700 lb
v =	234 PLF	v =	214 PLF

Height of Shearwall = 8.0 ft
Length of Shearwall = 4.0 ft
Aspect Ratio OK
Use alternate R factor for seismic? No

Weight of Shearwall = 10.0 lbs
Tributary width for dead load = 12.0 ft
Length of adjoining wall = 1.0 ft

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF → USE SW6

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 1876 lbs	=	1876 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 1441 lbs	=	1441 lbs	Load case 8 controls - Wind

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1711 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14
OR AT FOUNDATION / INTERIOR WALLS USE: LSTHD8/RJ

MAIN FLOOR REAR (PANTRY/DINING/LIVING)

SHEARWALL

Floor Info

Main	Floor Level, e.g. Upper, Main, Lower
Lt-Rt	Load Direction, e.g. Left-Right, Front-Rear
	(For Left Wall, Use Front-Rear Load Direction)
CDX	Sheathing type
	Values in accordance with AF&PA SDPWS-2015
U/FL	Resisting Dead Load
	(e.g. Roof, Upper Floor, Main Floor)
20.00 ft	Total Length of Shearwalls

WIND

Tributary Width (Upper Floor)
1.0 tributary width
2.0 total width

Tributary Width (Main Floor)
20.0 tributary width
52.0 total width

Not Used
1.0 tributary width
2.0 total width

SEISMIC

Tributary Area (Upper Floor)
1.0 tributary area
2.0 total area

Tributary Area (Main Floor)
20.0 tributary area
52.0 total area

Not Used
1.0 tributary area
2.0 total area

V(from upper)=	7053 lb		7700 lb
V(from main)=	7309 lb		6041 lb
V(from lower)=	0 lb		0 lb
Σ (Wind) =	14,362 lb	Σ (Smc) =	13,741 lb
v =	317 PLF	v =	309 PLF

Height of Shearwall = 11.0 ft
Length of Shearwall = 6.0 ft
Aspect Ratio OK
Use alternate R factor for seismic? No

Weight of Shearwall = 10.0 lbs
Tributary width for dead load = 2.0 ft
Length of adjoining wall = 2.0 ft

SDPWS, Table 4.3A → 0.93 x 380 = 353 PLF → USE SW4

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =	1008	+ 3486 lbs	=	4494 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =	883	+ 3070 lbs	=	3953 lbs	Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 3395 lbs

USE SIMPSON DESIGNED HOLDOWN: MST60
OR AT FOUNDATION / INTERIOR WALLS USE: HDU8-SDS2.5

MAIN FLOOR MID (AT GARAGE/PORCH)

SHEARWALL

Floor Info

Main	Floor Level, e.g. Upper, Main, Lower
Lt-Rt	Load Direction, e.g. Left-Right, Front-Rear
	(For Left Wall, Use Front-Rear Load Direction)
CDX	Sheathing type
	Values in accordance with AF&PA SDPWS-2015
U/FL	Resisting Dead Load
	(e.g. Roof, Upper Floor, Main Floor)
30.00 ft	Total Length of Shearwalls

WIND

Tributary Width (Upper Floor)
0.0 tributary width
2.0 total width

Tributary Width (Main Floor)
1.0 tributary width
2.0 total width

Not Used
1.0 tributary width
2.0 total width

SEISMIC

Tributary Area (Upper Floor)
0.0 tributary area
2.0 total area

Tributary Area (Main Floor)
1.0 tributary area
2.0 total area

Not Used
1.0 tributary area
2.0 total area

V(from upper)=	7053 lb		7700 lb
V(from main)=	7309 lb		6041 lb
V(from lower)=	0 lb		0 lb
Σ (Wind) =	14,362 lb	Σ (Smc) =	13,741 lb
v =	122 PLF	v =	101 PLF

Height of Shearwall = 11.0 ft
Length of Shearwall = 14.0 ft
Aspect Ratio OK
Use alternate R factor for seismic? No

Weight of Shearwall = 10.0 lbs
Tributary width for dead load = 1.3 ft
Length of adjoining wall = 1.0 ft

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF → USE SW6

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 1340 lbs	=	1340 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 716 lbs	=	716 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1107 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14
OR AT FOUNDATION / INTERIOR WALLS USE: LSTHD8/RJ

MAIN FLOOR FRONT (AT GARAGE)

SHEARWALL

Floor Info

		WIND		SEISMIC	
		Tributary Width (Upper Floor)		Tributary Area (Upper Floor)	
Main	Floor Level, e.g. Upper, Main, Lower	1.0	tributary width	31.0	tributary area
Lt-Rt	Load Direction, e.g. Left-Right, Front-Rear	2.0	total width	130.0	total area
	(For Left Wall, Use Front-Rear Load Direction)	Tributary Width (Main Floor)		Tributary Area (Main Floor)	
CDX	Sheathing type	13.0	tributary width	13.0	tributary area
	Values in accordance with AF&PA SDPWS-2015	52.0	total width	52.0	total area
Roof	Resisting Dead Load	Not Used		Not Used	
	(e.g. Roof, Upper Floor, Main Floor)	1.0	tributary width	1.0	tributary area
16.00 ft	Total Length of Shearwalls	2.0	total width	2.0	total area

V(from upper)=	7053 lb	7700 lb	Height of Shearwall =	7.0 ft	Weight of Shearwall = 10.0 lbs
V(from main)=	7309 lb	6041 lb	Length of Shearwall =	2.0 ft	Tributary width for dead load = 2.0 ft
V(from lower)=	0 lb	0 lb	Aspect Ratio OK		Length of adjoining wall = 4.0 ft
Σ (Wind) =	14,362 lb	Σ (Smc) = 13,741 lb	Use alternate R factor for seismic?	No	
v =	335 PLF	v = 209 PLF			

SDPWS, Table 4.3A → (2w/h) x 0.93 x 455 = 242 PLF → USE SW2 → USE SW3

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 2342 lbs	=	2342 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 2097 lbs	=	2097 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1464 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14

OR AT FOUNDATION / INTERIOR WALLS USE: STHD10/RJ

MAIN FLOOR FRONT (CLOS. BATH)

SHEARWALL

Floor Info

		WIND		SEISMIC	
		Tributary Width (Upper Floor)		Tributary Area (Upper Floor)	
Main	Floor Level, e.g. Upper, Main, Lower	1.0	tributary width	1.0	tributary area
Lt-Rt	Load Direction, e.g. Left-Right, Front-Rear	2.0	total width	2.0	total area
	(For Left Wall, Use Front-Rear Load Direction)	Tributary Width (Main Floor)		Tributary Area (Main Floor)	
CDX	Sheathing type	13.0	tributary width	13.0	tributary area
	Values in accordance with AF&PA SDPWS-2015	52.0	total width	52.0	total area
U/FL	Resisting Dead Load	Not Used		Not Used	
	(e.g. Roof, Upper Floor, Main Floor)	1.0	tributary width	1.0	tributary area
16.00 ft	Total Length of Shearwalls	2.0	total width	2.0	total area

V(from upper)=	7053 lb	7700 lb	Height of Shearwall =	11.0 ft	Weight of Shearwall = 10.0 lbs
V(from main)=	7309 lb	6041 lb	Length of Shearwall =	4.0 ft	Tributary width for dead load = 3.0 ft
V(from lower)=	0 lb	0 lb	Aspect Ratio OK		Length of adjoining wall = 1.0 ft
Σ (Wind) =	14,362 lb	Σ (Smc) = 13,741 lb	Use alternate R factor for seismic?	No	
v =	335 PLF	v = 335 PLF			

SDPWS, Table 4.3A → (2w/h) x 0.93 x 595 = 402 PLF → USE SW2

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 3681 lbs	=	3681 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 3469 lbs	=	3469 lbs	Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 3685 lbs

USE SIMPSON DESIGNED HOLDOWN: MST60

OR AT FOUNDATION / INTERIOR WALLS USE: STHD14/RJ

MAIN FLOOR LEFT (AT GARAGE/PANTRY)

SHEARWALL

Floor Info

		WIND		SEISMIC	
		Tributary Width (Upper Floor)		Tributary Area (Upper Floor)	
Main	Floor Level, e.g. Upper, Main, Lower	1.0	tributary width	1.0	tributary area
Ft-Rr	Load Direction, e.g. Left-Right, Front-Rear	2.0	total width	2.0	total area
	(For Left Wall, Use Front-Rear Load Direction)	Tributary Width (Main Floor)		Tributary Area (Main Floor)	
CDX	Sheathing type	16.0	tributary width	16.0	tributary area
	Values in accordance with AF&PA SDPWS-2015	74.0	total width	74.0	total area
U/FL	Resisting Dead Load	Not Used		Not Used	
	(e.g. Roof, Upper Floor, Main Floor)	1.0	tributary width	1.0	tributary area
39.00 ft	Total Length of Shearwalls	2.0	total width	2.0	total area

V(from upper)=	8440 lb	7700 lb	Height of Shearwall =	11.0 ft	Weight of Shearwall = 10.0 lbs
V(from main)=	8951 lb	6041 lb	Length of Shearwall =	16.0 ft	Tributary width for dead load = 1.3 ft
V(from lower)=	0 lb	0 lb	Aspect Ratio OK		Length of adjoining wall = 1.0 ft
Σ (Wind) =	17,391 lb	Σ (Smc) = 13,741 lb	Use alternate R factor for seismic?	No	
v =	158 PLF	v = 132 PLF			

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF → USE SW6

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 1736 lbs	=	1736 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 1034 lbs	=	1034 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1454 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14

OR AT FOUNDATION / INTERIOR WALLS USE: LSTHD8/RJ

MAIN FLOOR MID 1 (GARAGE)

SHEARWALL

Floor Info

		WIND		SEISMIC	
		Tributary Width (Upper Floor)		Tributary Area (Upper Floor)	
Main	Floor Level, e.g. Upper, Main, Lower	0.0	tributary width	0.0	tributary area
Ft-Rr	Load Direction, e.g. Left-Right, Front-Rear	2.0	total width	2.0	total area
	(For Left Wall, Use Front-Rear Load Direction)	Tributary Width (Main Floor)		Tributary Area (Main Floor)	
CDX	Sheathing type	26.5	tributary width	26.5	tributary area
	Values in accordance with AF&PA SDPWS-2015	74.0	total width	74.0	total area
U/FL	Resisting Dead Load	Not Used		Not Used	
	(e.g. Roof, Upper Floor, Main Floor)	1.0	tributary width	1.0	tributary area
18.00 ft	Total Length of Shearwalls	2.0	total width	2.0	total area

V(from upper)=	8440 lb	7700 lb	Height of Shearwall =	11.0 ft	Weight of Shearwall = 10.0 lbs
V(from main)=	8951 lb	6041 lb	Length of Shearwall =	18.0 ft	Tributary width for dead load = 1.0 ft
V(from lower)=	0 lb	0 lb			Length of adjoining wall = 0.0 ft
Σ (Wind) =	17,391 lb	Σ (Smc) = 13,741 lb	Use alternate R factor for seismic?	No	
v =	178 PLF	v = 120 PLF			

SDPWS, Table 4.3A → 1.4 x 0.93 x 260 = 339 PLF → USE SW6

Wind controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 1959 lbs	=	1959 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 1284 lbs	=	1284 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 1322 lbs

USE SIMPSON DESIGNED HOLDOWN: CS14

OR AT FOUNDATION / INTERIOR WALLS USE: LSTHD8/RJ

MAIN FLOOR MID 2 (PDR/LIVING)

SHEARWALL

Floor Info

		WIND		SEISMIC	
		Tributary Width (Upper Floor)		Tributary Area (Upper Floor)	
Main	Floor Level, e.g. Upper, Main, Lower	0.0	tributary width	0.0	tributary area
Ft-Rr	Load Direction, e.g. Left-Right, Front-Rear	2.0	total width	2.0	total area
	(For Left Wall, Use Front-Rear Load Direction)	Tributary Width (Main Floor)		Tributary Area (Main Floor)	
CDX	Sheathing type	22.0	tributary width	22.0	tributary area
	Values in accordance with AF&PA SDPWS-2015	74.0	total width	74.0	total area
U/FL	Resisting Dead Load	Not Used		Not Used	
	(e.g. Roof, Upper Floor, Main Floor)	1.0	tributary width	1.0	tributary area
9.00 ft	Total Length of Shearwalls	2.0	total width	2.0	total area

V(from upper)=	8440 lb	7700 lb	Height of Shearwall =	11.0 ft	Weight of Shearwall = 10.0 lbs
V(from main)=	8951 lb	6041 lb	Length of Shearwall =	3.0 ft	Tributary width for dead load = 1.0 ft
V(from lower)=	0 lb	0 lb	Warning! Height to Width Ratio!		Length of adjoining wall = 1.0 ft
Σ (Wind) =	17,391 lb	Σ (Smc) = 13,741 lb	Use alternate R factor for seismic?	No	
v =	296 PLF	v = 200 PLF			

SDPWS, Table 4.3A → (2w/h) x 0.93 x 455 = 231 PLF → USE SW3

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 3252 lbs	=	3252 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 3065 lbs	=	3065 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 2195 lbs

USE SIMPSON DESIGNED HOLDOWN: MST48

OR AT FOUNDATION / INTERIOR WALLS USE: STHD14/RJ

MAIN FLOOR RIGHT (AT PORCH/GUEST)

SHEARWALL

Floor Info

		WIND		SEISMIC	
		Tributary Width (Upper Floor)		Tributary Area (Upper Floor)	
Main	Floor Level, e.g. Upper, Main, Lower	1.0	tributary width	1.0	tributary area
Ft-Rr	Load Direction, e.g. Left-Right, Front-Rear	2.0	total width	2.0	total area
	(For Left Wall, Use Front-Rear Load Direction)	Tributary Width (Main Floor)		Tributary Area (Main Floor)	
CDX	Sheathing type	11.0	tributary width	11.0	tributary area
	Values in accordance with AF&PA SDPWS-2015	74.0	total width	74.0	total area
U/FL	Resisting Dead Load	Not Used		Not Used	
	(e.g. Roof, Upper Floor, Main Floor)	1.0	tributary width	1.0	tributary area
8.00 ft	Total Length of Shearwalls	2.0	total width	2.0	total area

V(from upper)=	8440 lb	7700 lb	Height of Shearwall =	11.0 ft	Weight of Shearwall = 10.0 lbs
V(from main)=	8951 lb	6041 lb	Length of Shearwall =	8.0 ft	Tributary width for dead load = 5.0 ft
V(from lower)=	0 lb	0 lb	Aspect Ratio OK		Length of adjoining wall = 3.0 ft
Σ (Wind) =	17,391 lb	Σ (Smc) = 13,741 lb	Use alternate R factor for seismic?	No	
v =	694 PLF	v = 593 PLF			

3x framing required per IBC

SDPWS, Table 4.3A → 0.93 x 700 = 651 PLF → USE (2)SW4

Seismic controls shearwall design

C_{TOTAL} =	(floor above) + (this floor) =		+ 7632 lbs	=	7632 lbs	Wind controls
T_{TOTAL} =	(floor above) + (this floor) =		+ 6855 lbs	=	6855 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E= 6528 lbs

USE SIMPSON DESIGNED HOLDOWN: HDU11-SDS2.5

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

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Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO Girder Truss #1 (Reactions Only)

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho: Allowable Stress Design
Load Combinati: ASCE 7-16

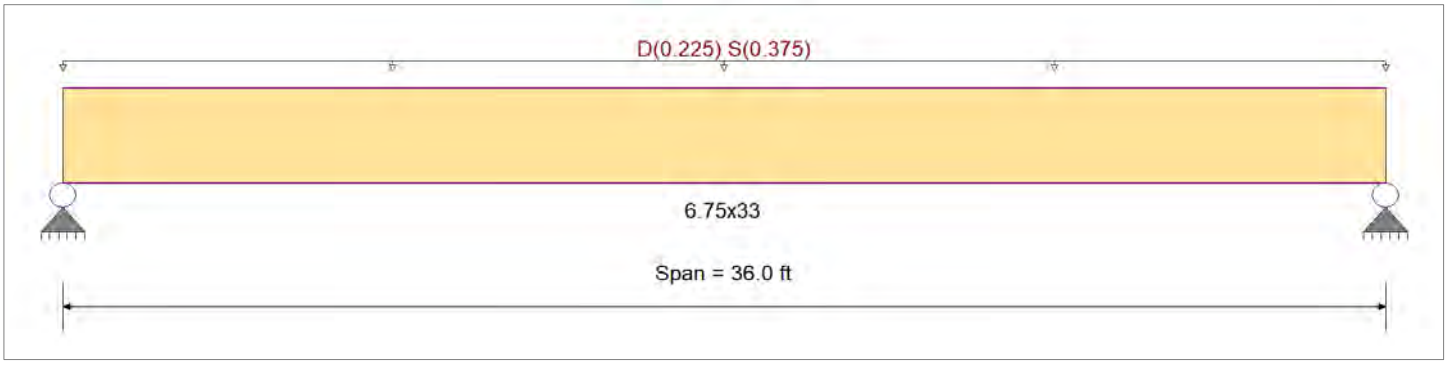
Wood Species: DF/DF
Wood Grade: 24F - V4

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

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasti

Ebend- xx	1800 ksi
Eminbend - x	950 ksi
Ebend- yy	1600 ksi
Eminbend - y	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 15.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.447 : 1	Maximum Shear Stress Ratio	=	0.220 : 1
Section used for this span		6.75x33	Section used for this span		6.75x33
	=	1,028.67 psi		=	67.11 psi
	=	2,299.36 psi		=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	18.000 ft	Location of maximum on span	=	33.372 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.392 in	Ratio =	1102 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.677 in	Ratio =	637 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.241	0.119	0.90	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	1799.50	4.20	28.29	238.50
+D+L+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.217	0.107	1.00	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	1999.44	4.20	28.29	265.00
+D+Lr+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.174	0.085	1.25	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	2499.30	4.20	28.29	331.25
+D+S+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.447	0.220	1.15	0.833	1.00	1.00	1.00	1.00	1.00	105.02	1,028.67	2299.36	9.97	67.11	304.75
+D+0.750Lr+0.750L+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.174	0.085	1.25	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	2499.30	4.20	28.29	331.25
+D+0.750L+0.750S+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.383	0.188	1.15	0.833	1.00	1.00	1.00	1.00	1.00	89.83	879.91	2299.36	8.52	57.40	304.75
+D+0.60W+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO Girder Truss #1 (Reactions Only)

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 36.0 ft	**1**	0.136	0.067	1.60	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	3199.11	4.20	28.29	424.00
+D+0.750Lr+0.750L+0.450W-					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.136	0.067	1.60	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	3199.11	4.20	28.29	424.00
+D+0.750L+0.750S+0.450W+					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.275	0.135	1.60	0.833	1.00	1.00	1.00	1.00	1.00	89.83	879.91	3199.11	8.52	57.40	424.00
+0.60D+0.60W+0.60H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.081	0.040	1.60	0.833	1.00	1.00	1.00	1.00	1.00	26.56	260.18	3199.11	2.52	16.97	424.00
+D+0.70E+0.60H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.136	0.067	1.60	0.833	1.00	1.00	1.00	1.00	1.00	44.27	433.63	3199.11	4.20	28.29	424.00
+D+0.750L+0.750S+0.5250E-					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.275	0.135	1.60	0.833	1.00	1.00	1.00	1.00	1.00	89.83	879.91	3199.11	8.52	57.40	424.00
+0.60D+0.70E+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.081	0.040	1.60	0.833	1.00	1.00	1.00	1.00	1.00	26.56	260.18	3199.11	2.52	16.97	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.6772	18.131		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	11.669	11.669
Overall MINimum	6.750	6.750
+D+H	4.919	4.919
+D+L+H	4.919	4.919
+D+Lr+H	4.919	4.919
+D+S+H	11.669	11.669
+D+0.750Lr+0.750L+H	4.919	4.919
+D+0.750L+0.750S+H	9.982	9.982
+D+0.60W+H	4.919	4.919
+D+0.750Lr+0.750L+0.450W+H	4.919	4.919
+D+0.750L+0.750S+0.450W+H	9.982	9.982
+0.60D+0.60W+0.60H	2.951	2.951
+D+0.70E+0.60H	4.919	4.919
+D+0.750L+0.750S+0.5250E+H	9.982	9.982
+0.60D+0.70E+H	2.951	2.951
D Only	4.919	4.919
Lr Only		
L Only		
S Only	6.750	6.750
W Only		
E Only		
H Only		

Feaster Residence
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Engineer:
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO Girder Truss #2 (Reactions Only)

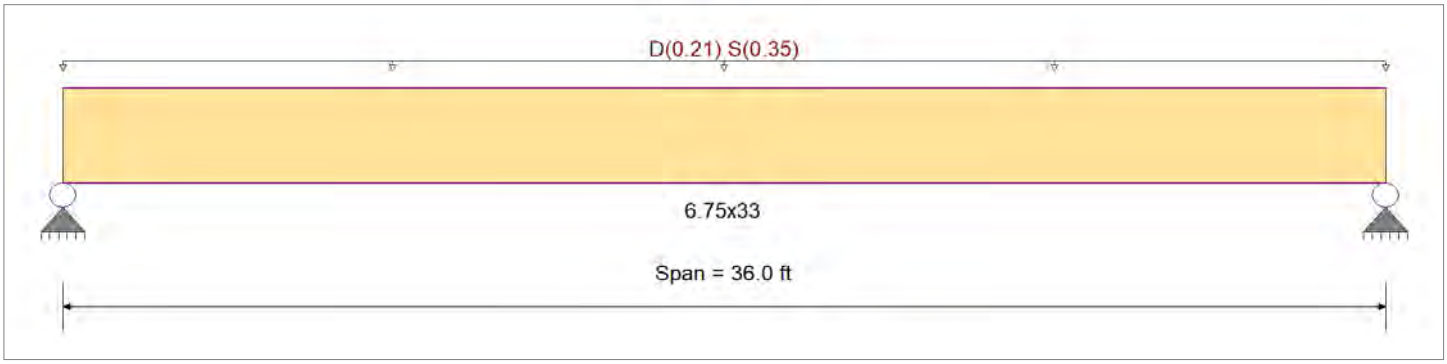
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,400.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - x	950.0 ksi
Wood Species	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade	24F - V4	Fv	265.0 psi	Eminbend - y	850.0 ksi
		Ft	1,100.0 psi	Density	31.210 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.420 : 1		Maximum Shear Stress Ratio	=	0.207 : 1
Section used for this span		6.75x33		Section used for this span		6.75x33
	=	965.20 psi			=	62.97 psi
	=	2,299.36 psi			=	304.75 psi
Load Combination		+D+S+H		Load Combination		+D+S+H
Location of maximum on span	=	18.000 ft		Location of maximum on span	=	33.372 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.366 in	Ratio =	1181 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.635 in	Ratio =	679 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.228	0.112	0.90	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	1799.50	3.97	26.74	238.50
+D+L+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.205	0.101	1.00	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	1999.44	3.97	26.74	265.00
+D+Lr+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.164	0.081	1.25	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	2499.30	3.97	26.74	331.25
+D+S+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.420	0.207	1.15	0.833	1.00	1.00	1.00	1.00	1.00	98.54	965.20	2299.36	9.35	62.97	304.75
+D+0.750Lr+0.750L+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.164	0.081	1.25	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	2499.30	3.97	26.74	331.25
+D+0.750L+0.750S+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.359	0.177	1.15	0.833	1.00	1.00	1.00	1.00	1.00	84.37	826.36	2299.36	8.01	53.91	304.75
+D+0.60W+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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DESCRIPTIO Girder Truss #2 (Reactions Only)

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 36.0 ft	**1**	0.128	0.063	1.60	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	3199.11	3.97	26.74	424.00
+D+0.750Lr+0.750L+0.450W-					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.128	0.063	1.60	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	3199.11	3.97	26.74	424.00
+D+0.750L+0.750S+0.450W+					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.258	0.127	1.60	0.833	1.00	1.00	1.00	1.00	1.00	84.37	826.36	3199.11	8.01	53.91	424.00
+0.60D+0.60W+0.60H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.077	0.038	1.60	0.833	1.00	1.00	1.00	1.00	1.00	25.10	245.90	3199.11	2.38	16.04	424.00
+D+0.70E+0.60H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.128	0.063	1.60	0.833	1.00	1.00	1.00	1.00	1.00	41.84	409.83	3199.11	3.97	26.74	424.00
+D+0.750L+0.750S+0.5250E-					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.258	0.127	1.60	0.833	1.00	1.00	1.00	1.00	1.00	84.37	826.36	3199.11	8.01	53.91	424.00
+0.60D+0.70E+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.077	0.038	1.60	0.833	1.00	1.00	1.00	1.00	1.00	25.10	245.90	3199.11	2.38	16.04	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.6355	18.131		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	10.949	10.949
Overall MINimum	6.300	6.300
+D+H	4.649	4.649
+D+L+H	4.649	4.649
+D+Lr+H	4.649	4.649
+D+S+H	10.949	10.949
+D+0.750Lr+0.750L+H	4.649	4.649
+D+0.750L+0.750S+H	9.374	9.374
+D+0.60W+H	4.649	4.649
+D+0.750Lr+0.750L+0.450W+H	4.649	4.649
+D+0.750L+0.750S+0.450W+H	9.374	9.374
+0.60D+0.60W+0.60H	2.789	2.789
+D+0.70E+0.60H	4.649	4.649
+D+0.750L+0.750S+0.5250E+H	9.374	9.374
+0.60D+0.70E+H	2.789	2.789
D Only	4.649	4.649
Lr Only		
L Only		
S Only	6.300	6.300
W Only		
E Only		
H Only		

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO Girder Truss #3 (Reactions Only)

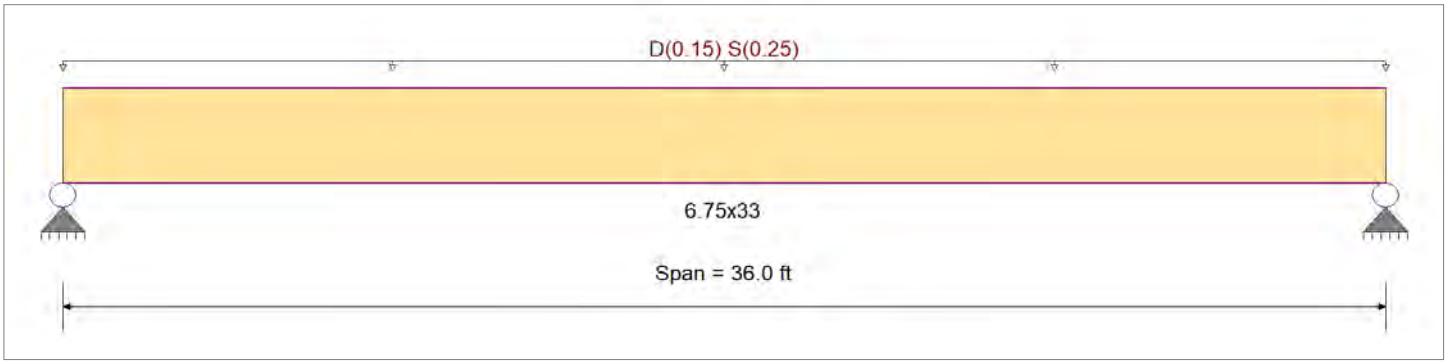
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,400.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - x	950.0 ksi
Wood Species	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade	24F - V4	Fv	265.0 psi	Eminbend - y	850.0 ksi
		Ft	1,100.0 psi	Density	31.210 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 10.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.309 : 1		Maximum Shear Stress Ratio	=	0.152 : 1
Section used for this span		6.75x33		Section used for this span		6.75x33
	=	711.32 psi			=	46.40 psi
	=	2,299.36 psi			=	304.75 psi
Load Combination		+D+S+H		Load Combination		+D+S+H
Location of maximum on span	=	18.000 ft		Location of maximum on span	=	33.372 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.261 in	Ratio =	1654 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.468 in	Ratio =	922 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.175	0.086	0.90	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	1799.50	3.05	20.53	238.50
+D+L+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.157	0.077	1.00	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	1999.44	3.05	20.53	265.00
+D+Lr+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.126	0.062	1.25	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	2499.30	3.05	20.53	331.25
+D+S+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.309	0.152	1.15	0.833	1.00	1.00	1.00	1.00	1.00	72.62	711.32	2299.36	6.89	46.40	304.75
+D+0.750Lr+0.750L+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.126	0.062	1.25	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	2499.30	3.05	20.53	331.25
+D+0.750L+0.750S+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.266	0.131	1.15	0.833	1.00	1.00	1.00	1.00	1.00	62.50	612.14	2299.36	5.93	39.93	304.75
+D+0.60W+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO Girder Truss #3 (Reactions Only)

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 36.0 ft	**1**	0.098	0.048	1.60	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	3199.11	3.05	20.53	424.00
+D+0.750Lr+0.750L+0.450W-					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.098	0.048	1.60	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	3199.11	3.05	20.53	424.00
+D+0.750L+0.750S+0.450W+					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.191	0.094	1.60	0.833	1.00	1.00	1.00	1.00	1.00	62.50	612.14	3199.11	5.93	39.93	424.00
+0.60D+0.60W+0.60H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.059	0.029	1.60	0.833	1.00	1.00	1.00	1.00	1.00	19.27	188.77	3199.11	1.83	12.32	424.00
+D+0.70E+0.60H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.098	0.048	1.60	0.833	1.00	1.00	1.00	1.00	1.00	32.12	314.62	3199.11	3.05	20.53	424.00
+D+0.750L+0.750S+0.5250E-					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.191	0.094	1.60	0.833	1.00	1.00	1.00	1.00	1.00	62.50	612.14	3199.11	5.93	39.93	424.00
+0.60D+0.70E+H					0.833	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	**1**	0.059	0.029	1.60	0.833	1.00	1.00	1.00	1.00	1.00	19.27	188.77	3199.11	1.83	12.32	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4683	18.131		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	8.069	8.069
Overall MINimum	4.500	4.500
+D+H	3.569	3.569
+D+L+H	3.569	3.569
+D+Lr+H	3.569	3.569
+D+S+H	8.069	8.069
+D+0.750Lr+0.750L+H	3.569	3.569
+D+0.750L+0.750S+H	6.944	6.944
+D+0.60W+H	3.569	3.569
+D+0.750Lr+0.750L+0.450W+H	3.569	3.569
+D+0.750L+0.750S+0.450W+H	6.944	6.944
+0.60D+0.60W+0.60H	2.141	2.141
+D+0.70E+0.60H	3.569	3.569
+D+0.750L+0.750S+0.5250E+H	6.944	6.944
+0.60D+0.70E+H	2.141	2.141
D Only	3.569	3.569
Lr Only		
L Only		
S Only	4.500	4.500
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#1

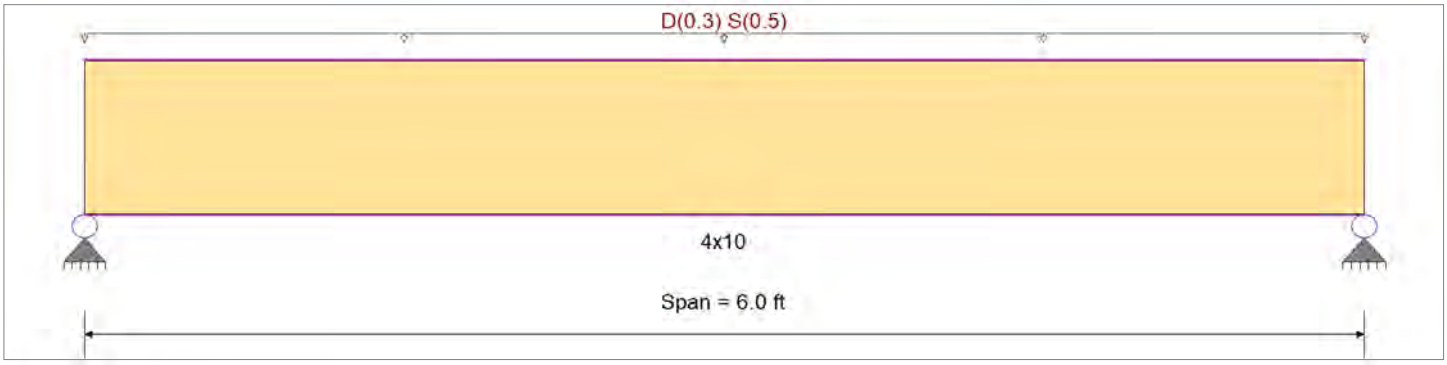
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	850 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	850 psi	Ebend- xx	1300 ksi
		Fc - Prll	1300 psi	Eminbend - x	470 ksi
Wood Species	Hem Fir	Fc - Perp	405 psi		
Wood Grade	No.2	Fv	150 psi		
		Ft	525 psi	Density	26.84 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 20.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.743 : 1		Maximum Shear Stress Ratio	=	0.484 : 1
Section used for this span		4x10		Section used for this span		4x10
	=	872.06 psi			=	83.41 psi
	=	1,173.00 psi			=	172.50 psi
Load Combination		+D+S+H		Load Combination		+D+S+H
Location of maximum on span	=	3.000 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.049 in	Ratio =	1473 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.079 in	Ratio =	913 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.361	0.235	0.90	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	918.00	0.68	31.67	135.00
+D+L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.325	0.211	1.00	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	1020.00	0.68	31.67	150.00
+D+Lr+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.260	0.169	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	1275.00	0.68	31.67	187.50
+D+S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.743	0.484	1.15	1.200	1.00	1.00	1.00	1.00	1.00	3.63	872.06	1173.00	1.80	83.41	172.50
+D+0.750Lr+0.750L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.260	0.169	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	1275.00	0.68	31.67	187.50
+D+0.750L+0.750S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.628	0.409	1.15	1.200	1.00	1.00	1.00	1.00	1.00	3.06	736.82	1173.00	1.52	70.48	172.50
+D+0.60W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 6.0 ft	1	0.203	0.132	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	1632.00	0.68	31.67	240.00
+D+0.750Lr+0.750L+0.450W-					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.203	0.132	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	1632.00	0.68	31.67	240.00
+D+0.750L+0.750S+0.450W+					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.451	0.294	1.60	1.200	1.00	1.00	1.00	1.00	1.00	3.06	736.82	1632.00	1.52	70.48	240.00
+0.60D+0.60W+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.122	0.079	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.83	198.66	1632.00	0.41	19.00	240.00
+D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.203	0.132	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.38	331.10	1632.00	0.68	31.67	240.00
+D+0.750L+0.750S+0.5250E-					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.451	0.294	1.60	1.200	1.00	1.00	1.00	1.00	1.00	3.06	736.82	1632.00	1.52	70.48	240.00
+0.60D+0.70E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.122	0.079	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.83	198.66	1632.00	0.41	19.00	240.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0788	3.022		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	2.418	2.418
Overall MINimum	1.500	1.500
+D+H	0.918	0.918
+D+L+H	0.918	0.918
+D+Lr+H	0.918	0.918
+D+S+H	2.418	2.418
+D+0.750Lr+0.750L+H	0.918	0.918
+D+0.750L+0.750S+H	2.043	2.043
+D+0.60W+H	0.918	0.918
+D+0.750Lr+0.750L+0.450W+H	0.918	0.918
+D+0.750L+0.750S+0.450W+H	2.043	2.043
+0.60D+0.60W+0.60H	0.551	0.551
+D+0.70E+0.60H	0.918	0.918
+D+0.750L+0.750S+0.5250E+H	2.043	2.043
+0.60D+0.70E+H	0.551	0.551
D Only	0.918	0.918
Lr Only		
L Only		
S Only	1.500	1.500
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
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Project Title:
Engineer:
Project ID:
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#2

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

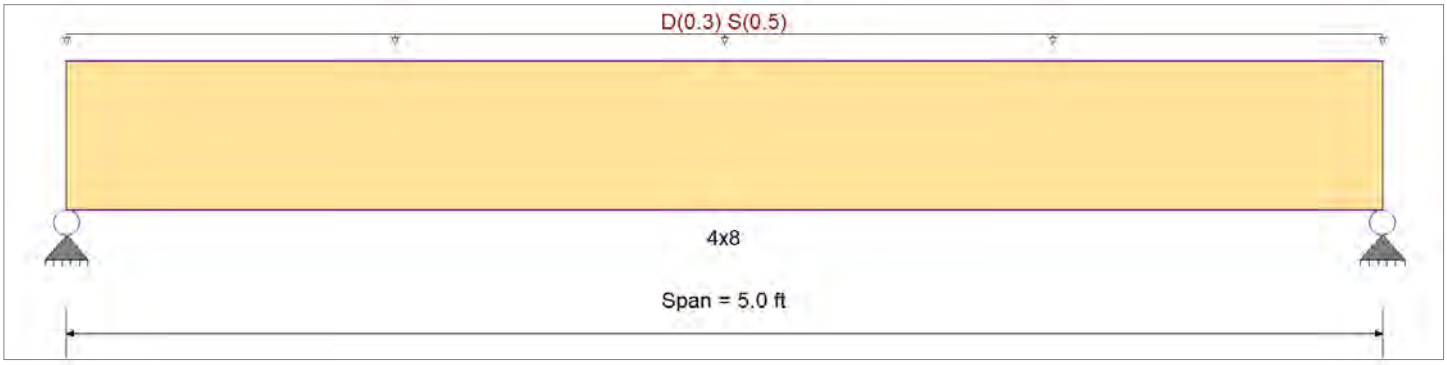
Wood Species Hem Fir
Wood Grade No.2

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	850.0 psi
Fb -	850.0 psi
Fc - Prll	1,300.0 psi
Fc - Perp	405.0 psi
Fv	150.0 psi
Ft	525.0 psi

E : Modulus of Elasti

Ebend- xx	1,300.0 ksi
Eminbend - x	470.0 ksi
Density	26.840 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 20.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.775 : 1	Maximum Shear Stress Ratio	=	0.523 : 1
Section used for this span		4x8	Section used for this span		4x8
	=	984.21 psi		=	90.28 psi
	=	1,270.75 psi		=	172.50 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.049 in	Ratio =	1225 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.079 in	Ratio =	761 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.375	0.253	0.90	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	994.50	0.58	34.19	135.00
+D+L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.337	0.228	1.00	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	1105.00	0.58	34.19	150.00
+D+Lr+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.270	0.182	1.25	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	1381.25	0.58	34.19	187.50
+D+S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.775	0.523	1.15	1.300	1.00	1.00	1.00	1.00	1.00	2.51	984.21	1270.75	1.53	90.28	172.50
+D+0.750Lr+0.750L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.270	0.182	1.25	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	1381.25	0.58	34.19	187.50
+D+0.750L+0.750S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.654	0.442	1.15	1.300	1.00	1.00	1.00	1.00	1.00	2.12	831.33	1270.75	1.29	76.26	172.50
+D+0.60W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
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Engineer:
Project ID:
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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.0 ft	**1**	0.211	0.142	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	1768.00	0.58	34.19	240.00
+D+0.750Lr+0.750L+0.450W-					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.211	0.142	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	1768.00	0.58	34.19	240.00
+D+0.750L+0.750S+0.450W+					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.470	0.318	1.60	1.300	1.00	1.00	1.00	1.00	1.00	2.12	831.33	1768.00	1.29	76.26	240.00
+0.60D+0.60W+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.126	0.085	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.57	223.62	1768.00	0.35	20.51	240.00
+D+0.70E+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.211	0.142	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.95	372.69	1768.00	0.58	34.19	240.00
+D+0.750L+0.750S+0.5250E-					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.470	0.318	1.60	1.300	1.00	1.00	1.00	1.00	1.00	2.12	831.33	1768.00	1.29	76.26	240.00
+0.60D+0.70E+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.126	0.085	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.57	223.62	1768.00	0.35	20.51	240.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0788	2.518		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	2.012	2.012
Overall MINimum	1.250	1.250
+D+H	0.762	0.762
+D+L+H	0.762	0.762
+D+Lr+H	0.762	0.762
+D+S+H	2.012	2.012
+D+0.750Lr+0.750L+H	0.762	0.762
+D+0.750L+0.750S+H	1.699	1.699
+D+0.60W+H	0.762	0.762
+D+0.750Lr+0.750L+0.450W+H	0.762	0.762
+D+0.750L+0.750S+0.450W+H	1.699	1.699
+0.60D+0.60W+0.60H	0.457	0.457
+D+0.70E+0.60H	0.762	0.762
+D+0.750L+0.750S+0.5250E+H	1.699	1.699
+0.60D+0.70E+H	0.457	0.457
D Only	0.762	0.762
Lr Only		
L Only		
S Only	1.250	1.250
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#3

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

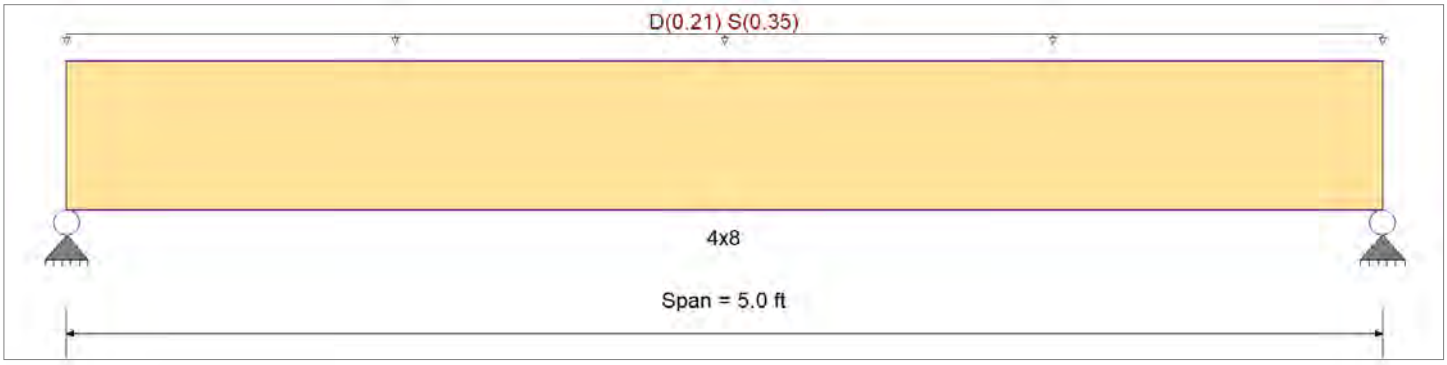
Wood Species Hem Fir
Wood Grade No.2

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	850.0 psi
Fb -	850.0 psi
Fc - Prll	1,300.0 psi
Fc - Perp	405.0 psi
Fv	150.0 psi
Ft	525.0 psi

E : Modulus of Elasti

Ebend- xx	1,300.0 ksi
Eminbend - x	470.0 ksi
Density	26.840 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.544 : 1	Maximum Shear Stress Ratio	=	0.367 : 1
Section used for this span		4x8	Section used for this span		4x8
	=	690.68 psi		=	63.35 psi
	=	1,270.75 psi		=	172.50 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.034 in	Ratio =	1751 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.055 in	Ratio =	1085 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.264	0.178	0.90	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	994.50	0.41	24.09	135.00
+D+L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.238	0.161	1.00	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	1105.00	0.41	24.09	150.00
+D+Lr+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.190	0.128	1.25	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	1381.25	0.41	24.09	187.50
+D+S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.544	0.367	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.76	690.68	1270.75	1.07	63.35	172.50
+D+0.750Lr+0.750L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.190	0.128	1.25	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	1381.25	0.41	24.09	187.50
+D+0.750L+0.750S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.459	0.310	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.49	583.67	1270.75	0.91	53.54	172.50
+D+0.60W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#3

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.0 ft	**1**	0.149	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	1768.00	0.41	24.09	240.00
+D+0.750Lr+0.750L+0.450W-					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.149	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	1768.00	0.41	24.09	240.00
+D+0.750L+0.750S+0.450W+					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.330	0.223	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.49	583.67	1768.00	0.91	53.54	240.00
+0.60D+0.60W+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.089	0.060	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.40	157.57	1768.00	0.24	14.45	240.00
+D+0.70E+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.149	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.67	262.62	1768.00	0.41	24.09	240.00
+D+0.750L+0.750S+0.5250E-					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.330	0.223	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.49	583.67	1768.00	0.91	53.54	240.00
+0.60D+0.70E+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.089	0.060	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.40	157.57	1768.00	0.24	14.45	240.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0553	2.518		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.412	1.412
Overall MINimum	0.875	0.875
+D+H	0.537	0.537
+D+L+H	0.537	0.537
+D+Lr+H	0.537	0.537
+D+S+H	1.412	1.412
+D+0.750Lr+0.750L+H	0.537	0.537
+D+0.750L+0.750S+H	1.193	1.193
+D+0.60W+H	0.537	0.537
+D+0.750Lr+0.750L+0.450W+H	0.537	0.537
+D+0.750L+0.750S+0.450W+H	1.193	1.193
+0.60D+0.60W+0.60H	0.322	0.322
+D+0.70E+0.60H	0.537	0.537
+D+0.750L+0.750S+0.5250E+H	1.193	1.193
+0.60D+0.70E+H	0.322	0.322
D Only	0.537	0.537
Lr Only		
L Only		
S Only	0.875	0.875
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#4

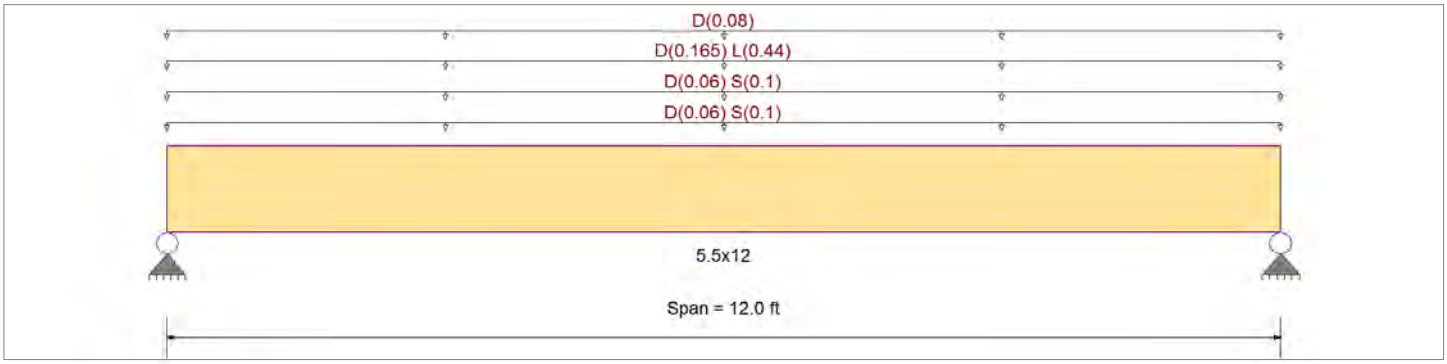
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2400 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	1850 psi	Ebend- xx	1800 ksi
		Fc - Prll	1650 psi	Eminbend - x	950 ksi
Wood Species	DF/DF	Fc - Perp	650 psi	Ebend- yy	1600 ksi
Wood Grade	24F - V4	Fv	265 psi	Eminbend - y	850 ksi
		Ft	1100 psi	Density	31.21 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft, (FLOOR)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.559 : 1		Maximum Shear Stress Ratio	=	0.354 : 1
Section used for this span		5.5x12		Section used for this span		5.5x12
	=	1,340.68 psi			=	93.78 psi
	=	2,400.00 psi			=	265.00 psi
Load Combination		+D+L+H		Load Combination		+D+L+H
Location of maximum on span	=	6.000 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.145 in	Ratio =	994 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.283 in	Ratio =	509 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.287	0.182	0.90	1.000	1.00	1.00	1.00	1.00	1.00	6.83	620.68	2160.00	1.91	43.42	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.559	0.354	1.00	1.000	1.00	1.00	1.00	1.00	1.00	14.75	1,340.68	2400.00	4.13	93.78	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.207	0.131	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.83	620.68	3000.00	1.91	43.42	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.343	0.218	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.43	947.95	2760.00	2.92	66.31	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.387	0.245	1.25	1.000	1.00	1.00	1.00	1.00	1.00	12.77	1,160.68	3000.00	3.57	81.19	331.25

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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DESCRIPTIO HDR#4

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.509	0.323	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.47	1,406.13	2760.00	4.33	98.36	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.162	0.102	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.83	620.68	3840.00	1.91	43.42	424.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.302	0.191	1.60	1.000	1.00	1.00	1.00	1.00	1.00	12.77	1,160.68	3840.00	3.57	81.19	424.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.366	0.232	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.47	1,406.13	3840.00	4.33	98.36	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.097	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.10	372.41	3840.00	1.15	26.05	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.162	0.102	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.83	620.68	3840.00	1.91	43.42	424.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.366	0.232	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.47	1,406.13	3840.00	4.33	98.36	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	**1**	0.097	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.10	372.41	3840.00	1.15	26.05	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.2829	6.044		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	5.156	5.156
Overall MINimum	1.200	1.200
+D+H	2.276	2.276
+D+L+H	4.916	4.916
+D+Lr+H	2.276	2.276
+D+S+H	3.476	3.476
+D+0.750Lr+0.750L+H	4.256	4.256
+D+0.750L+0.750S+H	5.156	5.156
+D+0.60W+H	2.276	2.276
+D+0.750Lr+0.750L+0.450W+H	4.256	4.256
+D+0.750L+0.750S+0.450W+H	5.156	5.156
+0.60D+0.60W+0.60H	1.365	1.365
+D+0.70E+0.60H	2.276	2.276
+D+0.750L+0.750S+0.5250E+H	5.156	5.156
+0.60D+0.70E+H	1.365	1.365
D Only	2.276	2.276
Lr Only		
L Only	2.640	2.640
S Only	1.200	1.200
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#5

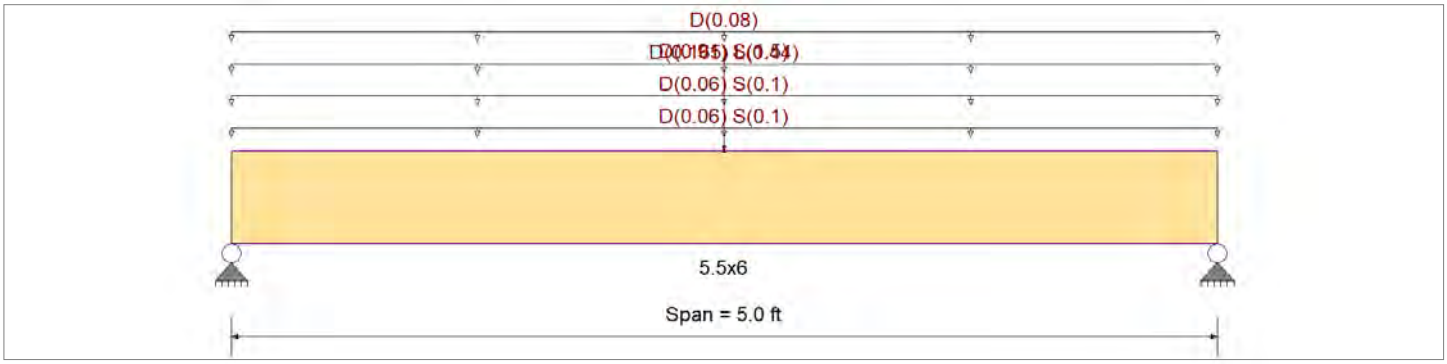
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,400.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - x	950.0 ksi
Wood Species	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade	24F - V4	Fv	265.0 psi	Eminbend - y	850.0 ksi
		Ft	1,100.0 psi	Density	31.210 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft, (FLOOR)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)
Point Load : D = 0.910, S = 1.50 k @ 2.50 ft, (HDR#1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.686 : 1	Maximum Shear Stress Ratio	=	0.407 : 1
Section used for this span		5.5x6	Section used for this span		5.5x6
	=	1,893.35 psi		=	124.00 psi
	=	2,760.00 psi		=	304.75 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.054 in	Ratio =	1111 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.119 in	Ratio =	502 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+H														0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.387	0.229	0.90	1.000	1.00	1.00	1.00	1.00	1.00		2.30	836.54	2160.00	1.20	54.64	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.557	0.358	1.00	1.000	1.00	1.00	1.00	1.00	1.00		3.68	1,336.54	2400.00	2.09	94.78	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.279	0.165	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.30	836.54	3000.00	1.20	54.64	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.632	0.351	1.15	1.000	1.00	1.00	1.00	1.00	1.00		4.80	1,745.63	2760.00	2.35	106.98	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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DESCRIPTIO HDR#5

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.0 ft	**1**	0.404	0.256	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.33	1,211.54	3000.00	1.86	84.75	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.686	0.407	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.21	1,893.35	2760.00	2.73	124.00	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.218	0.129	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.30	836.54	3840.00	1.20	54.64	424.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.316	0.200	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.33	1,211.54	3840.00	1.86	84.75	424.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.493	0.292	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.21	1,893.35	3840.00	2.73	124.00	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.131	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.38	501.92	3840.00	0.72	32.78	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.218	0.129	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.30	836.54	3840.00	1.20	54.64	424.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.493	0.292	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.21	1,893.35	3840.00	2.73	124.00	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.131	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.38	501.92	3840.00	0.72	32.78	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.1193	2.518		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.148	3.148
Overall MINimum	1.250	1.250
+D+H	1.385	1.385
+D+L+H	2.485	2.485
+D+Lr+H	1.385	1.385
+D+S+H	2.635	2.635
+D+0.750Lr+0.750L+H	2.210	2.210
+D+0.750L+0.750S+H	3.148	3.148
+D+0.60W+H	1.385	1.385
+D+0.750Lr+0.750L+0.450W+H	2.210	2.210
+D+0.750L+0.750S+0.450W+H	3.148	3.148
+0.60D+0.60W+0.60H	0.831	0.831
+D+0.70E+0.60H	1.385	1.385
+D+0.750L+0.750S+0.5250E+H	3.148	3.148
+0.60D+0.70E+H	0.831	0.831
D Only	1.385	1.385
Lr Only		
L Only	1.100	1.100
S Only	1.250	1.250
W Only		
E Only		
H Only		

Feaster Residence
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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#6

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

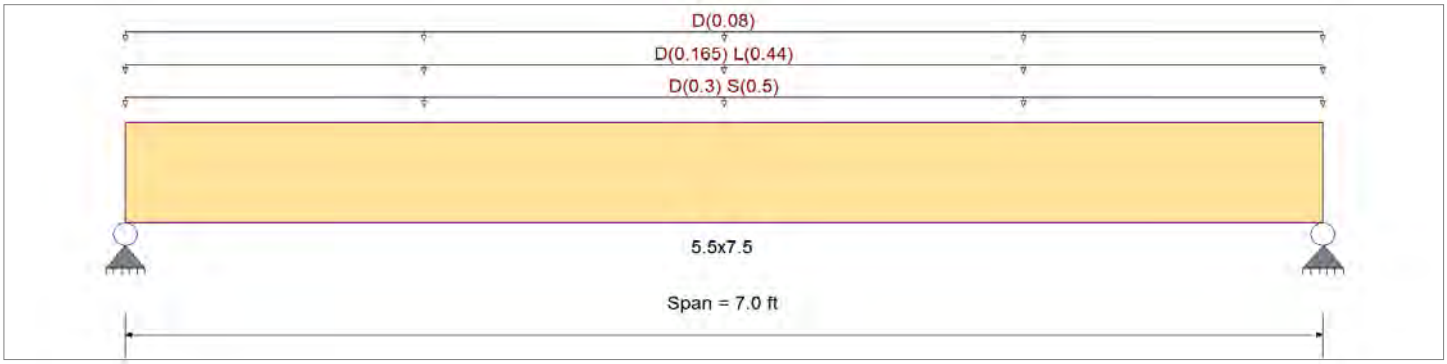
Wood Species DF/DF
Wood Grade 24F - V4

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasti

Ebend- xx	1,800.0 ksi
Eminbend - x	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - y	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 20.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft, (FLOOR)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.650 : 1	Maximum Shear Stress Ratio	=	0.434 : 1
Section used for this span		5.5x7.5	Section used for this span		5.5x7.5
	=	1,794.56 psi		=	132.16 psi
	=	2,760.00 psi		=	304.75 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	3.500 ft	Location of maximum on span	=	6.387 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.078 in	Ratio =	1076 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.197 in	Ratio =	427 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.0 ft	1	0.366	0.244	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.39	789.62	2160.00	1.60	58.15	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	1	0.590	0.394	1.00	1.000	1.00	1.00	1.00	1.00	1.00	6.09	1,416.82	2400.00	2.87	104.34	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	1	0.263	0.176	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.39	789.62	3000.00	1.60	58.15	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	1	0.544	0.363	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.46	1,502.34	2760.00	3.04	110.64	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	1	0.420	0.280	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.41	1,260.02	3000.00	2.55	92.79	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
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Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
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DESCRIPTIO HDR#6

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 7.0 ft	**1**	0.650	0.434	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.71	1,794.56	2760.00	3.63	132.16	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.206	0.137	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.39	789.62	3840.00	1.60	58.15	424.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.328	0.219	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.41	1,260.02	3840.00	2.55	92.79	424.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.467	0.312	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.71	1,794.56	3840.00	3.63	132.16	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.123	0.082	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.04	473.77	3840.00	0.96	34.89	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.206	0.137	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.39	789.62	3840.00	1.60	58.15	424.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.467	0.312	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.71	1,794.56	3840.00	3.63	132.16	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.0 ft	**1**	0.123	0.082	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.04	473.77	3840.00	0.96	34.89	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.1965	3.526		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	4.406	4.406
Overall MINimum	1.750	1.750
+D+H	1.939	1.939
+D+L+H	3.479	3.479
+D+Lr+H	1.939	1.939
+D+S+H	3.689	3.689
+D+0.750Lr+0.750L+H	3.094	3.094
+D+0.750L+0.750S+H	4.406	4.406
+D+0.60W+H	1.939	1.939
+D+0.750Lr+0.750L+0.450W+H	3.094	3.094
+D+0.750L+0.750S+0.450W+H	4.406	4.406
+0.60D+0.60W+0.60H	1.163	1.163
+D+0.70E+0.60H	1.939	1.939
+D+0.750L+0.750S+0.5250E+H	4.406	4.406
+0.60D+0.70E+H	1.163	1.163
D Only	1.939	1.939
Lr Only		
L Only	1.540	1.540
S Only	1.750	1.750
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
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Project Title:
Engineer:
Project ID:
Project Descr:

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DESCRIPTIO HDR#7

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

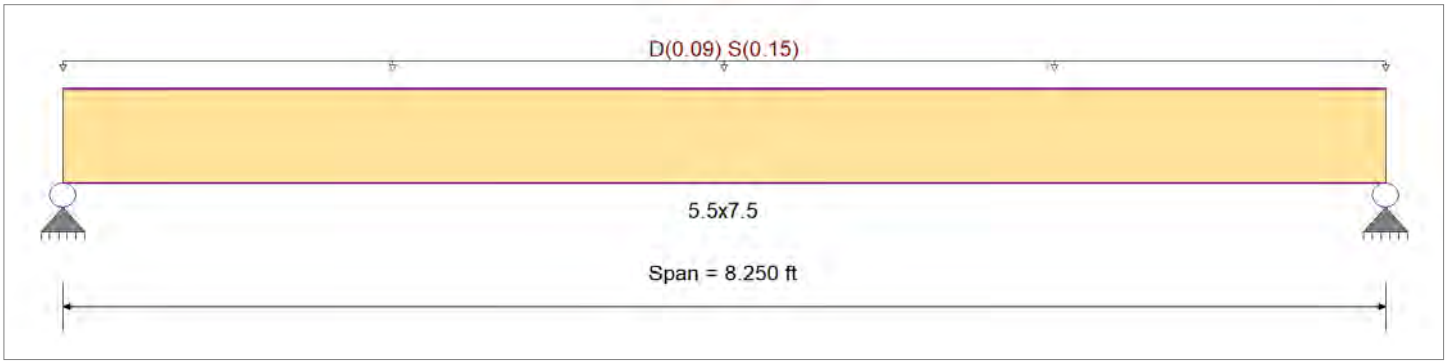
Wood Species DF/DF
Wood Grade 24F - V4

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasti

Ebend- xx	1,800.0 ksi
Eminbend - x	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - y	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 6.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.179 : 1	Maximum Shear Stress Ratio	=	0.105 : 1
Section used for this span		5.5x7.5	Section used for this span		5.5x7.5
	=	492.90 psi		=	31.89 psi
	=	2,760.00 psi		=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	4.125 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.045 in	Ratio =	2191 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.075 in	Ratio =	1320 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.091	0.053	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	2160.00	0.35	12.67	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.082	0.048	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	2400.00	0.35	12.67	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.065	0.038	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	3000.00	0.35	12.67	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.179	0.105	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.12	492.90	2760.00	0.88	31.89	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.065	0.038	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	3000.00	0.35	12.67	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.152	0.089	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.80	418.65	2760.00	0.74	27.09	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#7

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 8.250 ft	1	0.051	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	3840.00	0.35	12.67	424.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.051	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	3840.00	0.35	12.67	424.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.109	0.064	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.80	418.65	3840.00	0.74	27.09	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.51	117.54	3840.00	0.21	7.60	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.051	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.84	195.90	3840.00	0.35	12.67	424.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.109	0.064	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.80	418.65	3840.00	0.74	27.09	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.51	117.54	3840.00	0.21	7.60	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0750	4.155		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	1.027	1.027
Overall MINimum	0.619	0.619
+D+H	0.408	0.408
+D+L+H	0.408	0.408
+D+Lr+H	0.408	0.408
+D+S+H	1.027	1.027
+D+0.750Lr+0.750L+H	0.408	0.408
+D+0.750L+0.750S+H	0.872	0.872
+D+0.60W+H	0.408	0.408
+D+0.750Lr+0.750L+0.450W+H	0.408	0.408
+D+0.750L+0.750S+0.450W+H	0.872	0.872
+0.60D+0.60W+0.60H	0.245	0.245
+D+0.70E+0.60H	0.408	0.408
+D+0.750L+0.750S+0.5250E+H	0.872	0.872
+0.60D+0.70E+H	0.245	0.245
D Only	0.408	0.408
Lr Only		
L Only		
S Only	0.619	0.619
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#8

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

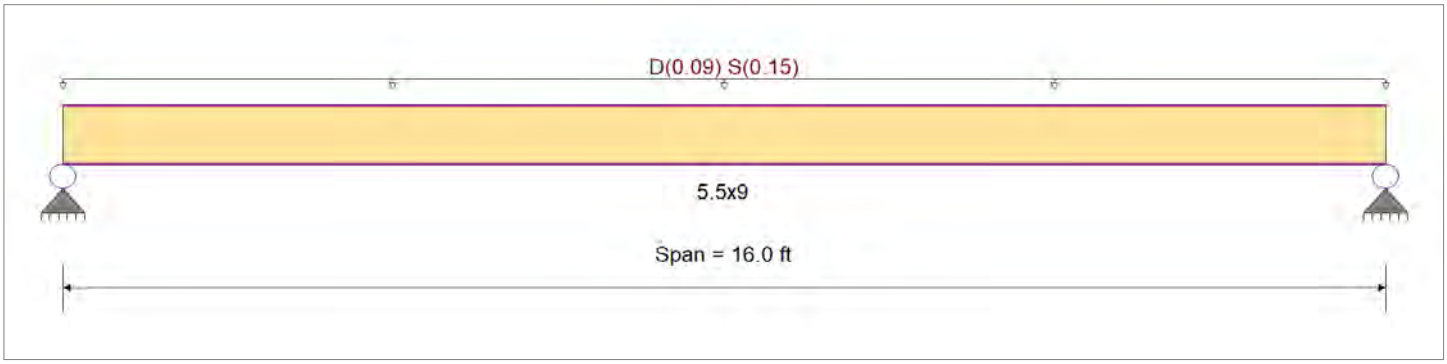
Wood Species DF/DF
Wood Grade 24F - V4

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasti

Ebend- xx	1,800.0 ksi
Eminbend - x	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - y	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 6.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.470 : 1	Maximum Shear Stress Ratio	=	0.182 : 1
Section used for this span		5.5x9	Section used for this span		5.5x9
	=	1,296.70 psi		=	55.46 psi
	=	2,760.00 psi		=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.299 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.370 in	Ratio =	519 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.618 in	Ratio =	310 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.241	0.093	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	2160.00	0.74	22.28	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.217	0.084	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	2400.00	0.74	22.28	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.174	0.067	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	3000.00	0.74	22.28	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.470	0.182	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.02	1,296.70	2760.00	1.83	55.46	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.174	0.067	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	3000.00	0.74	22.28	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.400	0.155	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.82	1,102.76	2760.00	1.56	47.16	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#8

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 16.0 ft	**1**	0.136	0.053	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	3840.00	0.74	22.28	424.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	**1**	0.136	0.053	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	3840.00	0.74	22.28	424.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	**1**	0.287	0.111	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.82	1,102.76	3840.00	1.56	47.16	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	**1**	0.081	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.93	312.56	3840.00	0.44	13.37	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	**1**	0.136	0.053	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.22	520.94	3840.00	0.74	22.28	424.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	**1**	0.287	0.111	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.82	1,102.76	3840.00	1.56	47.16	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	**1**	0.081	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.93	312.56	3840.00	0.44	13.37	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.6183	8.058		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	2.006	2.006
Overall MINimum	1.200	1.200
+D+H	0.806	0.806
+D+L+H	0.806	0.806
+D+Lr+H	0.806	0.806
+D+S+H	2.006	2.006
+D+0.750Lr+0.750L+H	0.806	0.806
+D+0.750L+0.750S+H	1.706	1.706
+D+0.60W+H	0.806	0.806
+D+0.750Lr+0.750L+0.450W+H	0.806	0.806
+D+0.750L+0.750S+0.450W+H	1.706	1.706
+0.60D+0.60W+0.60H	0.483	0.483
+D+0.70E+0.60H	0.806	0.806
+D+0.750L+0.750S+0.5250E+H	1.706	1.706
+0.60D+0.70E+H	0.483	0.483
D Only	0.806	0.806
Lr Only		
L Only		
S Only	1.200	1.200
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#9

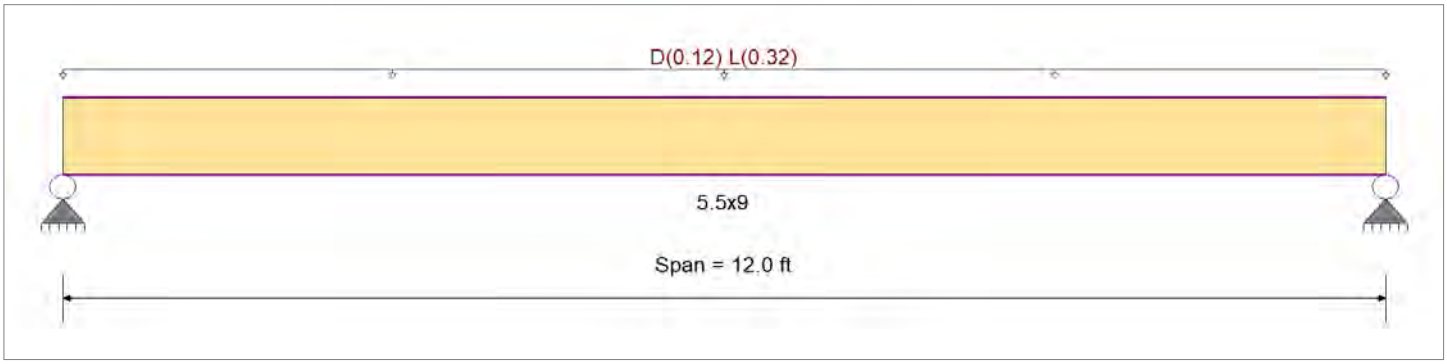
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,400.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - x	950.0 ksi
Wood Species	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade	24F - V4	Fv	265.0 psi	Eminbend - y	850.0 ksi
		Ft	1,100.0 psi	Density	31.210 pcf

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



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.546 : 1		Maximum Shear Stress Ratio	=	0.271 : 1
Section used for this span		5.5x9		Section used for this span		5.5x9
	=	1,311.21 psi			=	71.78 psi
	=	2,400.00 psi			=	265.00 psi
Load Combination		+D+L+H		Load Combination		+D+L+H
Location of maximum on span	=	6.000 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.250 in	Ratio =	576 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.352 in	Ratio =	409 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.176	0.087	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.35	380.30	2160.00	0.69	20.82	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.546	0.271	1.00	1.000	1.00	1.00	1.00	1.00	1.00	8.11	1,311.21	2400.00	2.37	71.78	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.127	0.063	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.35	380.30	3000.00	0.69	20.82	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.138	0.068	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.35	380.30	2760.00	0.69	20.82	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.359	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.67	1,078.48	3000.00	1.95	59.04	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.391	0.194	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.67	1,078.48	2760.00	1.95	59.04	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#9

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 12.0 ft	1	0.099	0.049	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	380.30	3840.00	0.69	20.82	424.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.281	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.67	1,078.48	3840.00	1.95	59.04	424.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.281	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.67	1,078.48	3840.00	1.95	59.04	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.059	0.029	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.41	228.18	3840.00	0.41	12.49	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.099	0.049	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	380.30	3840.00	0.69	20.82	424.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.281	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.67	1,078.48	3840.00	1.95	59.04	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.059	0.029	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.41	228.18	3840.00	0.41	12.49	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.3517	6.044		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.704	2.704
Overall MINimum	1.920	1.920
+D+H	0.784	0.784
+D+L+H	2.704	2.704
+D+Lr+H	0.784	0.784
+D+S+H	0.784	0.784
+D+0.750Lr+0.750L+H	2.224	2.224
+D+0.750L+0.750S+H	2.224	2.224
+D+0.60W+H	0.784	0.784
+D+0.750Lr+0.750L+0.450W+H	2.224	2.224
+D+0.750L+0.750S+0.450W+H	2.224	2.224
+0.60D+0.60W+0.60H	0.471	0.471
+D+0.70E+0.60H	0.784	0.784
+D+0.750L+0.750S+0.5250E+H	2.224	2.224
+0.60D+0.70E+H	0.471	0.471
D Only	0.784	0.784
Lr Only		
L Only	1.920	1.920
S Only		
W Only		
E Only		
H Only		

Feaster Residence
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#10

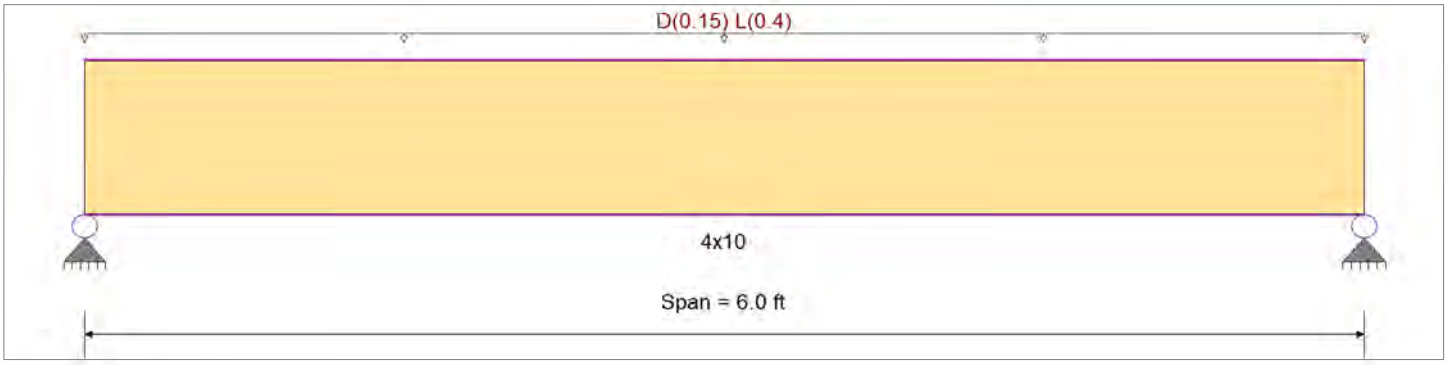
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	850 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	850 psi	Ebend- xx	1300 ksi
		Fc - Prll	1300 psi	Eminbend - x	470 ksi
Wood Species	Hem Fir	Fc - Perp	405 psi		
Wood Grade	No.2	Fv	150 psi		
		Ft	525 psi	Density	26.84 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 10.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.590 : 1		Maximum Shear Stress Ratio	=	0.384 : 1
Section used for this span		4x10		Section used for this span		4x10
	=	601.58 psi			=	57.54 psi
	=	1,020.00 psi			=	150.00 psi
Load Combination		+D+L+H		Load Combination		+D+L+H
Location of maximum on span	=	3.000 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.039 in	Ratio =	1841 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.054 in	Ratio =	1324 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.184	0.120	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.70	168.82	918.00	0.35	16.15	135.00
+D+L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.590	0.384	1.00	1.200	1.00	1.00	1.00	1.00	1.00	2.50	601.58	1020.00	1.24	57.54	150.00
+D+Lr+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.132	0.086	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.70	168.82	1275.00	0.35	16.15	187.50
+D+S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.144	0.094	1.15	1.200	1.00	1.00	1.00	1.00	1.00	0.70	168.82	1173.00	0.35	16.15	172.50
+D+0.750Lr+0.750L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.387	0.252	1.25	1.200	1.00	1.00	1.00	1.00	1.00	2.05	493.39	1275.00	1.02	47.19	187.50
+D+0.750L+0.750S+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.421	0.274	1.15	1.200	1.00	1.00	1.00	1.00	1.00	2.05	493.39	1173.00	1.02	47.19	172.50
+D+0.60W+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#10

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 6.0 ft	**1**	0.103	0.067	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.70	168.82	1632.00	0.35	16.15	240.00
+D+0.750Lr+0.750L+0.450W-					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.302	0.197	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.05	493.39	1632.00	1.02	47.19	240.00
+D+0.750L+0.750S+0.450W+					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.302	0.197	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.05	493.39	1632.00	1.02	47.19	240.00
+0.60D+0.60W+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.062	0.040	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.42	101.29	1632.00	0.21	9.69	240.00
+D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.103	0.067	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.70	168.82	1632.00	0.35	16.15	240.00
+D+0.750L+0.750S+0.5250E-					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.302	0.197	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.05	493.39	1632.00	1.02	47.19	240.00
+0.60D+0.70E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.062	0.040	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.42	101.29	1632.00	0.21	9.69	240.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0543	3.022		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	1.668	1.668
Overall MINimum	1.200	1.200
+D+H	0.468	0.468
+D+L+H	1.668	1.668
+D+Lr+H	0.468	0.468
+D+S+H	0.468	0.468
+D+0.750Lr+0.750L+H	1.368	1.368
+D+0.750L+0.750S+H	1.368	1.368
+D+0.60W+H	0.468	0.468
+D+0.750Lr+0.750L+0.450W+H	1.368	1.368
+D+0.750L+0.750S+0.450W+H	1.368	1.368
+0.60D+0.60W+0.60H	0.281	0.281
+D+0.70E+0.60H	0.468	0.468
+D+0.750L+0.750S+0.5250E+H	1.368	1.368
+0.60D+0.70E+H	0.281	0.281
D Only	0.468	0.468
Lr Only		
L Only	1.200	1.200
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
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Project Title:
Engineer:
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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO HDR#11

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho: Allowable Stress Design
Load Combinati: ASCE 7-16

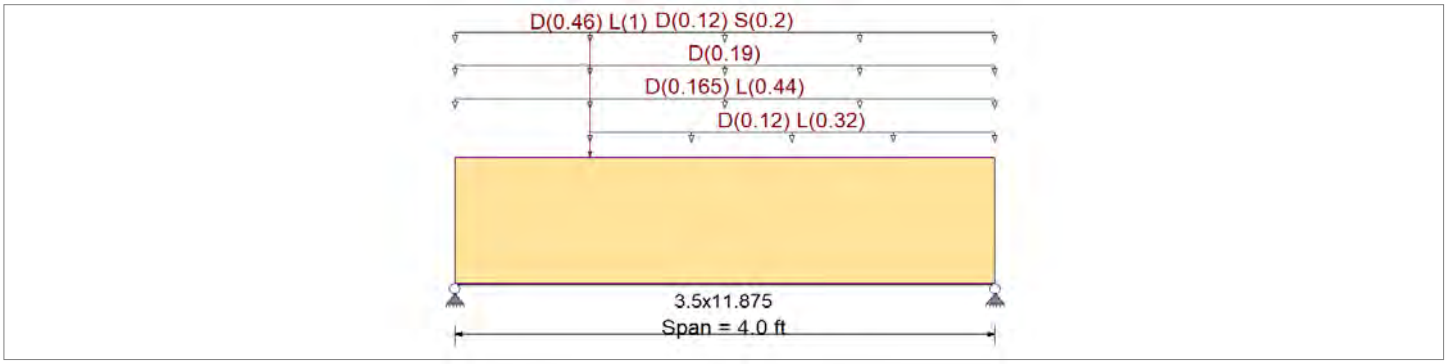
Wood Species: Trus Joist
Wood Grade: Parallam PSL 2.0E

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

Fb +	2900 psi
Fb -	2900 psi
Fc - Prll	2900 psi
Fc - Perp	625 psi
Fv	290 psi
Ft	2025 psi

E : Modulus of Elasti

Ebend- xx	2000 ksi
Eminbend - x	1016.535 ksi
Density	45.07 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
- Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 1.0 -->> 4.0 ft, Tributary Width = 8.0 ft, (MAIN FLOOR)
- Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft, (UPPER FLOOR)
- Uniform Load : D = 0.010 ksf, Tributary Width = 19.0 ft, (WALL)
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 8.0 ft, (ROOF)
- Point Load : D = 0.460, L = 1.0 k @ 1.0 ft, (BM#14)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.171 : 1	Maximum Shear Stress Ratio	=	0.316 : 1
Section used for this span		3.5x11.875	Section used for this span		3.5x11.875
	=	494.70 psi		=	91.61 psi
	=	2,900.00 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	1.766 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.006 in	Ratio =	8174 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.010 in	Ratio =	4739 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.080	0.135	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.42	207.77	2610.00	0.98	35.32	261.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.171	0.316	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.39	494.70	2900.00	2.54	91.61	290.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.057	0.097	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.42	207.77	3625.00	0.98	35.32	362.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.080	0.128	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.82	265.82	3335.00	1.18	42.70	333.50

Feaster Residence
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Engineer:
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO HDR#11

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.117	0.214	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.90	422.93	3625.00	2.15	77.54	362.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.140	0.249	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.20	466.23	3335.00	2.30	83.07	333.50
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.045	0.076	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.42	207.77	4640.00	0.98	35.32	464.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.091	0.167	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.90	422.93	4640.00	2.15	77.54	464.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.100	0.179	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.20	466.23	4640.00	2.30	83.07	464.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.027	0.046	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.85	124.66	4640.00	0.59	21.19	464.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.045	0.076	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.42	207.77	4640.00	0.98	35.32	464.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.100	0.179	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.20	466.23	4640.00	2.30	83.07	464.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.027	0.046	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.85	124.66	4640.00	0.59	21.19	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0101	1.956		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.446	3.046
Overall MINimum	0.400	0.400
+D+H	1.456	1.316
+D+L+H	3.446	3.046
+D+Lr+H	1.456	1.316
+D+S+H	1.856	1.716
+D+0.750Lr+0.750L+H	2.949	2.614
+D+0.750L+0.750S+H	3.249	2.914
+D+0.60W+H	1.456	1.316
+D+0.750Lr+0.750L+0.450W+H	2.949	2.614
+D+0.750L+0.750S+0.450W+H	3.249	2.914
+0.60D+0.60W+0.60H	0.874	0.790
+D+0.70E+0.60H	1.456	1.316
+D+0.750L+0.750S+0.5250E+H	3.249	2.914
+0.60D+0.70E+H	0.874	0.790
D Only	1.456	1.316
Lr Only		
L Only	1.990	1.730
S Only	0.400	0.400
W Only		
E Only		
H Only		

Feaster Residence
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#1

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

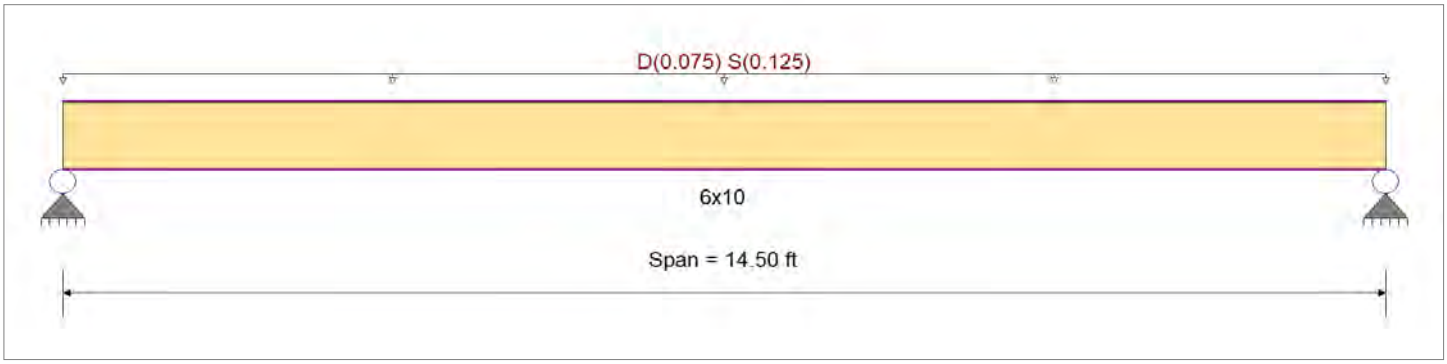
Wood Species Douglas Fir - Larch (North)
Wood Grade No. 1/No. 2

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	850 psi
Fb -	850 psi
Fc - Prll	1400 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	500 psi

E : Modulus of Elasti

Ebend- xx	1600 ksi
Eminbend - x	580 ksi
Density	30.59 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 5.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.823 : 1	Maximum Shear Stress Ratio	=	0.191 : 1
Section used for this span		6x10	Section used for this span		6x10
	=	804.74 psi		=	39.45 psi
	=	977.50 psi		=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	7.250 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.199 in	Ratio =	874 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.336 in	Ratio =	518 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.429	0.099	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	765.00	0.56	16.09	162.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.386	0.089	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	850.00	0.56	16.09	180.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.309	0.072	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	1062.50	0.56	16.09	225.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.823	0.191	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.55	804.74	977.50	1.37	39.45	207.00
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.309	0.072	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	1062.50	0.56	16.09	225.00
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.701	0.162	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.73	685.61	977.50	1.17	33.61	207.00
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 14.50 ft	1	0.241	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	1360.00	0.56	16.09	288.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.241	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	1360.00	0.56	16.09	288.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.504	0.117	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.73	685.61	1360.00	1.17	33.61	288.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.145	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.36	196.93	1360.00	0.34	9.65	288.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.241	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.26	328.22	1360.00	0.56	16.09	288.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.504	0.117	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.73	685.61	1360.00	1.17	33.61	288.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.145	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.36	196.93	1360.00	0.34	9.65	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3359	7.303		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.530	1.530
Overall MINimum	0.906	0.906
+D+H	0.624	0.624
+D+L+H	0.624	0.624
+D+Lr+H	0.624	0.624
+D+S+H	1.530	1.530
+D+0.750Lr+0.750L+H	0.624	0.624
+D+0.750L+0.750S+H	1.304	1.304
+D+0.60W+H	0.624	0.624
+D+0.750Lr+0.750L+0.450W+H	0.624	0.624
+D+0.750L+0.750S+0.450W+H	1.304	1.304
+0.60D+0.60W+0.60H	0.375	0.375
+D+0.70E+0.60H	0.624	0.624
+D+0.750L+0.750S+0.5250E+H	1.304	1.304
+0.60D+0.70E+H	0.375	0.375
D Only	0.624	0.624
Lr Only		
L Only		
S Only	0.906	0.906
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#2

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho: Allowable Stress Design
Load Combinati: ASCE 7-16

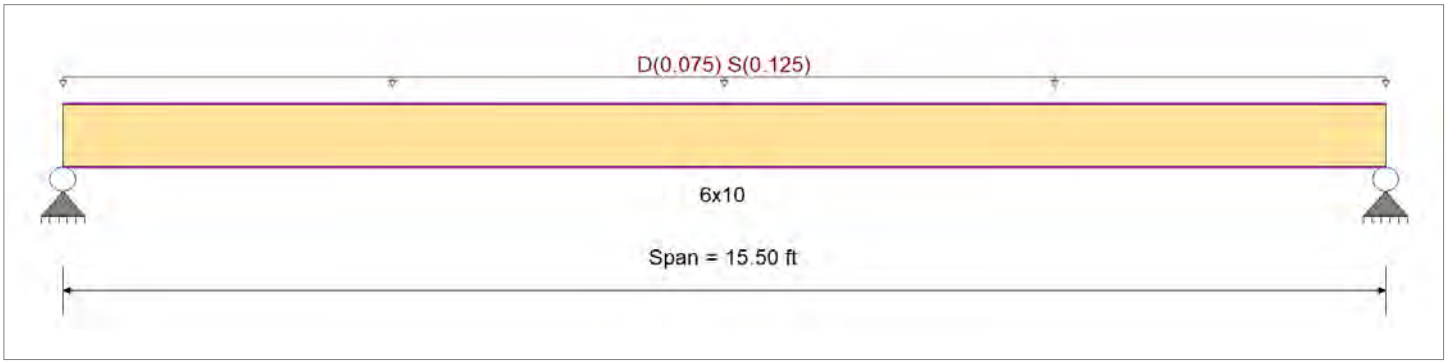
Wood Species: Douglas Fir - Larch (North)
Wood Grade: No. 1/No. 2

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

Fb +	850.0 psi
Fb -	850.0 psi
Fc - Prll	1,400.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	500.0 psi

E : Modulus of Elasti

Ebend- xx	1,600.0 ksi
Eminbend - x	580.0 ksi
Density	30.590 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 5.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.941 : 1	Maximum Shear Stress Ratio	=	0.205 : 1
Section used for this span		6x10	Section used for this span		6x10
	=	919.57 psi		=	42.51 psi
	=	977.50 psi		=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	7.750 ft	Location of maximum on span	=	14.765 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.260 in	Ratio =	716 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.439 in	Ratio =	424 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.490	0.107	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	765.00	0.60	17.34	162.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.441	0.096	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	850.00	0.60	17.34	180.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.353	0.077	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	1062.50	0.60	17.34	225.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.941	0.205	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.34	919.57	977.50	1.48	42.51	207.00
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.353	0.077	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	1062.50	0.60	17.34	225.00
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.801	0.175	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.40	783.44	977.50	1.26	36.22	207.00
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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DESCRIPTIO BM#2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 15.50 ft	**1**	0.276	0.060	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	1360.00	0.60	17.34	288.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	**1**	0.276	0.060	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	1360.00	0.60	17.34	288.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	**1**	0.576	0.126	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.40	783.44	1360.00	1.26	36.22	288.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	**1**	0.165	0.036	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.55	225.03	1360.00	0.36	10.40	288.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	**1**	0.276	0.060	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.59	375.06	1360.00	0.60	17.34	288.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	**1**	0.576	0.126	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.40	783.44	1360.00	1.26	36.22	288.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	**1**	0.165	0.036	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.55	225.03	1360.00	0.36	10.40	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4386	7.807		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.636	1.636
Overall MINimum	0.969	0.969
+D+H	0.667	0.667
+D+L+H	0.667	0.667
+D+Lr+H	0.667	0.667
+D+S+H	1.636	1.636
+D+0.750Lr+0.750L+H	0.667	0.667
+D+0.750L+0.750S+H	1.394	1.394
+D+0.60W+H	0.667	0.667
+D+0.750Lr+0.750L+0.450W+H	0.667	0.667
+D+0.750L+0.750S+0.450W+H	1.394	1.394
+0.60D+0.60W+0.60H	0.400	0.400
+D+0.70E+0.60H	0.667	0.667
+D+0.750L+0.750S+0.5250E+H	1.394	1.394
+0.60D+0.70E+H	0.400	0.400
D Only	0.667	0.667
Lr Only		
L Only		
S Only	0.969	0.969
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#3

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho: Allowable Stress Design
Load Combinati: ASCE 7-16

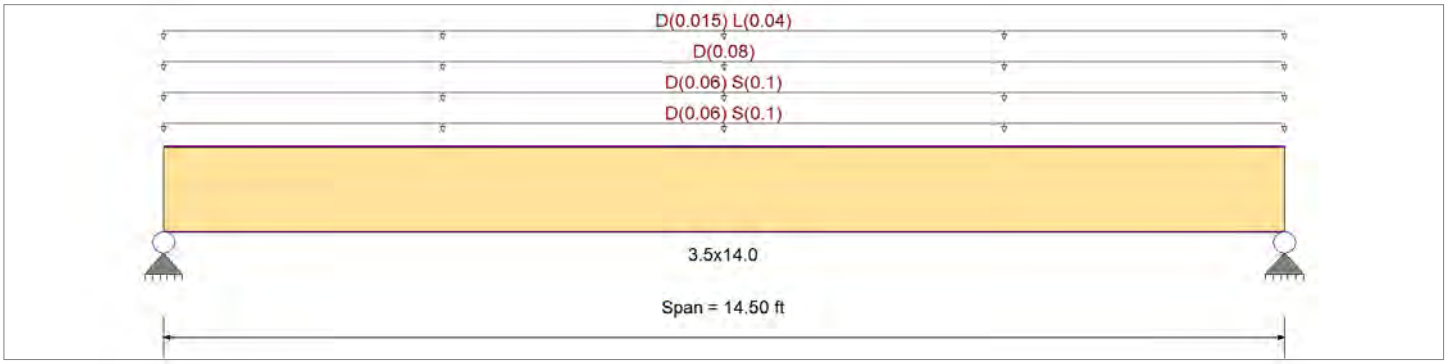
Wood Species: Trus Joist
Wood Grade: Parallam PSL 2.0E

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

Fb +	2900 psi
Fb -	2900 psi
Fc - Prll	2900 psi
Fc - Perp	625 psi
Fv	290 psi
Ft	2025 psi

E : Modulus of Elasti

Ebend- xx	2000 ksi
Eminbend - x	1016.535 ksi
Density	45.07 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (LOWER ROOF)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.356 : 1	Maximum Shear Stress Ratio	=	0.240 : 1
Section used for this span		3.5x14.0	Section used for this span		3.5x14.0
	=	1,187.03 psi		=	80.17 psi
	=	3,335.00 psi		=	333.50 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	7.250 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.125 in	Ratio =	1391 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.269 in	Ratio =	646 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.243	0.164	0.90	1.000	1.00	1.00	1.00	1.00	1.00	6.05	635.36	2610.00	1.40	42.91	261.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.257	0.174	1.00	1.000	1.00	1.00	1.00	1.00	1.00	7.10	745.69	2900.00	1.65	50.36	290.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.175	0.118	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.05	635.36	3625.00	1.40	42.91	362.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.356	0.240	1.15	1.000	1.00	1.00	1.00	1.00	1.00	11.31	1,187.03	3335.00	2.62	80.17	333.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.198	0.134	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.84	718.11	3625.00	1.58	48.50	362.50

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#3

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.339	0.229	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.78	1,131.86	3335.00	2.50	76.45	333.50
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.137	0.092	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.05	635.36	4640.00	1.40	42.91	464.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.155	0.105	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.84	718.11	4640.00	1.58	48.50	464.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.244	0.165	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.78	1,131.86	4640.00	2.50	76.45	464.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.082	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.63	381.21	4640.00	0.84	25.75	464.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.137	0.092	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.05	635.36	4640.00	1.40	42.91	464.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.244	0.165	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.78	1,131.86	4640.00	2.50	76.45	464.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.50 ft	1	0.082	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.63	381.21	4640.00	0.84	25.75	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2690	7.303		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.120	3.120
Overall MINimum	1.450	1.450
+D+H	1.670	1.670
+D+L+H	1.960	1.960
+D+Lr+H	1.670	1.670
+D+S+H	3.120	3.120
+D+0.750Lr+0.750L+H	1.887	1.887
+D+0.750L+0.750S+H	2.975	2.975
+D+0.60W+H	1.670	1.670
+D+0.750Lr+0.750L+0.450W+H	1.887	1.887
+D+0.750L+0.750S+0.450W+H	2.975	2.975
+0.60D+0.60W+0.60H	1.002	1.002
+D+0.70E+0.60H	1.670	1.670
+D+0.750L+0.750S+0.5250E+H	2.975	2.975
+0.60D+0.70E+H	1.002	1.002
D Only	1.670	1.670
Lr Only		
L Only	0.290	0.290
S Only	1.450	1.450
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#4

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

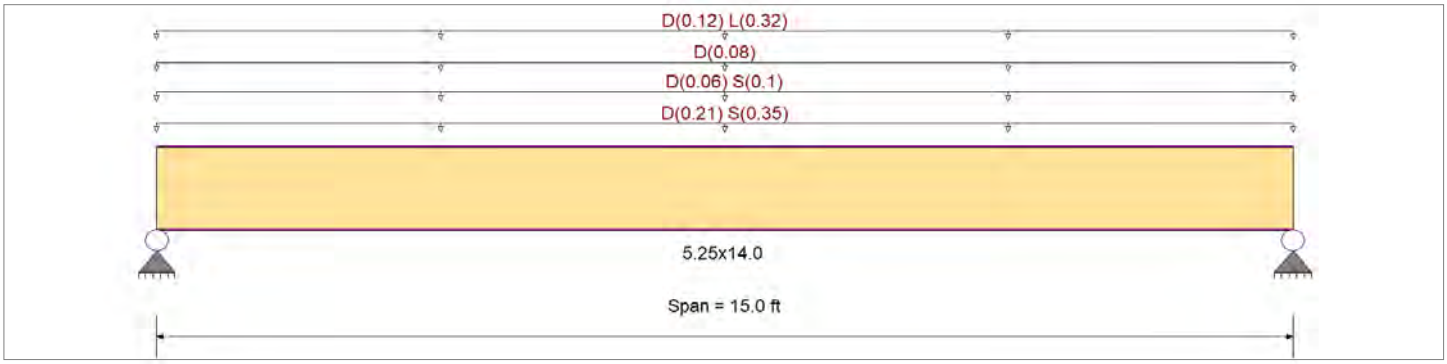
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (LOWER ROOF)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.643 : 1	Maximum Shear Stress Ratio	=	0.416 : 1
Section used for this span		5.25x14.0	Section used for this span		5.25x14.0
	=	2,106.68 psi		=	138.74 psi
	=	3,278.42 psi		=	333.50 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	7.500 ft	Location of maximum on span	=	13.850 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.215 in	Ratio =	838 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.511 in	Ratio =	352 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.378	0.245	0.90	0.983	1.00	1.00	1.00	1.00	1.00	13.87	970.20	2565.72	3.13	63.89	261.00
+D+L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.561	0.363	1.00	0.983	1.00	1.00	1.00	1.00	1.00	22.87	1,599.94	2850.80	5.16	105.36	290.00
+D+Lr+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.272	0.176	1.25	0.983	1.00	1.00	1.00	1.00	1.00	13.87	970.20	3563.50	3.13	63.89	362.50
+D+S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.566	0.366	1.15	0.983	1.00	1.00	1.00	1.00	1.00	26.52	1,855.77	3278.42	5.99	122.21	333.50
+D+0.750Lr+0.750L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.405	0.262	1.25	0.983	1.00	1.00	1.00	1.00	1.00	20.62	1,442.50	3563.50	4.65	95.00	362.50

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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DESCRIPTIO BM#4

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750L+0.750S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.643	0.416	1.15	0.983	1.00	1.00	1.00	1.00	1.00	30.11	2,106.68	3278.42	6.80	138.74	333.50
+D+0.60W+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.213	0.138	1.60	0.983	1.00	1.00	1.00	1.00	1.00	13.87	970.20	4561.28	3.13	63.89	464.00
+D+0.750Lr+0.750L+0.450W-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.316	0.205	1.60	0.983	1.00	1.00	1.00	1.00	1.00	20.62	1,442.50	4561.28	4.65	95.00	464.00
+D+0.750L+0.750S+0.450W+					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.462	0.299	1.60	0.983	1.00	1.00	1.00	1.00	1.00	30.11	2,106.68	4561.28	6.80	138.74	464.00
+0.60D+0.60W+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.128	0.083	1.60	0.983	1.00	1.00	1.00	1.00	1.00	8.32	582.12	4561.28	1.88	38.34	464.00
+D+0.70E+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.213	0.138	1.60	0.983	1.00	1.00	1.00	1.00	1.00	13.87	970.20	4561.28	3.13	63.89	464.00
+D+0.750L+0.750S+0.5250E-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.462	0.299	1.60	0.983	1.00	1.00	1.00	1.00	1.00	30.11	2,106.68	4561.28	6.80	138.74	464.00
+0.60D+0.70E+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.128	0.083	1.60	0.983	1.00	1.00	1.00	1.00	1.00	8.32	582.12	4561.28	1.88	38.34	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.5108	7.555		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	8.029	8.029
Overall MINimum	3.375	3.375
+D+H	3.698	3.698
+D+L+H	6.098	6.098
+D+Lr+H	3.698	3.698
+D+S+H	7.073	7.073
+D+0.750Lr+0.750L+H	5.498	5.498
+D+0.750L+0.750S+H	8.029	8.029
+D+0.60W+H	3.698	3.698
+D+0.750Lr+0.750L+0.450W+H	5.498	5.498
+D+0.750L+0.750S+0.450W+H	8.029	8.029
+0.60D+0.60W+0.60H	2.219	2.219
+D+0.70E+0.60H	3.698	3.698
+D+0.750L+0.750S+0.5250E+H	8.029	8.029
+0.60D+0.70E+H	2.219	2.219
D Only	3.698	3.698
Lr Only		
L Only	2.400	2.400
S Only	3.375	3.375
W Only		
E Only		
H Only		

Feaster Residence
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Seattle, WA 98117
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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#5

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

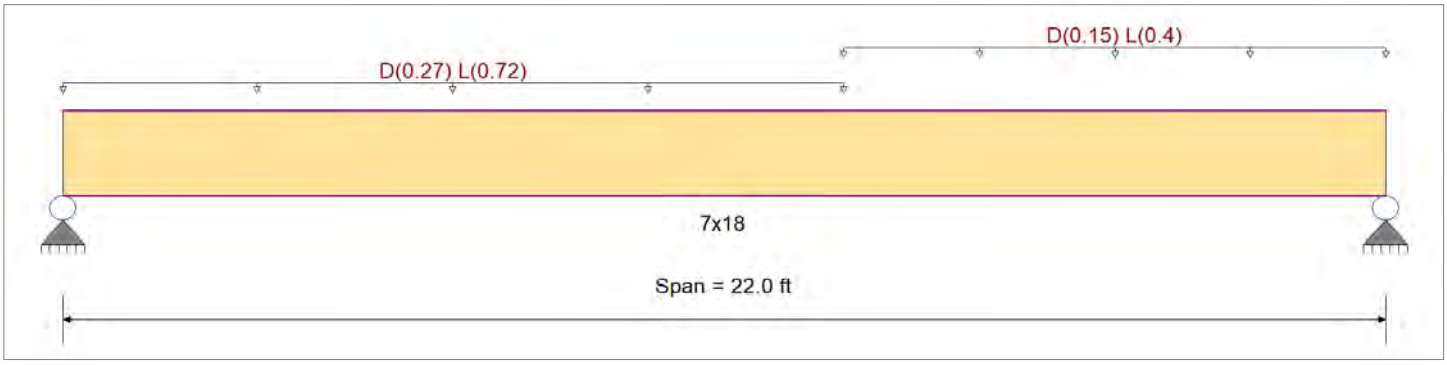
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 0.0 -->> 13.0 ft, Tributary Width = 18.0 ft, (FLOOR)
Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 13.0 -->> 22.0 ft, Tributary Width = 10.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.615 : 1	Maximum Shear Stress Ratio	=	0.371 : 1
Section used for this span		7x18	Section used for this span		7x18
	=	1,704.43 psi		=	107.45 psi
	=	2,772.37 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	10.197 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.472 in	Ratio =	558 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.680 in	Ratio =	388 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 22.0 ft	1	0.208	0.125	0.90	0.956	1.00	1.00	1.00	1.00	1.00	16.37	519.67	2495.14	2.74	32.57	261.00
+D+L+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	1	0.615	0.371	1.00	0.956	1.00	1.00	1.00	1.00	1.00	53.69	1,704.43	2772.37	9.03	107.45	290.00
+D+Lr+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	1	0.150	0.090	1.25	0.956	1.00	1.00	1.00	1.00	1.00	16.37	519.67	3465.47	2.74	32.57	362.50
+D+S+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	1	0.163	0.098	1.15	0.956	1.00	1.00	1.00	1.00	1.00	16.37	519.67	3188.23	2.74	32.57	333.50
+D+0.750Lr+0.750L+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	1	0.406	0.245	1.25	0.956	1.00	1.00	1.00	1.00	1.00	44.36	1,408.23	3465.47	7.45	88.73	362.50
+D+0.750L+0.750S+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#5

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 22.0 ft	**1**	0.442	0.266	1.15	0.956	1.00	1.00	1.00	1.00	1.00	44.36	1,408.23	3188.23	7.45	88.73	333.50
+D+0.60W+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.117	0.070	1.60	0.956	1.00	1.00	1.00	1.00	1.00	16.37	519.67	4435.80	2.74	32.57	464.00
+D+0.750Lr+0.750L+0.450W-					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.317	0.191	1.60	0.956	1.00	1.00	1.00	1.00	1.00	44.36	1,408.23	4435.80	7.45	88.73	464.00
+D+0.750L+0.750S+0.450W+					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.317	0.191	1.60	0.956	1.00	1.00	1.00	1.00	1.00	44.36	1,408.23	4435.80	7.45	88.73	464.00
+0.60D+0.60W+0.60H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.070	0.042	1.60	0.956	1.00	1.00	1.00	1.00	1.00	9.82	311.80	4435.80	1.64	19.54	464.00
+D+0.70E+0.60H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.117	0.070	1.60	0.956	1.00	1.00	1.00	1.00	1.00	16.37	519.67	4435.80	2.74	32.57	464.00
+D+0.750L+0.750S+0.5250E-					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.317	0.191	1.60	0.956	1.00	1.00	1.00	1.00	1.00	44.36	1,408.23	4435.80	7.45	88.73	464.00
+0.60D+0.70E+H					0.956	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.0 ft	**1**	0.070	0.042	1.60	0.956	1.00	1.00	1.00	1.00	1.00	9.82	311.80	4435.80	1.64	19.54	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.6802	10.839		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	10.514	8.174
Overall MINimum	7.331	5.629
+D+H	3.183	2.545
+D+L+H	10.514	8.174
+D+Lr+H	3.183	2.545
+D+S+H	3.183	2.545
+D+0.750Lr+0.750L+H	8.681	6.767
+D+0.750L+0.750S+H	8.681	6.767
+D+0.60W+H	3.183	2.545
+D+0.750Lr+0.750L+0.450W+H	8.681	6.767
+D+0.750L+0.750S+0.450W+H	8.681	6.767
+0.60D+0.60W+0.60H	1.910	1.527
+D+0.70E+0.60H	3.183	2.545
+D+0.750L+0.750S+0.5250E+H	8.681	6.767
+0.60D+0.70E+H	1.910	1.527
D Only	3.183	2.545
Lr Only		
L Only	7.331	5.629
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
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Project Title:
Engineer:
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#6

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

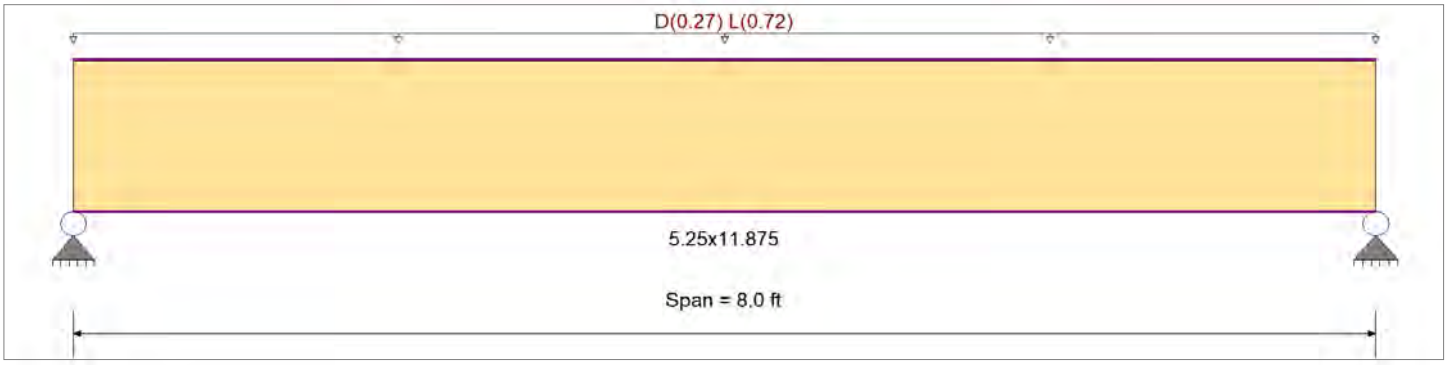
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 18.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.271 : 1	Maximum Shear Stress Ratio	=	0.254 : 1
Section used for this span		5.25x11.875	Section used for this span		5.25x11.875
	=	785.43 psi		=	73.75 psi
	=	2,900.00 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	4.000 ft	Location of maximum on span	=	7.036 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.046 in	Ratio =	2107 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.064 in	Ratio =	1503 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.086	0.081	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.32	225.25	2610.00	0.88	21.15	261.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.271	0.254	1.00	1.000	1.00	1.00	1.00	1.00	1.00	8.08	785.43	2900.00	3.07	73.75	290.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.062	0.058	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.32	225.25	3625.00	0.88	21.15	362.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.068	0.063	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.32	225.25	3335.00	0.88	21.15	333.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.178	0.167	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.64	645.39	3625.00	2.52	60.60	362.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.194	0.182	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.64	645.39	3335.00	2.52	60.60	333.50
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO BM#6

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 8.0 ft	**1**	0.049	0.046	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.32	225.25	4640.00	0.88	21.15	464.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	**1**	0.139	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.64	645.39	4640.00	2.52	60.60	464.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	**1**	0.139	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.64	645.39	4640.00	2.52	60.60	464.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	**1**	0.029	0.027	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.39	135.15	4640.00	0.53	12.69	464.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	**1**	0.049	0.046	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.32	225.25	4640.00	0.88	21.15	464.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	**1**	0.139	0.131	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.64	645.39	4640.00	2.52	60.60	464.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	**1**	0.029	0.027	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.39	135.15	4640.00	0.53	12.69	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0639	4.029		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	4.038	4.038
Overall MINimum	2.880	2.880
+D+H	1.158	1.158
+D+L+H	4.038	4.038
+D+Lr+H	1.158	1.158
+D+S+H	1.158	1.158
+D+0.750Lr+0.750L+H	3.318	3.318
+D+0.750L+0.750S+H	3.318	3.318
+D+0.60W+H	1.158	1.158
+D+0.750Lr+0.750L+0.450W+H	3.318	3.318
+D+0.750L+0.750S+0.450W+H	3.318	3.318
+0.60D+0.60W+0.60H	0.695	0.695
+D+0.70E+0.60H	1.158	1.158
+D+0.750L+0.750S+0.5250E+H	3.318	3.318
+0.60D+0.70E+H	0.695	0.695
D Only	1.158	1.158
Lr Only		
L Only	2.880	2.880
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

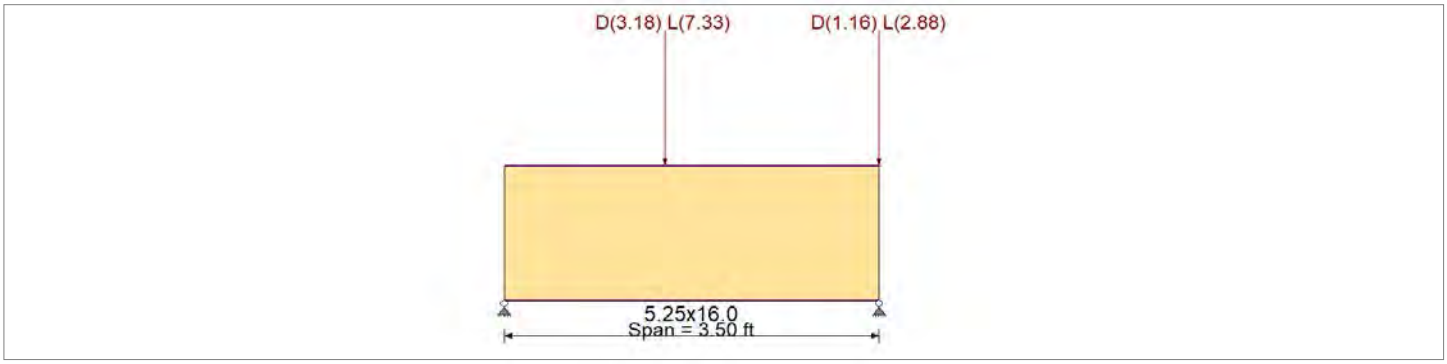
DESCRIPTIO BM#7

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,900.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,900.0 psi	Eminbend - x	1,016.54 ksi
Wood Species	Trus Joist	Fc - Perp	625.0 psi		
Wood Grade	Parallam PSL 2.0E	Fv	290.0 psi		
		Ft	2,025.0 psi	Density	45.070 pcf
Beam Bracing	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loads
Point Load : D = 3.180, L = 7.330 k @ 1.50 ft, (BM#5)
Point Load : D = 1.160, L = 2.880 k @ 3.50 ft, (BM#6)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.172 : 1		Maximum Shear Stress Ratio	=	0.370 : 1
Section used for this span		5.25x16.0		Section used for this span		5.25x16.0
	=	482.96 psi			=	107.44 psi
	=	2,808.86 psi			=	290.00 psi
Load Combination		+D+L+H		Load Combination		+D+L+H
Location of maximum on span	=	1.507 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.003 in	Ratio =	13590 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.004 in	Ratio =	9425 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.058	0.125	0.90	0.969	1.00	1.00	1.00	1.00	1.00	2.76	147.60	2527.97	1.83	32.65	261.00
+D+L+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.172	0.370	1.00	0.969	1.00	1.00	1.00	1.00	1.00	9.02	482.96	2808.86	6.02	107.44	290.00
+D+Lr+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.042	0.090	1.25	0.969	1.00	1.00	1.00	1.00	1.00	2.76	147.60	3511.07	1.83	32.65	362.50
+D+S+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.046	0.098	1.15	0.969	1.00	1.00	1.00	1.00	1.00	2.76	147.60	3230.19	1.83	32.65	333.50
+D+0.750Lr+0.750L+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.114	0.245	1.25	0.969	1.00	1.00	1.00	1.00	1.00	7.45	399.12	3511.07	4.97	88.74	362.50
+D+0.750L+0.750S+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.124	0.266	1.15	0.969	1.00	1.00	1.00	1.00	1.00	7.45	399.12	3230.19	4.97	88.74	333.50

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#7

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.60W+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.033	0.070	1.60	0.969	1.00	1.00	1.00	1.00	1.00	2.76	147.60	4494.17	1.83	32.65	464.00
+D+0.750Lr+0.750L+0.450W-					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.089	0.191	1.60	0.969	1.00	1.00	1.00	1.00	1.00	7.45	399.12	4494.17	4.97	88.74	464.00
+D+0.750L+0.750S+0.450W+					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.089	0.191	1.60	0.969	1.00	1.00	1.00	1.00	1.00	7.45	399.12	4494.17	4.97	88.74	464.00
+0.60D+0.60W+0.60H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.020	0.042	1.60	0.969	1.00	1.00	1.00	1.00	1.00	1.65	88.56	4494.17	1.10	19.59	464.00
+D+0.70E+0.60H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.033	0.070	1.60	0.969	1.00	1.00	1.00	1.00	1.00	2.76	147.60	4494.17	1.83	32.65	464.00
+D+0.750L+0.750S+0.5250E-					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.089	0.191	1.60	0.969	1.00	1.00	1.00	1.00	1.00	7.45	399.12	4494.17	4.97	88.74	464.00
+0.60D+0.70E+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.50 ft	1	0.020	0.042	1.60	0.969	1.00	1.00	1.00	1.00	1.00	1.65	88.56	4494.17	1.10	19.59	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0045	1.686		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.052	8.590
Overall MINimum	4.189	6.021
+D+H	1.863	2.569
+D+L+H	6.052	8.590
+D+Lr+H	1.863	2.569
+D+S+H	1.863	2.569
+D+0.750Lr+0.750L+H	5.005	7.085
+D+0.750L+0.750S+H	5.005	7.085
+D+0.60W+H	1.863	2.569
+D+0.750Lr+0.750L+0.450W+H	5.005	7.085
+D+0.750L+0.750S+0.450W+H	5.005	7.085
+0.60D+0.60W+0.60H	1.118	1.541
+D+0.70E+0.60H	1.863	2.569
+D+0.750L+0.750S+0.5250E+H	5.005	7.085
+0.60D+0.70E+H	1.118	1.541
D Only	1.863	2.569
Lr Only		
L Only	4.189	6.021
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
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Engineer:
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#8

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

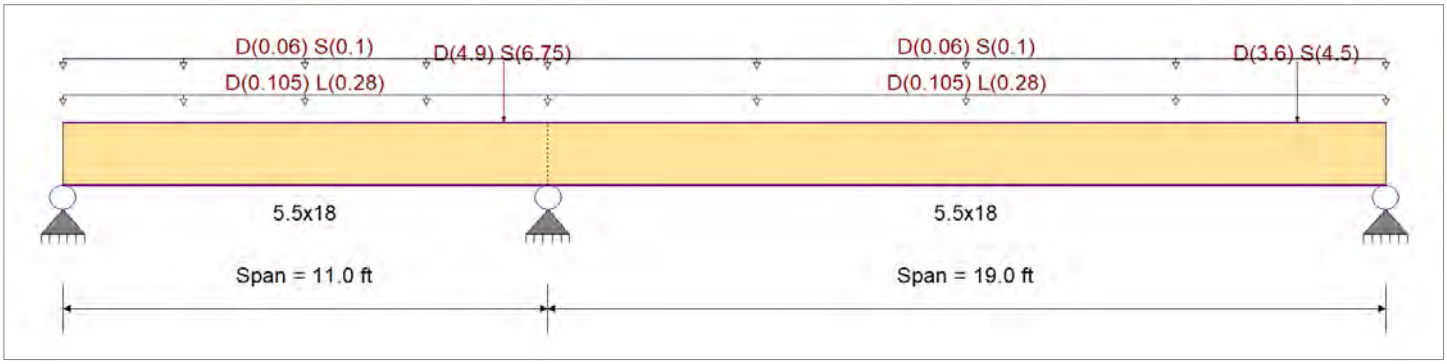
Wood Species DF/DF
Wood Grade 24F - V4

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasti

Ebend- xx	1800 ksi
Eminbend - x	950 ksi
Ebend- yy	1600 ksi
Eminbend - y	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 7.0 ft, (FLOOR)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (LOWER ROOF)
Point Load : D = 4.90, S = 6.750 k @ 10.0 ft, (G.T.#1)
Load for Span Number 2
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 7.0 ft, (FLOOR)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (LOWER ROOF)
Point Load : D = 3.60, S = 4.50 k @ 17.0 ft, (G.T.#3)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.466 : 1	Maximum Shear Stress Ratio	=	0.436 : 1
Section used for this span		5.5x18	Section used for this span		5.5x18
	=	954.62 psi		=	132.96 psi
	=	2,048.99 psi		=	304.75 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	17.514 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.095 in	Ratio =	2403 >=360
Max Upward Transient Deflection	-0.009 in	Ratio =	14413 >=360
Max Downward Total Deflection	0.217 in	Ratio =	1052 >=240
Max Upward Total Deflection	-0.013 in	Ratio =	10354 >=240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.247	0.153	0.90	1.000	1.00	1.00	1.00	1.00	1.00	10.18	411.18	1665.00	2.41	36.50	238.50
Length = 19.0 ft	2	0.256	0.266	0.90	0.963	1.00	1.00	1.00	1.00	1.00	10.18	411.18	1603.56	4.18	63.33	238.50
+D+L+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.431	0.295	1.00	1.000	1.00	1.00	1.00	1.00	1.00	19.73	797.24	1850.00	5.16	78.12	265.00

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#8

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 19.0 ft	**2**	0.447	0.339	1.00	0.963	1.00	1.00	1.00	1.00	1.00	19.73	797.24	1781.73	5.92	89.71	265.00
+D+Lr+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.178	0.110	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.18	411.18	2312.50	2.41	36.50	331.25
Length = 19.0 ft	**2**	0.185	0.191	1.25	0.963	1.00	1.00	1.00	1.00	1.00	10.18	411.18	2227.16	4.18	63.33	331.25
+D+S+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.352	0.205	1.15	1.000	1.00	1.00	1.00	1.00	1.00	18.56	749.71	2127.50	4.12	62.50	304.75
Length = 19.0 ft	**2**	0.366	0.426	1.15	0.963	1.00	1.00	1.00	1.00	1.00	18.56	749.71	2048.99	8.57	129.79	304.75
+D+0.750Lr+0.750L+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.303	0.204	1.25	1.000	1.00	1.00	1.00	1.00	1.00	17.34	700.72	2312.50	4.47	67.71	331.25
Length = 19.0 ft	**2**	0.315	0.251	1.25	0.963	1.00	1.00	1.00	1.00	1.00	17.34	700.72	2227.16	5.49	83.11	331.25
+D+0.750L+0.750S+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.449	0.286	1.15	1.000	1.00	1.00	1.00	1.00	1.00	23.63	954.62	2127.50	5.76	87.21	304.75
Length = 19.0 ft	**2**	0.466	0.436	1.15	0.963	1.00	1.00	1.00	1.00	1.00	23.63	954.62	2048.99	8.78	132.96	304.75
+D+0.60W+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.139	0.086	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.18	411.18	2960.00	2.41	36.50	424.00
Length = 19.0 ft	**2**	0.144	0.149	1.60	0.963	1.00	1.00	1.00	1.00	1.00	10.18	411.18	2850.77	4.18	63.33	424.00
+D+0.750Lr+0.750L+0.450W-					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.237	0.160	1.60	1.000	1.00	1.00	1.00	1.00	1.00	17.34	700.72	2960.00	4.47	67.71	424.00
Length = 19.0 ft	**2**	0.246	0.196	1.60	0.963	1.00	1.00	1.00	1.00	1.00	17.34	700.72	2850.77	5.49	83.11	424.00
+D+0.750L+0.750S+0.450W+					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.323	0.206	1.60	1.000	1.00	1.00	1.00	1.00	1.00	23.63	954.62	2960.00	5.76	87.21	424.00
Length = 19.0 ft	**2**	0.335	0.314	1.60	0.963	1.00	1.00	1.00	1.00	1.00	23.63	954.62	2850.77	8.78	132.96	424.00
+0.60D+0.60W+0.60H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.083	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.11	246.71	2960.00	1.45	21.90	424.00
Length = 19.0 ft	**2**	0.087	0.090	1.60	0.963	1.00	1.00	1.00	1.00	1.00	6.11	246.71	2850.77	2.51	38.00	424.00
+D+0.70E+0.60H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.139	0.086	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.18	411.18	2960.00	2.41	36.50	424.00
Length = 19.0 ft	**2**	0.144	0.149	1.60	0.963	1.00	1.00	1.00	1.00	1.00	10.18	411.18	2850.77	4.18	63.33	424.00
+D+0.750L+0.750S+0.5250E-					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.323	0.206	1.60	1.000	1.00	1.00	1.00	1.00	1.00	23.63	954.62	2960.00	5.76	87.21	424.00
Length = 19.0 ft	**2**	0.335	0.314	1.60	0.963	1.00	1.00	1.00	1.00	1.00	23.63	954.62	2850.77	8.78	132.96	424.00
+0.60D+0.70E+H					0.963	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.083	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.11	246.71	2960.00	1.45	21.90	424.00
Length = 19.0 ft	**2**	0.087	0.090	1.60	0.963	1.00	1.00	1.00	1.00	1.00	6.11	246.71	2850.77	2.51	38.00	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0019	2.212	+D+L+H	-0.0127	8.112
+D+0.750L+0.750S+0.5250E+H	2	0.2166	11.145		0.0000	8.112

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	1.351	20.254	9.476
Overall MINimum	0.402	9.313	4.535
+D+H	0.546	9.091	4.457
+D+L+H	1.217	14.663	6.614
+D+Lr+H	0.546	9.091	4.457
+D+S+H	0.948	18.404	8.992
+D+0.750Lr+0.750L+H	1.049	13.270	6.075
+D+0.750L+0.750S+H	1.351	20.254	9.476
+D+0.60W+H	0.546	9.091	4.457
+D+0.750Lr+0.750L+0.450W+H	1.049	13.270	6.075
+D+0.750L+0.750S+0.450W+H	1.351	20.254	9.476
+0.60D+0.60W+0.60H	0.327	5.455	2.674
+D+0.70E+0.60H	0.546	9.091	4.457
+D+0.750L+0.750S+0.5250E+H	1.351	20.254	9.476
+0.60D+0.70E+H	0.327	5.455	2.674
D Only	0.546	9.091	4.457
Lr Only			
L Only	0.671	5.572	2.157

Wood Beam

DESCRIPTIO BM#8

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
S Only	0.402	9.313	4.535
W Only			
E Only			
H Only			

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

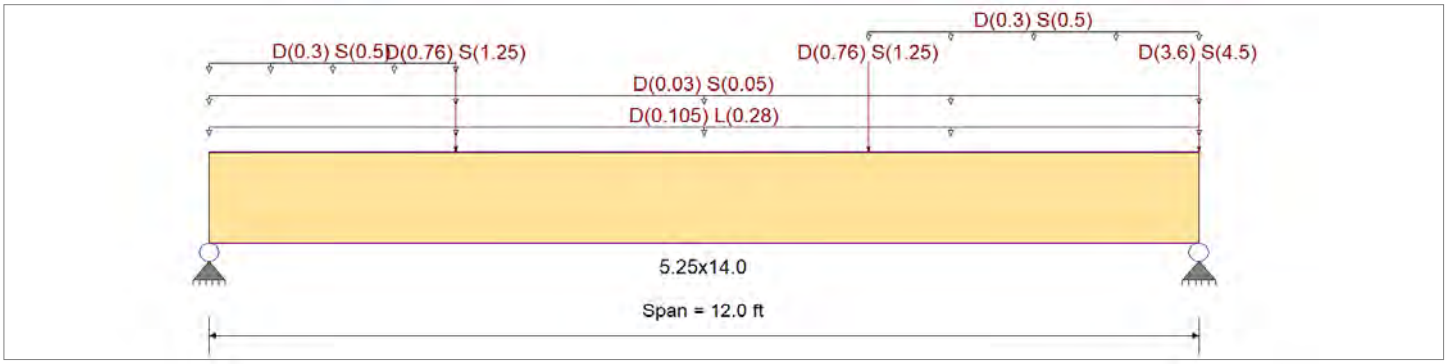
DESCRIPTIO BM#9

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,900.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,900.0 psi	Eminbend - x	1,016.54 ksi
Wood Species	Trus Joist	Fc - Perp	625.0 psi		
Wood Grade	Parallam PSL 2.0E	Fv	290.0 psi		
		Ft	2,025.0 psi	Density	45.070 pcf
Beam Bracing	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loads
- Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 7.0 ft, (FLOOR)
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 2.0 ft, (LOWER ROOF)
- Point Load : D = 3.60, S = 4.50 k @ 12.0 ft, (G.T.#3)
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Extent = 0.0 -->> 3.0 ft, Tributary Width = 20.0 ft, (UPPER ROOF)
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Extent = 8.0 -->> 12.0 ft, Tributary Width = 20.0 ft, (UPPER ROOF)
- Point Load : D = 0.760, S = 1.250 k @ 3.0 ft, (HDR#2)
- Point Load : D = 0.760, S = 1.250 k @ 8.0 ft, (HDR#2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.376** : 1	Maximum Shear Stress Ratio	=	**0.322** : 1
Section used for this span		**5.25x14.0**	Section used for this span		**5.25x14.0**
	=	1,231.50 psi		=	107.42 psi
	=	3,278.42 psi		=	333.50 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	6.832 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.098 in	Ratio =	1467 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.199 in	Ratio =	723 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.203	0.175	0.90	0.983	1.00	1.00	1.00	1.00	1.00	7.45	521.36	2565.72	2.24	45.66	261.00
+D+L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.305	0.253	1.00	0.983	1.00	1.00	1.00	1.00	1.00	12.45	870.79	2850.80	3.60	73.44	290.00
+D+Lr+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.146	0.126	1.25	0.983	1.00	1.00	1.00	1.00	1.00	7.45	521.36	3563.50	2.24	45.66	362.50

Feaster Residence
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Seattle, WA 98117
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DESCRIPTIO BM#9

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.345	0.301	1.15	0.983	1.00	1.00	1.00	1.00	1.00	16.17	1,131.10	3278.42	4.91	100.23	333.50
+D+0.750Lr+0.750L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.220	0.183	1.25	0.983	1.00	1.00	1.00	1.00	1.00	11.19	782.97	3563.50	3.26	66.49	362.50
+D+0.750L+0.750S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.376	0.322	1.15	0.983	1.00	1.00	1.00	1.00	1.00	17.60	1,231.50	3278.42	5.26	107.42	333.50
+D+0.60W+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.114	0.098	1.60	0.983	1.00	1.00	1.00	1.00	1.00	7.45	521.36	4561.28	2.24	45.66	464.00
+D+0.750Lr+0.750L+0.450W-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.172	0.143	1.60	0.983	1.00	1.00	1.00	1.00	1.00	11.19	782.97	4561.28	3.26	66.49	464.00
+D+0.750L+0.750S+0.450W+					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.270	0.232	1.60	0.983	1.00	1.00	1.00	1.00	1.00	17.60	1,231.50	4561.28	5.26	107.42	464.00
+0.60D+0.60W+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.069	0.059	1.60	0.983	1.00	1.00	1.00	1.00	1.00	4.47	312.81	4561.28	1.34	27.40	464.00
+D+0.70E+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.114	0.098	1.60	0.983	1.00	1.00	1.00	1.00	1.00	7.45	521.36	4561.28	2.24	45.66	464.00
+D+0.750L+0.750S+0.5250E-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.270	0.232	1.60	0.983	1.00	1.00	1.00	1.00	1.00	17.60	1,231.50	4561.28	5.26	107.42	464.00
+0.60D+0.70E+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.069	0.059	1.60	0.983	1.00	1.00	1.00	1.00	1.00	4.47	312.81	4561.28	1.34	27.40	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.1989	6.044		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	6.494	14.157
Overall MINimum	3.300	7.800
+D+H	2.759	6.357
+D+L+H	4.439	8.037
+D+Lr+H	2.759	6.357
+D+S+H	6.059	14.157
+D+0.750Lr+0.750L+H	4.019	7.617
+D+0.750L+0.750S+H	6.494	13.467
+D+0.60W+H	2.759	6.357
+D+0.750Lr+0.750L+0.450W+H	4.019	7.617
+D+0.750L+0.750S+0.450W+H	6.494	13.467
+0.60D+0.60W+0.60H	1.655	3.814
+D+0.70E+0.60H	2.759	6.357
+D+0.750L+0.750S+0.5250E+H	6.494	13.467
+0.60D+0.70E+H	1.655	3.814
D Only	2.759	6.357
Lr Only		
L Only	1.680	1.680
S Only	3.300	7.800
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#10

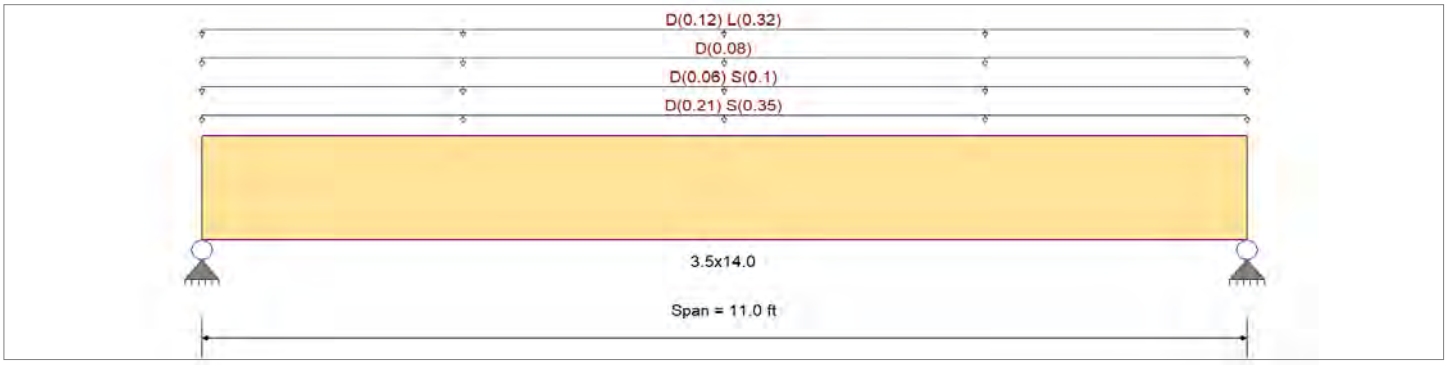
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho	Allowable Stress Design	Fb +	2,900.0 psi	***E : Modulus of Elasti***	
Load Combinati	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,900.0 psi	Eminbend - x	1,016.54 ksi
Wood Species	Trus Joist	Fc - Perp	625.0 psi		
Wood Grade	Parallam PSL 2.0E	Fv	290.0 psi		
		Ft	2,025.0 psi	Density	45.070 pcf

Beam Bracing Beam is Fully Braced against lateral-torsional buckling



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (LOWER ROOF)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.515 : 1	Maximum Shear Stress Ratio	=	0.423 : 1
Section used for this span		3.5x14.0	Section used for this span		3.5x14.0
	=	1,687.21 psi		=	141.07 psi
	=	3,278.42 psi		=	333.50 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	5.500 ft	Location of maximum on span	=	9.836 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.093 in	Ratio =	1417 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.220 in	Ratio =	599 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.300	0.247	0.90	0.983	1.00	1.00	1.00	1.00	1.00	7.34	770.45	2565.72	2.10	64.42	261.00
+D+L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.448	0.369	1.00	0.983	1.00	1.00	1.00	1.00	1.00	12.18	1,278.44	2850.80	3.49	106.89	290.00
+D+Lr+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.216	0.178	1.25	0.983	1.00	1.00	1.00	1.00	1.00	7.34	770.45	3563.50	2.10	64.42	362.50
+D+S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.453	0.372	1.15	0.983	1.00	1.00	1.00	1.00	1.00	14.15	1,484.81	3278.42	4.06	124.14	333.50
+D+0.750Lr+0.750L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.323	0.266	1.25	0.983	1.00	1.00	1.00	1.00	1.00	10.97	1,151.44	3563.50	3.14	96.27	362.50

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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DESCRIPTIO BM#10

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750L+0.750S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.515	0.423	1.15	0.983	1.00	1.00	1.00	1.00	1.00	16.08	1,687.21	3278.42	4.61	141.07	333.50
+D+0.60W+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.169	0.139	1.60	0.983	1.00	1.00	1.00	1.00	1.00	7.34	770.45	4561.28	2.10	64.42	464.00
+D+0.750Lr+0.750L+0.450W-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.252	0.207	1.60	0.983	1.00	1.00	1.00	1.00	1.00	10.97	1,151.44	4561.28	3.14	96.27	464.00
+D+0.750L+0.750S+0.450W+					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.370	0.304	1.60	0.983	1.00	1.00	1.00	1.00	1.00	16.08	1,687.21	4561.28	4.61	141.07	464.00
+0.60D+0.60W+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.101	0.083	1.60	0.983	1.00	1.00	1.00	1.00	1.00	4.40	462.27	4561.28	1.26	38.65	464.00
+D+0.70E+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.169	0.139	1.60	0.983	1.00	1.00	1.00	1.00	1.00	7.34	770.45	4561.28	2.10	64.42	464.00
+D+0.750L+0.750S+0.5250E-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.370	0.304	1.60	0.983	1.00	1.00	1.00	1.00	1.00	16.08	1,687.21	4561.28	4.61	141.07	464.00
+0.60D+0.70E+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.101	0.083	1.60	0.983	1.00	1.00	1.00	1.00	1.00	4.40	462.27	4561.28	1.26	38.65	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.2200	5.540		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.846	5.846
Overall MINimum	2.475	2.475
+D+H	2.669	2.669
+D+L+H	4.429	4.429
+D+Lr+H	2.669	2.669
+D+S+H	5.144	5.144
+D+0.750Lr+0.750L+H	3.989	3.989
+D+0.750L+0.750S+H	5.846	5.846
+D+0.60W+H	2.669	2.669
+D+0.750Lr+0.750L+0.450W+H	3.989	3.989
+D+0.750L+0.750S+0.450W+H	5.846	5.846
+0.60D+0.60W+0.60H	1.602	1.602
+D+0.70E+0.60H	2.669	2.669
+D+0.750L+0.750S+0.5250E+H	5.846	5.846
+0.60D+0.70E+H	1.602	1.602
D Only	2.669	2.669
Lr Only		
L Only	1.760	1.760
S Only	2.475	2.475
W Only		
E Only		
H Only		

Feaster Residence
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#11

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

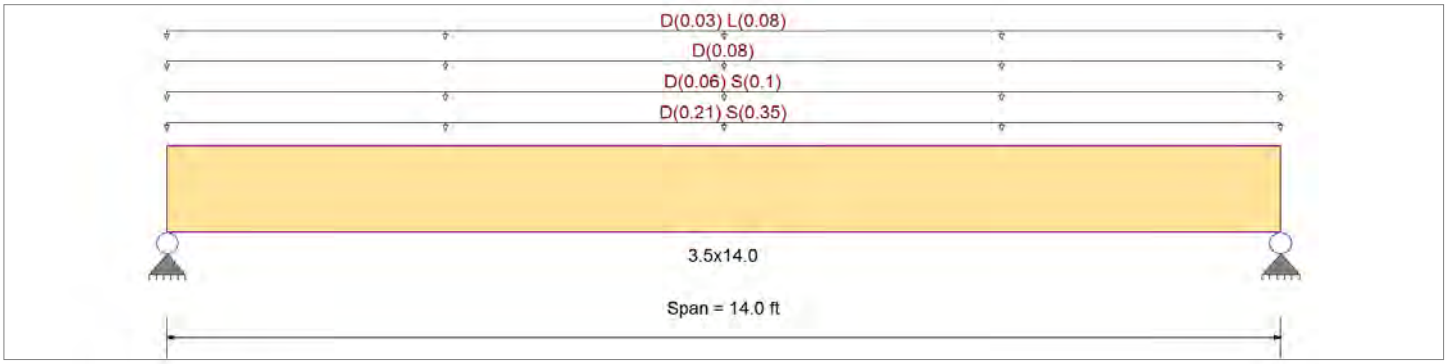
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft, (UPPER ROOF)
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft, (LOWER ROOF)
Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft, (WALL)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 2.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.663 : 1	Maximum Shear Stress Ratio	=	0.456 : 1
Section used for this span		3.5x14.0	Section used for this span		3.5x14.0
	=	2,173.72 psi		=	152.05 psi
	=	3,278.42 psi		=	333.50 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	7.000 ft	Location of maximum on span	=	12.876 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.244 in	Ratio =	687 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.459 in	Ratio =	365 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.396	0.272	0.90	0.983	1.00	1.00	1.00	1.00	1.00	9.69	1,016.58	2565.72	2.32	71.11	261.00
+D+L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.429	0.295	1.00	0.983	1.00	1.00	1.00	1.00	1.00	11.65	1,222.29	2850.80	2.79	85.50	290.00
+D+Lr+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.285	0.196	1.25	0.983	1.00	1.00	1.00	1.00	1.00	9.69	1,016.58	3563.50	2.32	71.11	362.50
+D+S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.663	0.456	1.15	0.983	1.00	1.00	1.00	1.00	1.00	20.71	2,173.72	3278.42	4.97	152.05	333.50
+D+0.750Lr+0.750L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.329	0.226	1.25	0.983	1.00	1.00	1.00	1.00	1.00	11.16	1,170.86	3563.50	2.68	81.90	362.50

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#11

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750L+0.750S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.622	0.428	1.15	0.983	1.00	1.00	1.00	1.00	1.00	19.42	2,038.72	3278.42	4.66	142.61	333.50
+D+0.60W+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.223	0.153	1.60	0.983	1.00	1.00	1.00	1.00	1.00	9.69	1,016.58	4561.28	2.32	71.11	464.00
+D+0.750Lr+0.750L+0.450W-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.257	0.177	1.60	0.983	1.00	1.00	1.00	1.00	1.00	11.16	1,170.86	4561.28	2.68	81.90	464.00
+D+0.750L+0.750S+0.450W+					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.447	0.307	1.60	0.983	1.00	1.00	1.00	1.00	1.00	19.42	2,038.72	4561.28	4.66	142.61	464.00
+0.60D+0.60W+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.134	0.092	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.81	609.95	4561.28	1.39	42.67	464.00
+D+0.70E+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.223	0.153	1.60	0.983	1.00	1.00	1.00	1.00	1.00	9.69	1,016.58	4561.28	2.32	71.11	464.00
+D+0.750L+0.750S+0.5250E-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.447	0.307	1.60	0.983	1.00	1.00	1.00	1.00	1.00	19.42	2,038.72	4561.28	4.66	142.61	464.00
+0.60D+0.70E+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.134	0.092	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.81	609.95	4561.28	1.39	42.67	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4591	7.051		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.917	5.917
Overall MINimum	3.150	3.150
+D+H	2.767	2.767
+D+L+H	3.327	3.327
+D+Lr+H	2.767	2.767
+D+S+H	5.917	5.917
+D+0.750Lr+0.750L+H	3.187	3.187
+D+0.750L+0.750S+H	5.550	5.550
+D+0.60W+H	2.767	2.767
+D+0.750Lr+0.750L+0.450W+H	3.187	3.187
+D+0.750L+0.750S+0.450W+H	5.550	5.550
+0.60D+0.60W+0.60H	1.660	1.660
+D+0.70E+0.60H	2.767	2.767
+D+0.750L+0.750S+0.5250E+H	5.550	5.550
+0.60D+0.70E+H	1.660	1.660
D Only	2.767	2.767
Lr Only		
L Only	0.560	0.560
S Only	3.150	3.150
W Only		
E Only		
H Only		

Feaster Residence
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Seattle, WA 98117
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DESCRIPTIO BM#12

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

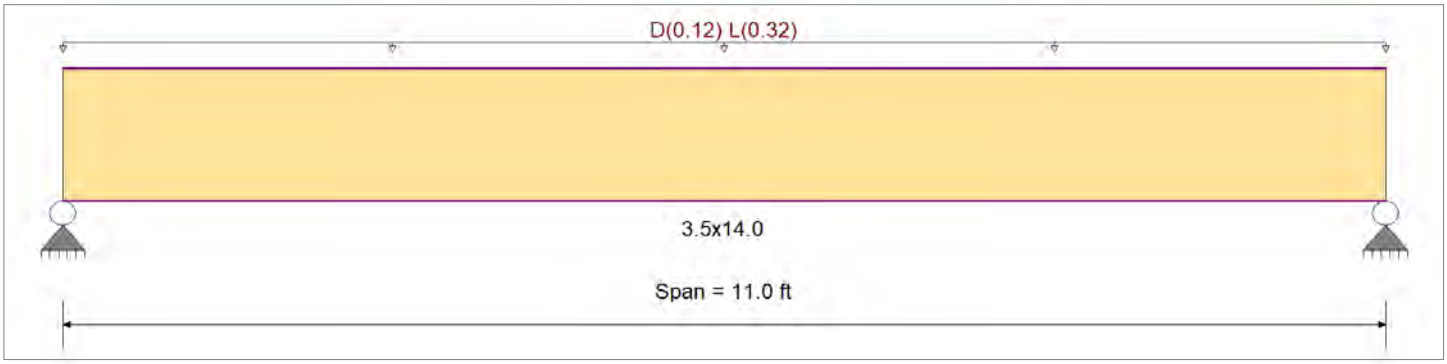
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.254 : 1	Maximum Shear Stress Ratio	=	0.208 : 1
Section used for this span		3.5x14.0	Section used for this span		3.5x14.0
	=	722.83 psi		=	60.44 psi
	=	2,850.80 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	5.500 ft	Location of maximum on span	=	9.836 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.066 in	Ratio =	1992 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.094 in	Ratio =	1400 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.084	0.069	0.90	0.983	1.00	1.00	1.00	1.00	1.00	2.05	214.84	2565.72	0.59	17.96	261.00
+D+L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.254	0.208	1.00	0.983	1.00	1.00	1.00	1.00	1.00	6.89	722.83	2850.80	1.97	60.44	290.00
+D+Lr+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.060	0.050	1.25	0.983	1.00	1.00	1.00	1.00	1.00	2.05	214.84	3563.50	0.59	17.96	362.50
+D+S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.066	0.054	1.15	0.983	1.00	1.00	1.00	1.00	1.00	2.05	214.84	3278.42	0.59	17.96	333.50
+D+0.750Lr+0.750L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.167	0.137	1.25	0.983	1.00	1.00	1.00	1.00	1.00	5.68	595.83	3563.50	1.63	49.82	362.50
+D+0.750L+0.750S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.182	0.149	1.15	0.983	1.00	1.00	1.00	1.00	1.00	5.68	595.83	3278.42	1.63	49.82	333.50
+D+0.60W+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO BM#12

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 11.0 ft	**1**	0.047	0.039	1.60	0.983	1.00	1.00	1.00	1.00	1.00	2.05	214.84	4561.28	0.59	17.96	464.00
+D+0.750Lr+0.750L+0.450W-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.131	0.107	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.68	595.83	4561.28	1.63	49.82	464.00
+D+0.750L+0.750S+0.450W+					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.131	0.107	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.68	595.83	4561.28	1.63	49.82	464.00
+0.60D+0.60W+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.028	0.023	1.60	0.983	1.00	1.00	1.00	1.00	1.00	1.23	128.90	4561.28	0.35	10.78	464.00
+D+0.70E+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.047	0.039	1.60	0.983	1.00	1.00	1.00	1.00	1.00	2.05	214.84	4561.28	0.59	17.96	464.00
+D+0.750L+0.750S+0.5250E-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.131	0.107	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.68	595.83	4561.28	1.63	49.82	464.00
+0.60D+0.70E+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	**1**	0.028	0.023	1.60	0.983	1.00	1.00	1.00	1.00	1.00	1.23	128.90	4561.28	0.35	10.78	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0943	5.540		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	2.504	2.504
Overall MINimum	1.760	1.760
+D+H	0.744	0.744
+D+L+H	2.504	2.504
+D+Lr+H	0.744	0.744
+D+S+H	0.744	0.744
+D+0.750Lr+0.750L+H	2.064	2.064
+D+0.750L+0.750S+H	2.064	2.064
+D+0.60W+H	0.744	0.744
+D+0.750Lr+0.750L+0.450W+H	2.064	2.064
+D+0.750L+0.750S+0.450W+H	2.064	2.064
+0.60D+0.60W+0.60H	0.447	0.447
+D+0.70E+0.60H	0.744	0.744
+D+0.750L+0.750S+0.5250E+H	2.064	2.064
+0.60D+0.70E+H	0.447	0.447
D Only	0.744	0.744
Lr Only		
L Only	1.760	1.760
S Only		
W Only		
E Only		
H Only		

Feaster Residence
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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#13

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

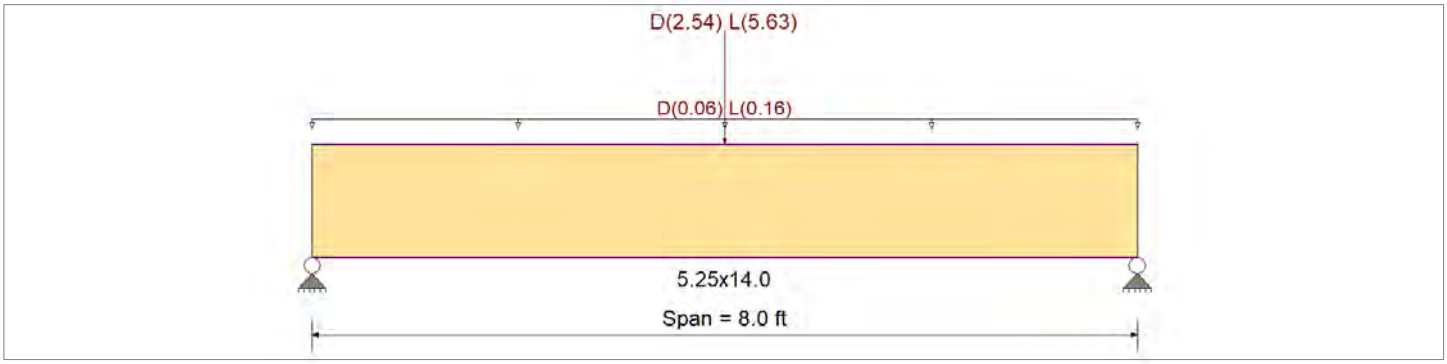
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 4.0 ft, (FLOOR)
Point Load : D = 2.540, L = 5.630 k @ 4.0 ft, (BM#5)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.449 : 1	Maximum Shear Stress Ratio	=	0.336 : 1
Section used for this span		5.25x14.0	Section used for this span		5.25x14.0
	=	1,279.35 psi		=	97.56 psi
	=	2,850.80 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	4.000 ft	Location of maximum on span	=	6.861 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.050 in	Ratio =	1934 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.072 in	Ratio =	1325 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.157	0.118	0.90	0.983	1.00	1.00	1.00	1.00	1.00	5.74	401.92	2565.72	1.51	30.77	261.00
+D+L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.449	0.336	1.00	0.983	1.00	1.00	1.00	1.00	1.00	18.28	1,279.35	2850.80	4.78	97.56	290.00
+D+Lr+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.113	0.085	1.25	0.983	1.00	1.00	1.00	1.00	1.00	5.74	401.92	3563.50	1.51	30.77	362.50
+D+S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.123	0.092	1.15	0.983	1.00	1.00	1.00	1.00	1.00	5.74	401.92	3278.42	1.51	30.77	333.50
+D+0.750Lr+0.750L+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.297	0.223	1.25	0.983	1.00	1.00	1.00	1.00	1.00	15.15	1,059.99	3563.50	3.96	80.86	362.50
+D+0.750L+0.750S+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.323	0.242	1.15	0.983	1.00	1.00	1.00	1.00	1.00	15.15	1,059.99	3278.42	3.96	80.86	333.50

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#13

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.60W+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.088	0.066	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.74	401.92	4561.28	1.51	30.77	464.00
+D+0.750Lr+0.750L+0.450W-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.232	0.174	1.60	0.983	1.00	1.00	1.00	1.00	1.00	15.15	1,059.99	4561.28	3.96	80.86	464.00
+D+0.750L+0.750S+0.450W+					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.232	0.174	1.60	0.983	1.00	1.00	1.00	1.00	1.00	15.15	1,059.99	4561.28	3.96	80.86	464.00
+0.60D+0.60W+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.053	0.040	1.60	0.983	1.00	1.00	1.00	1.00	1.00	3.45	241.15	4561.28	0.90	18.46	464.00
+D+0.70E+0.60H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.088	0.066	1.60	0.983	1.00	1.00	1.00	1.00	1.00	5.74	401.92	4561.28	1.51	30.77	464.00
+D+0.750L+0.750S+0.5250E-					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.232	0.174	1.60	0.983	1.00	1.00	1.00	1.00	1.00	15.15	1,059.99	4561.28	3.96	80.86	464.00
+0.60D+0.70E+H					0.983	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.053	0.040	1.60	0.983	1.00	1.00	1.00	1.00	1.00	3.45	241.15	4561.28	0.90	18.46	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0724	4.029		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.057	5.057
Overall MINimum	3.455	3.455
+D+H	1.602	1.602
+D+L+H	5.057	5.057
+D+Lr+H	1.602	1.602
+D+S+H	1.602	1.602
+D+0.750Lr+0.750L+H	4.193	4.193
+D+0.750L+0.750S+H	4.193	4.193
+D+0.60W+H	1.602	1.602
+D+0.750Lr+0.750L+0.450W+H	4.193	4.193
+D+0.750L+0.750S+0.450W+H	4.193	4.193
+0.60D+0.60W+0.60H	0.961	0.961
+D+0.70E+0.60H	1.602	1.602
+D+0.750L+0.750S+0.5250E+H	4.193	4.193
+0.60D+0.70E+H	0.961	0.961
D Only	1.602	1.602
Lr Only		
L Only	3.455	3.455
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#14

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

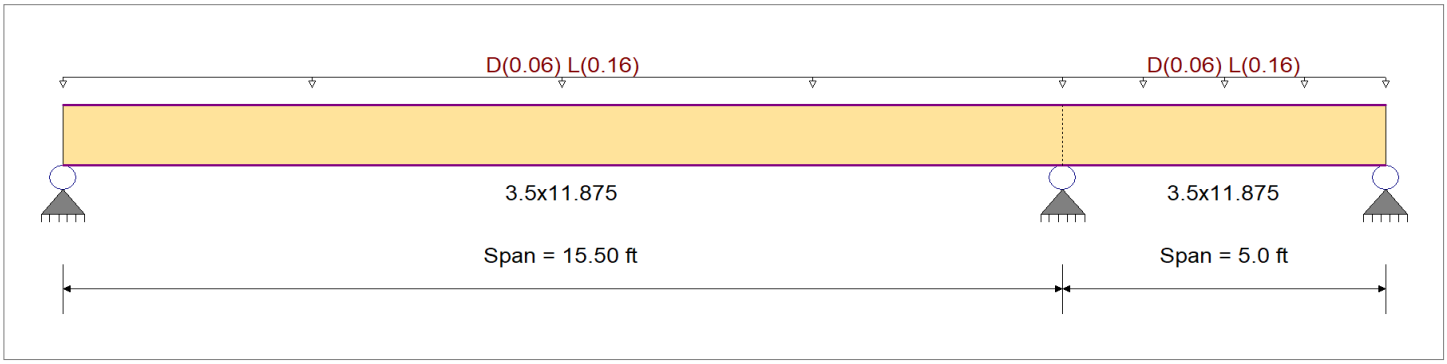
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 4.0 ft, (FLOOR)
Load for Span Number 2
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 4.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.275 : 1	Maximum Shear Stress Ratio	=	0.241 : 1
Section used for this span		3.5x11.875	Section used for this span		3.5x11.875
	=	797.74 psi		=	69.89 psi
	=	2,900.00 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	15.500 ft	Location of maximum on span	=	14.547 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.116 in	Ratio =	1605 >=360
Max Upward Transient Deflection	-0.009 in	Ratio =	7001 >=360
Max Downward Total Deflection	0.169 in	Ratio =	1102 >=240
Max Upward Total Deflection	-0.012 in	Ratio =	4808 >=240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.096	0.084	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	2610.00	0.61	21.90	261.00
Length = 5.0 ft	2	0.096	0.084	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	2610.00	0.45	21.90	261.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.275	0.241	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.47	797.74	2900.00	1.94	69.89	290.00
Length = 5.0 ft	2	0.275	0.241	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.47	797.74	2900.00	1.45	69.89	290.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.069	0.060	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	3625.00	0.61	21.90	362.50
Length = 5.0 ft	2	0.069	0.060	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	3625.00	0.45	21.90	362.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#14

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 15.50 ft	1	0.075	0.066	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	3335.00	0.61	21.90	333.50
Length = 5.0 ft	2	0.075	0.066	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	3335.00	0.45	21.90	333.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.182	0.160	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	3625.00	1.60	57.90	362.50
Length = 5.0 ft	2	0.182	0.160	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	3625.00	1.20	57.90	362.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.198	0.174	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	3335.00	1.60	57.90	333.50
Length = 5.0 ft	2	0.198	0.174	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	3335.00	1.20	57.90	333.50
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.054	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	4640.00	0.61	21.90	464.00
Length = 5.0 ft	2	0.054	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	4640.00	0.45	21.90	464.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.142	0.125	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	4640.00	1.60	57.90	464.00
Length = 5.0 ft	2	0.142	0.125	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	4640.00	1.20	57.90	464.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.142	0.125	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	4640.00	1.60	57.90	464.00
Length = 5.0 ft	2	0.142	0.125	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	4640.00	1.20	57.90	464.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.032	0.028	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.03	149.97	4640.00	0.36	13.14	464.00
Length = 5.0 ft	2	0.032	0.028	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.03	149.97	4640.00	0.27	13.14	464.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.054	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	4640.00	0.61	21.90	464.00
Length = 5.0 ft	2	0.054	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.71	249.95	4640.00	0.45	21.90	464.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.142	0.125	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	4640.00	1.60	57.90	464.00
Length = 5.0 ft	2	0.142	0.125	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.53	660.79	4640.00	1.20	57.90	464.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.50 ft	1	0.032	0.028	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.03	149.97	4640.00	0.36	13.14	464.00
Length = 5.0 ft	2	0.032	0.028	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.03	149.97	4640.00	0.27	13.14	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.1688	7.014		0.0000	0.000
	2	0.0000	7.014	+D+L+H	-0.0125	2.011

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	1.453	3.835	-0.511
Overall MINimum	0.998	2.633	-0.160
+D+H	0.455	1.202	-0.160
+D+L+H	1.453	3.835	-0.511
+D+Lr+H	0.455	1.202	-0.160
+D+S+H	0.455	1.202	-0.160
+D+0.750Lr+0.750L+H	1.204	3.177	-0.423
+D+0.750L+0.750S+H	1.204	3.177	-0.423
+D+0.60W+H	0.455	1.202	-0.160
+D+0.750Lr+0.750L+0.450W+H	1.204	3.177	-0.423
+D+0.750L+0.750S+0.450W+H	1.204	3.177	-0.423
+0.60D+0.60W+0.60H	0.273	0.721	-0.096
+D+0.70E+0.60H	0.455	1.202	-0.160
+D+0.750L+0.750S+0.5250E+H	1.204	3.177	-0.423
+0.60D+0.70E+H	0.273	0.721	-0.096
D Only	0.455	1.202	-0.160
Lr Only			
L Only	0.998	2.633	-0.351
S Only			
W Only			
E Only			
H Only			

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#15

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

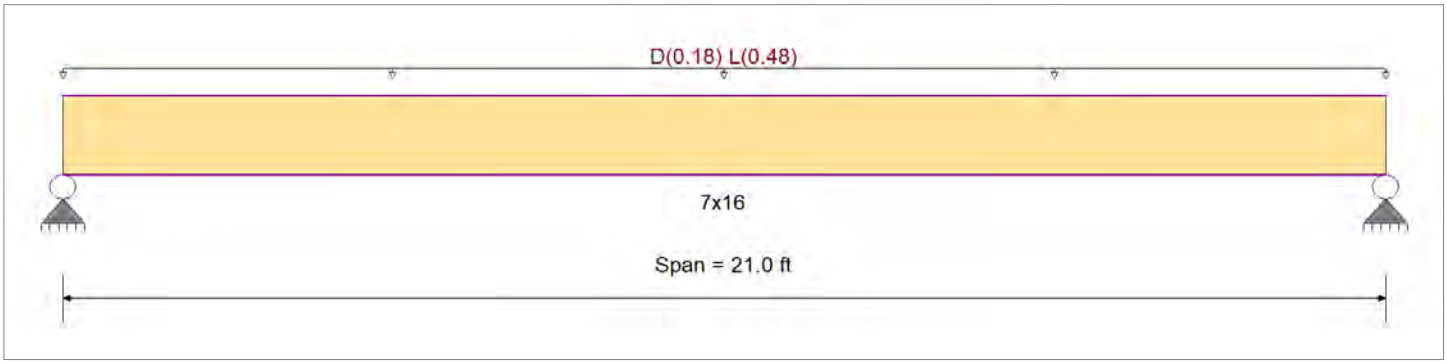
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 12.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.548 : 1	Maximum Shear Stress Ratio	=	0.295 : 1
Section used for this span		7x16	Section used for this span		7x16
	=	1,539.44 psi		=	85.61 psi
	=	2,808.86 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	10.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.442 in	Ratio =	570 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.640 in	Ratio =	393 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.188	0.101	0.90	0.969	1.00	1.00	1.00	1.00	1.00	11.85	476.31	2527.97	1.98	26.49	261.00
+D+L+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.548	0.295	1.00	0.969	1.00	1.00	1.00	1.00	1.00	38.31	1,539.44	2808.86	6.39	85.61	290.00
+D+Lr+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.136	0.073	1.25	0.969	1.00	1.00	1.00	1.00	1.00	11.85	476.31	3511.07	1.98	26.49	362.50
+D+S+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.147	0.079	1.15	0.969	1.00	1.00	1.00	1.00	1.00	11.85	476.31	3230.19	1.98	26.49	333.50
+D+0.750Lr+0.750L+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.363	0.195	1.25	0.969	1.00	1.00	1.00	1.00	1.00	31.70	1,273.66	3511.07	5.29	70.83	362.50
+D+0.750L+0.750S+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.394	0.212	1.15	0.969	1.00	1.00	1.00	1.00	1.00	31.70	1,273.66	3230.19	5.29	70.83	333.50
+D+0.60W+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Feaster Residence
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Permit # 6736413 - CM

Project Title:
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Wood Beam

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Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO BM#15

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 21.0 ft	**1**	0.106	0.057	1.60	0.969	1.00	1.00	1.00	1.00	1.00	11.85	476.31	4494.17	1.98	26.49	464.00
+D+0.750Lr+0.750L+0.450W-					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	**1**	0.283	0.153	1.60	0.969	1.00	1.00	1.00	1.00	1.00	31.70	1,273.66	4494.17	5.29	70.83	464.00
+D+0.750L+0.750S+0.450W+					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	**1**	0.283	0.153	1.60	0.969	1.00	1.00	1.00	1.00	1.00	31.70	1,273.66	4494.17	5.29	70.83	464.00
+0.60D+0.60W+0.60H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	**1**	0.064	0.034	1.60	0.969	1.00	1.00	1.00	1.00	1.00	7.11	285.79	4494.17	1.19	15.89	464.00
+D+0.70E+0.60H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	**1**	0.106	0.057	1.60	0.969	1.00	1.00	1.00	1.00	1.00	11.85	476.31	4494.17	1.98	26.49	464.00
+D+0.750L+0.750S+0.5250E-					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	**1**	0.283	0.153	1.60	0.969	1.00	1.00	1.00	1.00	1.00	31.70	1,273.66	4494.17	5.29	70.83	464.00
+0.60D+0.70E+H					0.969	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	**1**	0.064	0.034	1.60	0.969	1.00	1.00	1.00	1.00	1.00	7.11	285.79	4494.17	1.19	15.89	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.6402	10.577		0.0000	0.000

Vertical Reactions

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

Load Combination	Support 1	Support 2
Overall MAXimum	7.298	7.298
Overall MINimum	5.040	5.040
+D+H	2.258	2.258
+D+L+H	7.298	7.298
+D+Lr+H	2.258	2.258
+D+S+H	2.258	2.258
+D+0.750Lr+0.750L+H	6.038	6.038
+D+0.750L+0.750S+H	6.038	6.038
+D+0.60W+H	2.258	2.258
+D+0.750Lr+0.750L+0.450W+H	6.038	6.038
+D+0.750L+0.750S+0.450W+H	6.038	6.038
+0.60D+0.60W+0.60H	1.355	1.355
+D+0.70E+0.60H	2.258	2.258
+D+0.750L+0.750S+0.5250E+H	6.038	6.038
+0.60D+0.70E+H	1.355	1.355
D Only	2.258	2.258
Lr Only		
L Only	5.040	5.040
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO BM#16

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-16

Material Properties

Analysis Metho Allowable Stress Design
Load Combinati ASCE 7-16

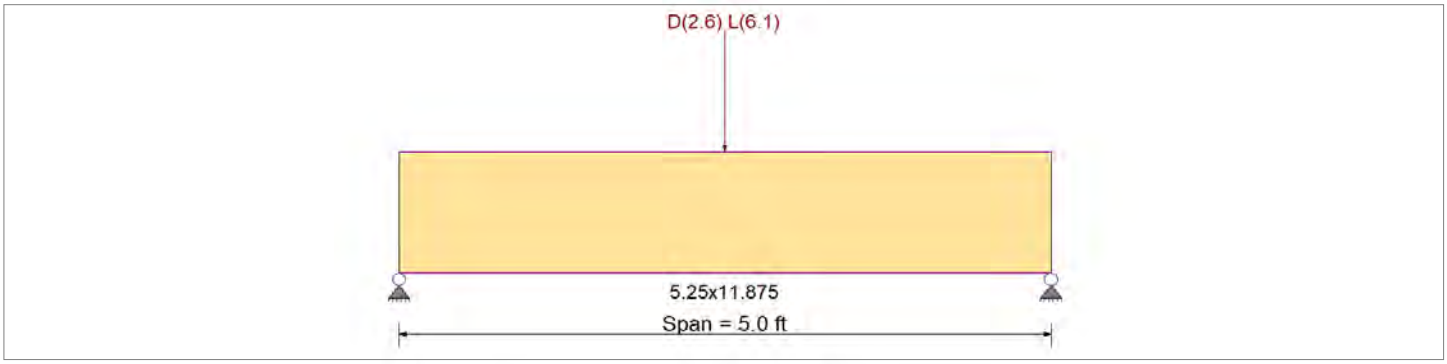
Wood Species Trus Joist
Wood Grade Parallam PSL 2.0E

Beam Bracing Beam is Fully Braced against lateral-torsional buckling

Fb +	2,900.0 psi
Fb -	2,900.0 psi
Fc - Prll	2,900.0 psi
Fc - Perp	625.0 psi
Fv	290.0 psi
Ft	2,025.0 psi

E : Modulus of Elasti

Ebend- xx	2,000.0 ksi
Eminbend - x	1,016.54 ksi
Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Point Load : D = 2.60, L = 6.10 k @ 2.50 ft, (BM37)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.367 : 1	Maximum Shear Stress Ratio	=	0.363 : 1
Section used for this span		5.25x11.875	Section used for this span		5.25x11.875
	=	1,063.56 psi		=	105.37 psi
	=	2,900.00 psi		=	290.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	4.015 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.019 in	Ratio =	3185 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.027 in	Ratio =	2217 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.123	0.123	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.31	322.00	2610.00	1.33	31.99	261.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.367	0.363	1.00	1.000	1.00	1.00	1.00	1.00	1.00	10.94	1,063.56	2900.00	4.38	105.37	290.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.089	0.088	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.31	322.00	3625.00	1.33	31.99	362.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.097	0.096	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.31	322.00	3335.00	1.33	31.99	333.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.242	0.240	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.03	878.17	3625.00	3.62	87.03	362.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	1	0.263	0.261	1.15	1.000	1.00	1.00	1.00	1.00	1.00	9.03	878.17	3335.00	3.62	87.03	333.50
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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DESCRIPTIO BM#16

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.0 ft	**1**	0.069	0.069	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.31	322.00	4640.00	1.33	31.99	464.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.189	0.188	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.03	878.17	4640.00	3.62	87.03	464.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.189	0.188	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.03	878.17	4640.00	3.62	87.03	464.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.042	0.041	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.99	193.20	4640.00	0.80	19.19	464.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.069	0.069	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.31	322.00	4640.00	1.33	31.99	464.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.189	0.188	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.03	878.17	4640.00	3.62	87.03	464.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.0 ft	**1**	0.042	0.041	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.99	193.20	4640.00	0.80	19.19	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0271	2.518		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.399	4.399
Overall MINimum	3.050	3.050
+D+H	1.349	1.349
+D+L+H	4.399	4.399
+D+Lr+H	1.349	1.349
+D+S+H	1.349	1.349
+D+0.750Lr+0.750L+H	3.636	3.636
+D+0.750L+0.750S+H	3.636	3.636
+D+0.60W+H	1.349	1.349
+D+0.750Lr+0.750L+0.450W+H	3.636	3.636
+D+0.750L+0.750S+0.450W+H	3.636	3.636
+0.60D+0.60W+0.60H	0.809	0.809
+D+0.70E+0.60H	1.349	1.349
+D+0.750L+0.750S+0.5250E+H	3.636	3.636
+0.60D+0.70E+H	0.809	0.809
D Only	1.349	1.349
Lr Only		
L Only	3.050	3.050
S Only		
W Only		
E Only		
H Only		

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Column

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 — CK Engineering LLC

DESCRIPTIO COL#1

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Analysis Metho	Allowable Stress Design				
End Fixities	Top & Bottom Pinned				
Overall Column Heigh	10 ft				
(Used for non-slender calculations)					
Wood Specie	Trus Joist				
Wood Grade	Parallam PSL 2.0E				
Fb +	2900 psi	Fv	290 psi		
Fb -	2900 psi	Ft	2025 psi		
Fc - Prll	2900 psi	Density	45.07 pcf		
Fc - Perp	625 psi				

E : Modulus of Elasticity . . . x-x Bending y-y Bending Axial

Basic	2000	2000	2000 ksi
Minimum	1016.535	1016.535	

Wood Section Name	**7x7**		
Wood Grading/Manuf.	Trus Joist		
Wood Member Type	Parallam PSL		
Exact Width	**7.0** in	Allow Stress Modification Factors	
Exact Depth	**7.0** in	Cf or Cv for Bending	1.0
Area	49.0 in^2	Cf or Cv for Compressio	1.0
Ix	200.083 in^4	Cf or Cv for Tension	1.0
Iy	200.083 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis Unbraced Length for buckling ABOUT Y-Y Axis = 1(
Y-Y (depth) axis Unbraced Length for buckling ABOUT X-X Axis = 1(

Applied Loads

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

Column self weight included : 153.363 lbs * Dead Load Factor
AXIAL LOADS . . .
BM#8: Axial Load at 10.0 ft, D = 9.10, L = 5.60, S = 9.30 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.180 : 1**

Load Combination	+D+0.750L+0.750S+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	20.428 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	2,316.48 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+H
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	464.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.791	0.09151	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+L+H	1.000	0.752	0.1390	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+Lr+H	1.250	0.658	0.07919	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S+H	1.150	0.695	0.1635	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+H	1.250	0.658	0.1151	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+H	1.150	0.695	0.180	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.60W+H	1.600	0.547	0.07443	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.547	0.1082	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.547	0.1643	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D+0.60W+0.60H	1.600	0.547	0.04466	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.70E+0.60H	1.600	0.547	0.07443	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.547	0.1643	PASS	0.0 ft	0.0	PASS	10.0 ft

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DESCRIPTIO COL#1

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+H	1.600	0.547	0.04466	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+D+H						9.253					
+D+L+H						14.853					
+D+Lr+H						9.253					
+D+S+H						18.553					
+D+0.750Lr+0.750L+H						13.453					
+D+0.750L+0.750S+H						20.428					
+D+0.60W+H						9.253					
+D+0.750Lr+0.750L+0.450W+H						13.453					
+D+0.750L+0.750S+0.450W+H						20.428					
+0.60D+0.60W+0.60H						5.552					
+D+0.70E+0.60H						9.253					
+D+0.750L+0.750S+0.5250E+H						20.428					
+0.60D+0.70E+H						5.552					
D Only						9.253					
Lr Only											
L Only						5.600					
S Only						9.300					
W Only											
E Only											
H Only											

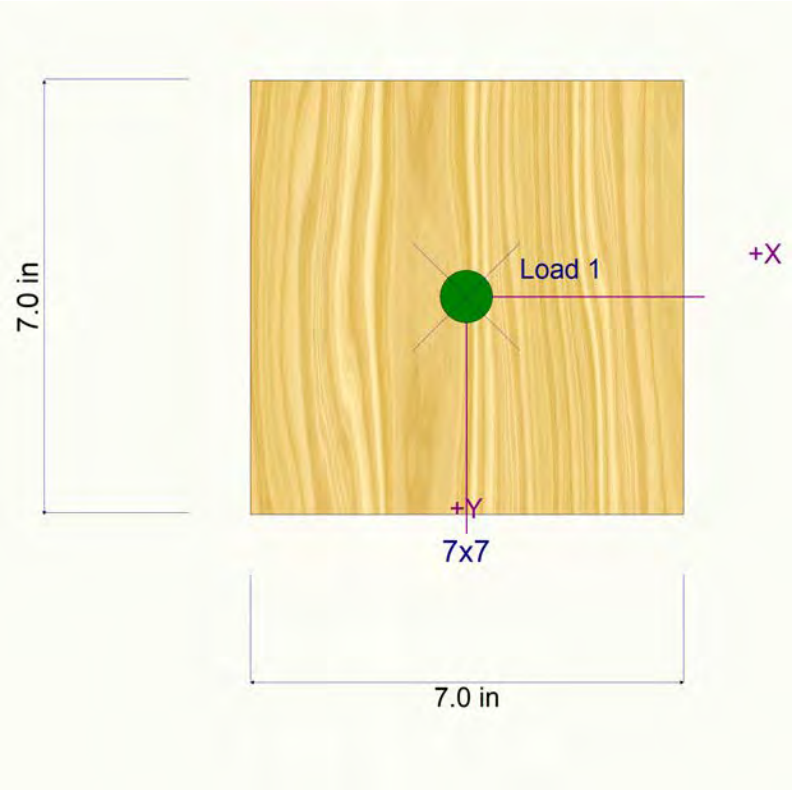
Maximum Deflections for Load Combinations

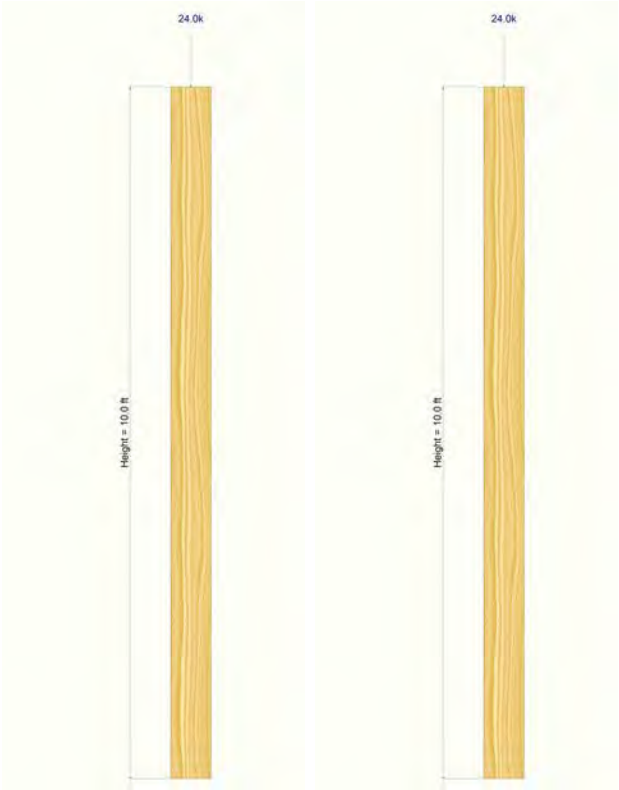
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+L+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+Lr+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+S+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.60W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+0.60D+0.60W+0.60H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.70E+0.60H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+0.60D+0.70E+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
D Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
Lr Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
L Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
S Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
W Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
E Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
H Only	0.0000 in	0.00 ft	0.000 in	0.00 ft

Wood Column

DESCRIPTIO COL#1

Sketches





Feaster Residence
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DESCRIPTIO COL#2

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Analysis Metho	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Heigh	11 ft		
(Used for non-slender calculations)			
Wood Specie	Trus Joist		
Wood Grade	Parallam PSL 2.0E		
Fb +	2,900.0 psi	Fv	290.0 psi
Fb -	2,900.0 psi	Ft	2,025.0 psi
Fc - Prll	2,900.0 psi	Density	45.070 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	2,000.0	2,000.0	2,000.0 ksi
Minimum	1,016.54	1,016.54	

Wood Section Name	**3.5x9.5**		
Wood Grading/Manuf.	Trus Joist		
Wood Member Type	Parallam PSL		
Exact Width	**3.50** in	Allow Stress Modification Factors	
Exact Depth	**9.50** in	Cf or Cv for Bending	1.0
Area	33.250 in^2	Cf or Cv for Compressio	1.0
Ix	250.068 in^4	Cf or Cv for Tension	1.0
Iy	33.943 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis Unbraced Length for buckling ABOUT Y-Y Axis = 11
Y-Y (depth) axis Unbraced Length for buckling ABOUT X-X Axis = 11

Applied Loads

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

Column self weight included : 114.475 lbs * Dead Load Factor
AXIAL LOADS . . .
BM#10&11: Axial Load at 11.0 ft, D = 5.470, L = 2.320, S = 5.650 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.6043 : 1**

Load Combination	+D+0.750L+0.750S+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	11.562 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	575.47 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+H
Location of max.above base	11.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	464.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.219	0.2939	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+L+H	1.000	0.198	0.4146	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+Lr+H	1.250	0.159	0.2913	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+S+H	1.150	0.173	0.5871	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750Lr+0.750L+H	1.250	0.159	0.3821	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750L+0.750S+H	1.150	0.173	0.6043	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.60W+H	1.600	0.125	0.290	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.125	0.3803	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.125	0.6004	PASS	0.0 ft	0.0	PASS	11.0 ft
+0.60D+0.60W+0.60H	1.600	0.125	0.1740	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.70E+0.60H	1.600	0.125	0.290	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.125	0.6004	PASS	0.0 ft	0.0	PASS	11.0 ft

Feaster Residence
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Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
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DESCRIPTIO COL#2

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+H	1.600	0.125	0.1740	PASS	0.0 ft	0.0	PASS	11.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+D+H						5.584					
+D+L+H						7.904					
+D+Lr+H						5.584					
+D+S+H						11.234					
+D+0.750Lr+0.750L+H						7.324					
+D+0.750L+0.750S+H						11.562					
+D+0.60W+H						5.584					
+D+0.750Lr+0.750L+0.450W+H						7.324					
+D+0.750L+0.750S+0.450W+H						11.562					
+0.60D+0.60W+0.60H						3.351					
+D+0.70E+0.60H						5.584					
+D+0.750L+0.750S+0.5250E+H						11.562					
+0.60D+0.70E+H						3.351					
D Only						5.584					
Lr Only											
L Only						2.320					
S Only						5.650					
W Only											
E Only											
H Only											

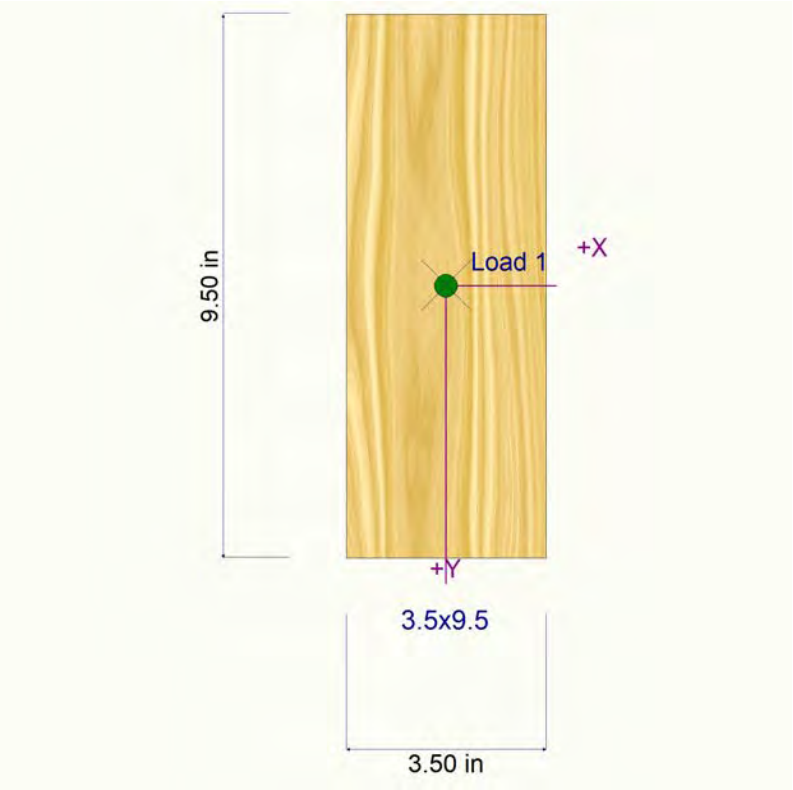
Maximum Deflections for Load Combinations

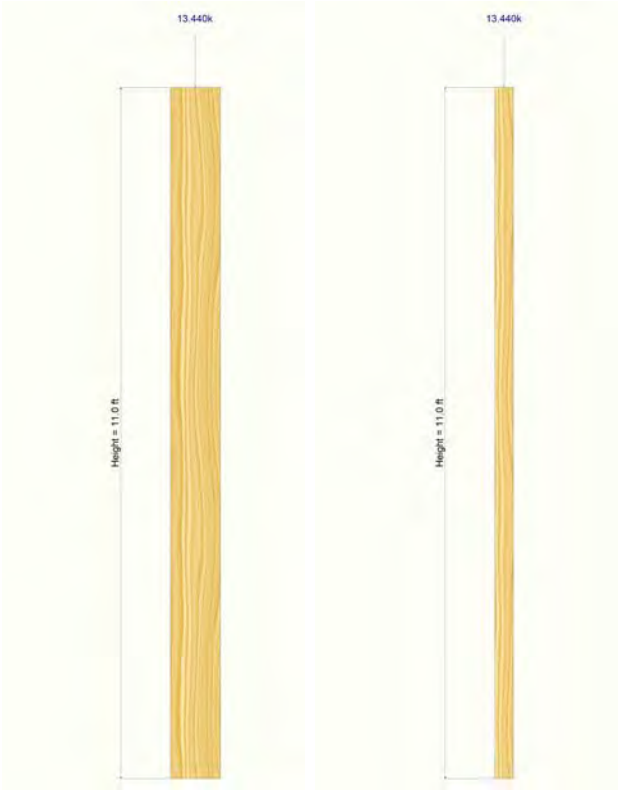
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+L+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+Lr+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+S+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.60W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+0.60D+0.60W+0.60H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.70E+0.60H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+0.60D+0.70E+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
D Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
Lr Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
L Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
S Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
W Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
E Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
H Only	0.0000 in	0.00 ft	0.000 in	0.00 ft

Wood Column

DESCRIPTIO COL#2

Sketches





Feaster Residence
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DESCRIPTIO COL#3

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Analysis Metho: Allowable Stress Design
End Fixities: Top & Bottom Pinned
Overall Column Heigh: 11 ft
(Used for non-slender calculations)
Wood Specie: Trus Joist
Wood Grade: Parallam PSL 2.0E

Fb +	2,900.0 psi	Fv	290.0 psi
Fb -	2,900.0 psi	Ft	2,025.0 psi
Fc - Prll	2,900.0 psi	Density	45.070 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	2,000.0	2,000.0	2,000.0 ksi
Minimum	1,016.54	1,016.54	

Wood Section Name: **5.25x5.25**
Wood Grading/Manuf.: Trus Joist
Wood Member Type: Parallam PSL

Exact Width	**5.250**	in
Exact Depth	**5.250**	in
Area	27.563	in^2
Ix	63.308	in^4
Iy	63.308	in^4

Allow Stress Modification Factors

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

Brace condition for deflection (buckling) along columns :
X-X (width) axis: Unbraced Length for buckling ABOUT Y-Y Axis = 11
Y-Y (depth) axis: Unbraced Length for buckling ABOUT X-X Axis = 11

Applied Loads

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

Column self weight included : 94.895 lbs * Dead Load Factor
AXIAL LOADS . . .
BM#8&9: Axial Load at 11.0 ft, D = 10.860, L = 3.90, S = 12.30 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.6764 : 1**
Load Combination: +D+S+H
Governing NDS Forumla: Comp Only, fc/Fc'
Location of max.above base: 0.0 ft
At maximum location values are .
Applied Axial: 23.255 k
Applied Mx: 0.0 k-ft
Applied My: 0.0 k-ft
Fc : Allowable: 1,247.29 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination: +0.60D+0.70E+H
Location of max.above base: 11.0 ft
Applied Design Shear: 0.0 psi
Allowable Shear: 464.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

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

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Max Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Max Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.466	0.3269	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+L+H	1.000	0.424	0.4378	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+Lr+H	1.250	0.346	0.3166	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+S+H	1.150	0.374	0.6764	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750Lr+0.750L+H	1.250	0.346	0.4012	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750L+0.750S+H	1.150	0.374	0.6721	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.60W+H	1.600	0.274	0.3121	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.274	0.3954	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.274	0.6582	PASS	0.0 ft	0.0	PASS	11.0 ft
+0.60D+0.60W+0.60H	1.600	0.274	0.1872	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.70E+0.60H	1.600	0.274	0.3121	PASS	0.0 ft	0.0	PASS	11.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.274	0.6582	PASS	0.0 ft	0.0	PASS	11.0 ft

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DESCRIPTIO COL#3

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+H	1.600	0.274	0.1872	PASS	0.0 ft	0.0	PASS	11.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+D+H						10.955					
+D+L+H						14.855					
+D+Lr+H						10.955					
+D+S+H						23.255					
+D+0.750Lr+0.750L+H						13.880					
+D+0.750L+0.750S+H						23.105					
+D+0.60W+H						10.955					
+D+0.750Lr+0.750L+0.450W+H						13.880					
+D+0.750L+0.750S+0.450W+H						23.105					
+0.60D+0.60W+0.60H						6.573					
+D+0.70E+0.60H						10.955					
+D+0.750L+0.750S+0.5250E+H						23.105					
+0.60D+0.70E+H						6.573					
D Only						10.955					
Lr Only											
L Only						3.900					
S Only						12.300					
W Only											
E Only											
H Only											

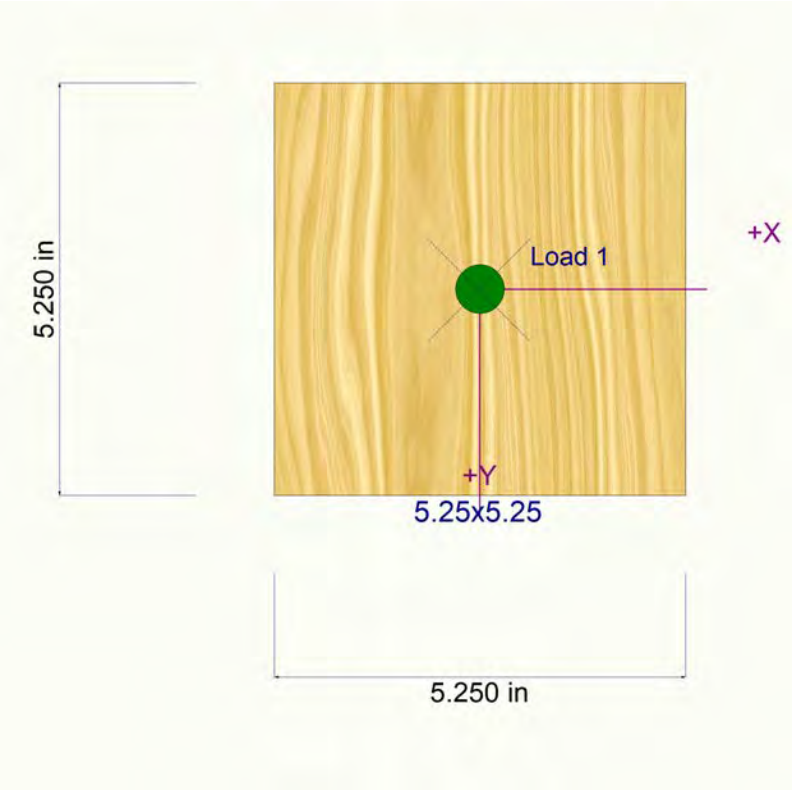
Maximum Deflections for Load Combinations

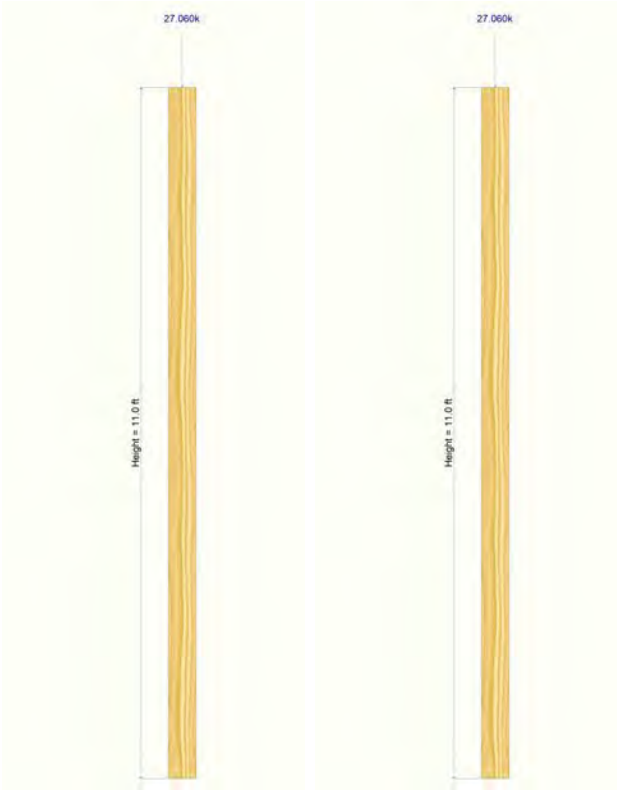
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+L+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+Lr+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+S+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.60W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+0.60D+0.60W+0.60H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.70E+0.60H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
+0.60D+0.70E+H	0.0000 in	0.00 ft	0.000 in	0.00 ft
D Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
Lr Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
L Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
S Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
W Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
E Only	0.0000 in	0.00 ft	0.000 in	0.00 ft
H Only	0.0000 in	0.00 ft	0.000 in	0.00 ft

Wood Column

DESCRIPTIO COL#3

Sketches





Feaster Residence
7544 31st Ave NW
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Project Title:
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General Footing

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DESCRIPTIO FTNG#1

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Beari	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	150.0	pcf
Soil/Concrete Friction Coeff.	=	0.250	

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

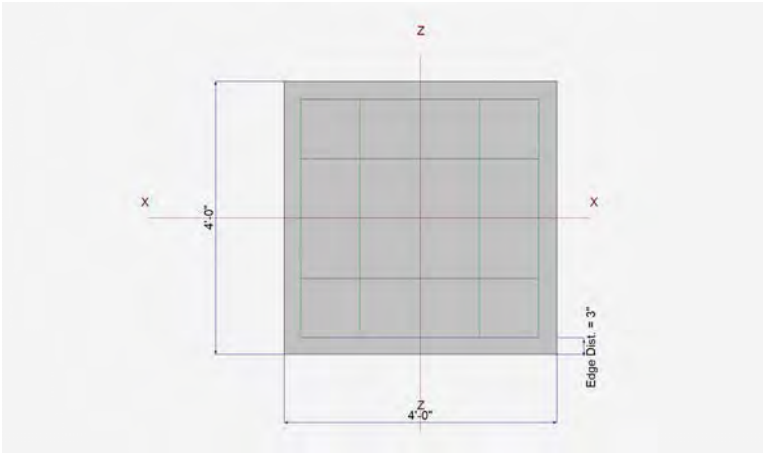
Width parallel to X-X Axis	=	4.0	ft
Length parallel to Z-Z Axis	=	4.0	ft
Footing Thickness	=	14.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=		in
pz : parallel to Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



Reinforcing

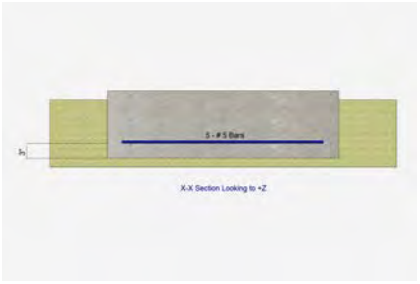
Bars parallel to X-X Axis			
Number of Bars	=		5.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		5.0
Reinforcing Bar Size	=	#	5

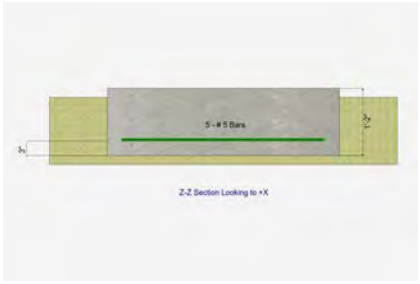
Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio

n/a

# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	9.10		5.60	9.30				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

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DESCRIPTIO FTNG#1

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9573	Soil Bearing	1.436 ksf	1.50 ksf	+D+0.750L+0.750S+0.5250E+H a
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2135	Z Flexure (+X)	3.925 k-ft/ft	18.386 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2135	Z Flexure (-X)	3.925 k-ft/ft	18.386 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2135	X Flexure (+Z)	3.925 k-ft/ft	18.386 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2135	X Flexure (-Z)	3.925 k-ft/ft	18.386 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2141	1-way Shear (+X)	16.057 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2141	1-way Shear (-X)	16.057 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2141	1-way Shear (+Z)	16.057 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2141	1-way Shear (-Z)	16.057 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.4116	2-way Punching	61.736 psi	150.0 psi	+1.20D+L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.7379	0.7379	n/a	n/a	0.492
X-X, +D+L+H	1.50	n/a	0.0	1.088	1.088	n/a	n/a	0.725
X-X, +D+Lr+H	1.50	n/a	0.0	0.7379	0.7379	n/a	n/a	0.492
X-X, +D+S+H	1.50	n/a	0.0	1.319	1.319	n/a	n/a	0.879
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	1.0	1.0	n/a	n/a	0.667
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	1.436	1.436	n/a	n/a	0.957
X-X, +D+0.60W+H	1.50	n/a	0.0	0.7379	0.7379	n/a	n/a	0.492
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	1.0	1.0	n/a	n/a	0.667
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	1.436	1.436	n/a	n/a	0.957
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.4428	0.4428	n/a	n/a	0.295
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.7379	0.7379	n/a	n/a	0.492
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	1.436	1.436	n/a	n/a	0.957
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.4428	0.4428	n/a	n/a	0.295
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.7379	0.7379	0.492
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	1.088	1.088	0.725
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.7379	0.7379	0.492
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	1.319	1.319	0.879
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	1.0	1.0	0.667
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	1.436	1.436	0.957
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.7379	0.7379	0.492
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	1.0	1.0	0.667
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	1.436	1.436	0.957
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.4428	0.4428	0.295
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.7379	0.7379	0.492
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	1.436	1.436	0.957
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.4428	0.4428	0.295

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
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Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	1.593	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.40D+1.60H	1.593	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.485	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.485	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60L+0.50S+1.60H	3.066	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60L+0.50S+1.60H	3.066	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.065	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.065	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	1.365	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	1.365	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+L+1.60S+1.60H	3.925	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+L+1.60S+1.60H	3.925	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60S+0.50W+1.60H	3.225	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+1.60S+0.50W+1.60H	3.225	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.065	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.065	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.646	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.646	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +0.90D+W+1.60H	1.024	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +0.90D+W+1.60H	1.024	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+L+0.20S+E+1.60H	2.298	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +1.20D+L+0.20S+E+1.60H	2.298	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +0.90D+E+0.90H	1.024	+Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
X-X, +0.90D+E+0.90H	1.024	-Z	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.40D+1.60H	1.593	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.40D+1.60H	1.593	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.485	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.485	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.066	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.066	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.065	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.065	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	1.365	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	1.365	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+L+1.60S+1.60H	3.925	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+L+1.60S+1.60H	3.925	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	3.225	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	3.225	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.065	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.065	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.646	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.646	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +0.90D+W+1.60H	1.024	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +0.90D+W+1.60H	1.024	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	2.298	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	2.298	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +0.90D+E+0.90H	1.024	-X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK
Z-Z, +0.90D+E+0.90H	1.024	+X	Bottom	0.3024	Min Temp %	0.3875	18.386	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	6.52 psi	6.52 psi	6.52 psi	6.52 psi	6.52 psi	75.00 psi	0.09	OK
+1.20D+0.50Lr+1.60L+1.60H	10.17 psi	10.17 psi	10.17 psi	10.17 psi	10.17 psi	75.00 psi	0.14	OK
+1.20D+1.60L+0.50S+1.60H	12.54 psi	12.54 psi	12.54 psi	12.54 psi	12.54 psi	75.00 psi	0.17	OK
+1.20D+1.60Lr+L+1.60H	8.45 psi	8.45 psi	8.45 psi	8.45 psi	8.45 psi	75.00 psi	0.11	OK
+1.20D+1.60Lr+0.50W+1.60H	5.58 psi	5.58 psi	5.58 psi	5.58 psi	5.58 psi	75.00 psi	0.07	OK
+1.20D+L+1.60S+1.60H	16.06 psi	16.06 psi	16.06 psi	16.06 psi	16.06 psi	75.00 psi	0.21	OK
+1.20D+1.60S+0.50W+1.60H	13.19 psi	13.19 psi	13.19 psi	13.19 psi	13.19 psi	75.00 psi	0.18	OK
+1.20D+0.50Lr+L+W+1.60H	8.45 psi	8.45 psi	8.45 psi	8.45 psi	8.45 psi	75.00 psi	0.11	OK
+1.20D+L+0.50S+W+1.60H	10.83 psi	10.83 psi	10.83 psi	10.83 psi	10.83 psi	75.00 psi	0.14	OK
+0.90D+W+1.60H	4.19 psi	4.19 psi	4.19 psi	4.19 psi	4.19 psi	75.00 psi	0.06	OK
+1.20D+L+0.20S+E+1.60H	9.40 psi	9.40 psi	9.40 psi	9.40 psi	9.40 psi	75.00 psi	0.13	OK

General Footing

DESCRIPTIO FTNG#1

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	4.19 psi	4.19 psi	4.19 psi	4.19 psi	4.19 psi	75.00 psi	0.06	OK
							All units k	

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	25.05 psi	150.00 psi	0.167	OK
+1.20D+0.50Lr+1.60L+1.60H	39.09 psi	150.00 psi	0.2606	OK
+1.20D+1.60L+0.50S+1.60H	48.23 psi	150.00 psi	0.3215	OK
+1.20D+1.60Lr+L+1.60H	32.48 psi	150.00 psi	0.2165	OK
+1.20D+1.60Lr+0.50W+1.60H	21.47 psi	150.00 psi	0.1431	OK
+1.20D+L+1.60S+1.60H	61.74 psi	150.00 psi	0.4116	OK
+1.20D+1.60S+0.50W+1.60H	50.73 psi	150.00 psi	0.3382	OK
+1.20D+0.50Lr+L+W+1.60H	32.48 psi	150.00 psi	0.2165	OK
+1.20D+L+0.50S+W+1.60H	41.62 psi	150.00 psi	0.2775	OK
+0.90D+W+1.60H	16.10 psi	150.00 psi	0.1074	OK
+1.20D+L+0.20S+E+1.60H	36.14 psi	150.00 psi	0.2409	OK
+0.90D+E+0.90H	16.10 psi	150.00 psi	0.1074	OK

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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General Footing

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO FTNG#2

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Beari	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	150.0	pcf
Soil/Concrete Friction Coeff.	=	0.250	

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

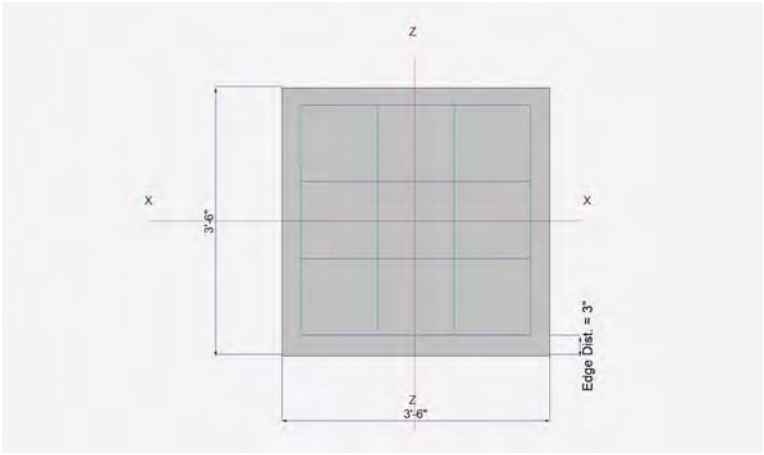
Width parallel to X-X Axis	=	3.50	ft
Length parallel to Z-Z Axis	=	3.50	ft
Footing Thickness	=	14	in

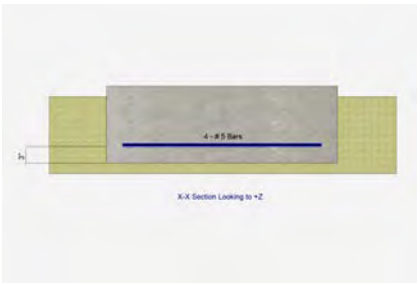
Pedestal dimensions...

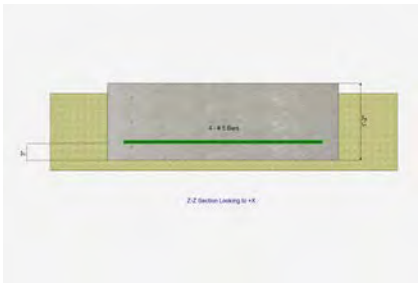
px : parallel to X-X Axis	=		in
pz : parallel to Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in







Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		4
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		4
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	5.470		2.320	5.650				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

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DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7360	Soil Bearing	1.104 ksf	1.50 ksf	+D+0.750L+0.750S+0.5250E+H a
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1328	Z Flexure (+X)	2.241 k-ft/ft	16.873 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1328	Z Flexure (-X)	2.241 k-ft/ft	16.873 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1328	X Flexure (+Z)	2.241 k-ft/ft	16.873 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1328	X Flexure (-Z)	2.241 k-ft/ft	16.873 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1241	1-way Shear (+X)	9.311 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1241	1-way Shear (-X)	9.311 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1241	1-way Shear (+Z)	9.311 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1241	1-way Shear (-Z)	9.311 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2302	2-way Punching	34.530 psi	150.0 psi	+1.20D+L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.6157	0.6157	n/a	n/a	0.411
X-X, +D+L+H	1.50	n/a	0.0	0.8051	0.8051	n/a	n/a	0.537
X-X, +D+Lr+H	1.50	n/a	0.0	0.6157	0.6157	n/a	n/a	0.411
X-X, +D+S+H	1.50	n/a	0.0	1.077	1.077	n/a	n/a	0.718
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.7577	0.7577	n/a	n/a	0.505
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	1.104	1.104	n/a	n/a	0.736
X-X, +D+0.60W+H	1.50	n/a	0.0	0.6157	0.6157	n/a	n/a	0.411
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.7577	0.7577	n/a	n/a	0.505
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	1.104	1.104	n/a	n/a	0.736
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.3694	0.3694	n/a	n/a	0.246
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.6157	0.6157	n/a	n/a	0.411
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	1.104	1.104	n/a	n/a	0.736
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.3694	0.3694	n/a	n/a	0.246
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.6157	0.6157	0.411
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.8051	0.8051	0.537
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.6157	0.6157	0.411
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	1.077	1.077	0.718
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.7577	0.7577	0.505
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	1.104	1.104	0.736
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.6157	0.6157	0.411
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.7577	0.7577	0.505
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	1.104	1.104	0.736
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.3694	0.3694	0.246
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.6157	0.6157	0.411
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	1.104	1.104	0.736
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.3694	0.3694	0.246

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

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Seattle, WA 98117
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Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.9573	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.40D+1.60H	0.9573	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.285	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.285	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.638	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.638	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.111	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.111	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.8205	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.8205	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+L+1.60S+1.60H	2.241	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+L+1.60S+1.60H	2.241	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.951	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.951	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.111	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.111	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.464	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.464	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +0.90D+W+1.60H	0.6154	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +0.90D+W+1.60H	0.6154	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+L+0.20S+E+1.60H	1.252	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +1.20D+L+0.20S+E+1.60H	1.252	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +0.90D+E+0.90H	0.6154	+Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
X-X, +0.90D+E+0.90H	0.6154	-Z	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.40D+1.60H	0.9573	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.40D+1.60H	0.9573	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.285	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.285	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.638	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.638	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.111	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.111	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.8205	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.8205	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.241	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.241	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.951	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.951	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.111	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.111	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.464	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.464	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +0.90D+W+1.60H	0.6154	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +0.90D+W+1.60H	0.6154	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	1.252	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	1.252	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +0.90D+E+0.90H	0.6154	-X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK
Z-Z, +0.90D+E+0.90H	0.6154	+X	Bottom	0.3024	Min Temp %	0.3543	16.873	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	3.98 psi	3.98 psi	3.98 psi	3.98 psi	3.98 psi	75.00 psi	0.05	OK
+1.20D+0.50Lr+1.60L+1.60H	5.34 psi	5.34 psi	5.34 psi	5.34 psi	5.34 psi	75.00 psi	0.07	OK
+1.20D+1.60L+0.50S+1.60H	6.81 psi	6.81 psi	6.81 psi	6.81 psi	6.81 psi	75.00 psi	0.09	OK
+1.20D+1.60Lr+L+1.60H	4.62 psi	4.62 psi	4.62 psi	4.62 psi	4.62 psi	75.00 psi	0.06	OK
+1.20D+1.60Lr+0.50W+1.60H	3.41 psi	3.41 psi	3.41 psi	3.41 psi	3.41 psi	75.00 psi	0.05	OK
+1.20D+L+1.60S+1.60H	9.31 psi	9.31 psi	9.31 psi	9.31 psi	9.31 psi	75.00 psi	0.12	OK
+1.20D+1.60S+0.50W+1.60H	8.11 psi	8.11 psi	8.11 psi	8.11 psi	8.11 psi	75.00 psi	0.11	OK
+1.20D+0.50Lr+L+W+1.60H	4.62 psi	4.62 psi	4.62 psi	4.62 psi	4.62 psi	75.00 psi	0.06	OK
+1.20D+L+0.50S+W+1.60H	6.08 psi	6.08 psi	6.08 psi	6.08 psi	6.08 psi	75.00 psi	0.08	OK
+0.90D+W+1.60H	2.56 psi	2.56 psi	2.56 psi	2.56 psi	2.56 psi	75.00 psi	0.03	OK
+1.20D+L+0.20S+E+1.60H	5.20 psi	5.20 psi	5.20 psi	5.20 psi	5.20 psi	75.00 psi	0.07	OK

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One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	2.56 psi	2.56 psi	2.56 psi	2.56 psi	2.56 psi	75.00 psi	0.03	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	14.75 psi	150.00 psi	0.09835	OK
+1.20D+0.50Lr+1.60L+1.60H	19.80 psi	150.00 psi	0.132	OK
+1.20D+1.60L+0.50S+1.60H	25.24 psi	150.00 psi	0.1683	OK
+1.20D+1.60Lr+L+1.60H	17.12 psi	150.00 psi	0.1141	OK
+1.20D+1.60Lr+0.50W+1.60H	12.65 psi	150.00 psi	0.0843	OK
+1.20D+L+1.60S+1.60H	34.53 psi	150.00 psi	0.2302	OK
+1.20D+1.60S+0.50W+1.60H	30.06 psi	150.00 psi	0.2004	OK
+1.20D+0.50Lr+L+W+1.60H	17.12 psi	150.00 psi	0.1141	OK
+1.20D+L+0.50S+W+1.60H	22.56 psi	150.00 psi	0.1504	OK
+0.90D+W+1.60H	9.48 psi	150.00 psi	0.06323	OK
+1.20D+L+0.20S+E+1.60H	19.29 psi	150.00 psi	0.1286	OK
+0.90D+E+0.90H	9.48 psi	150.00 psi	0.06323	OK

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Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Beari	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	150.0	pcf
Soil/Concrete Friction Coeff.	=	0.250	

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

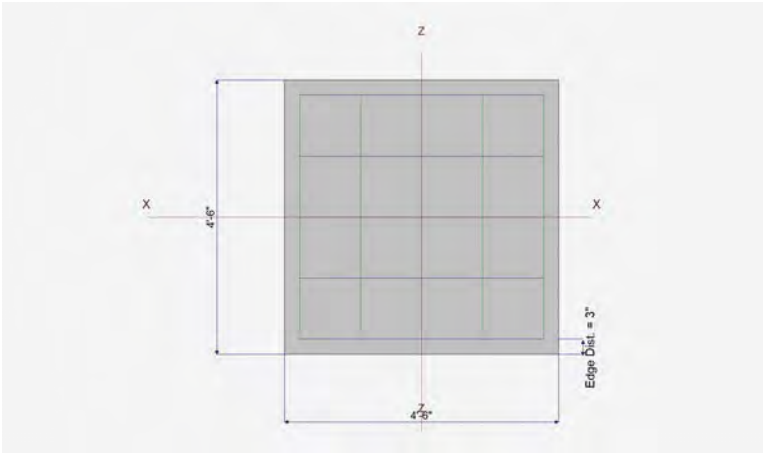
Width parallel to X-X Axis	=	4.50	ft
Length parallel to Z-Z Axis	=	4.50	ft
Footing Thickness	=	14.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=		in
pz : parallel to Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in

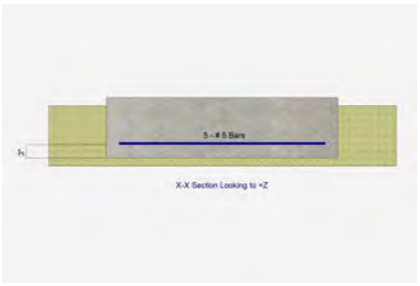


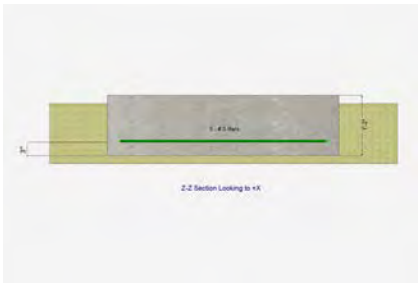
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		5
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		5
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio	
	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	10.860		3.90	12.30				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

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DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8753	Soil Bearing	1.313 ksf	1.50 ksf	+D+S+H about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2787	Z Flexure (+X)	4.577 k-ft/ft	16.422 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2787	Z Flexure (-X)	4.577 k-ft/ft	16.422 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2787	X Flexure (+Z)	4.577 k-ft/ft	16.422 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2787	X Flexure (-Z)	4.577 k-ft/ft	16.422 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.2465	1-way Shear (+X)	18.491 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2465	1-way Shear (-X)	18.491 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2465	1-way Shear (+Z)	18.491 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2465	1-way Shear (-Z)	18.491 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.4841	2-way Punching	72.619 psi	150.0 psi	+1.20D+L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.7055	0.7055	n/a	n/a	0.470
X-X, +D+L+H	1.50	n/a	0.0	0.8981	0.8981	n/a	n/a	0.599
X-X, +D+Lr+H	1.50	n/a	0.0	0.7055	0.7055	n/a	n/a	0.470
X-X, +D+S+H	1.50	n/a	0.0	1.313	1.313	n/a	n/a	0.875
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.8499	0.8499	n/a	n/a	0.567
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	1.305	1.305	n/a	n/a	0.870
X-X, +D+0.60W+H	1.50	n/a	0.0	0.7055	0.7055	n/a	n/a	0.470
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.8499	0.8499	n/a	n/a	0.567
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	1.305	1.305	n/a	n/a	0.870
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.4233	0.4233	n/a	n/a	0.282
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.7055	0.7055	n/a	n/a	0.470
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	1.305	1.305	n/a	n/a	0.870
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.4233	0.4233	n/a	n/a	0.282
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.7055	0.7055	0.470
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.8981	0.8981	0.599
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.7055	0.7055	0.470
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	1.313	1.313	0.875
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.8499	0.8499	0.567
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	1.305	1.305	0.870
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.7055	0.7055	0.470
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.8499	0.8499	0.567
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	1.305	1.305	0.870
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.4233	0.4233	0.282
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.7055	0.7055	0.470
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	1.305	1.305	0.870
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.4233	0.4233	0.282

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

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General Footing

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Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO FTNG#3

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	1.901	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.40D+1.60H	1.901	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.409	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.409	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60L+0.50S+1.60H	3.178	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60L+0.50S+1.60H	3.178	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.117	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.117	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	1.629	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	1.629	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+L+1.60S+1.60H	4.577	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+L+1.60S+1.60H	4.577	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60S+0.50W+1.60H	4.089	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+1.60S+0.50W+1.60H	4.089	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.117	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.117	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.885	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.885	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +0.90D+W+1.60H	1.222	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +0.90D+W+1.60H	1.222	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+L+0.20S+E+1.60H	2.424	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +1.20D+L+0.20S+E+1.60H	2.424	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +0.90D+E+0.90H	1.222	+Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
X-X, +0.90D+E+0.90H	1.222	-Z	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.40D+1.60H	1.901	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.40D+1.60H	1.901	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.409	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.409	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.178	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.178	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.117	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.117	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	1.629	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	1.629	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+L+1.60S+1.60H	4.577	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+L+1.60S+1.60H	4.577	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	4.089	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	4.089	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.117	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.117	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.885	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.885	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +0.90D+W+1.60H	1.222	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +0.90D+W+1.60H	1.222	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	2.424	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	2.424	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +0.90D+E+0.90H	1.222	-X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK
Z-Z, +0.90D+E+0.90H	1.222	+X	Bottom	0.3024	Min Temp %	0.3444	16.422	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	7.68 psi	7.68 psi	7.68 psi	7.68 psi	7.68 psi	75.00 psi	0.10	OK
+1.20D+0.50Lr+1.60L+1.60H	9.73 psi	9.73 psi	9.73 psi	9.73 psi	9.73 psi	75.00 psi	0.13	OK
+1.20D+1.60L+0.50S+1.60H	12.84 psi	12.84 psi	12.84 psi	12.84 psi	12.84 psi	75.00 psi	0.17	OK
+1.20D+1.60Lr+L+1.60H	8.55 psi	8.55 psi	8.55 psi	8.55 psi	8.55 psi	75.00 psi	0.11	OK
+1.20D+1.60Lr+0.50W+1.60H	6.58 psi	6.58 psi	6.58 psi	6.58 psi	6.58 psi	75.00 psi	0.09	OK
+1.20D+L+1.60S+1.60H	18.49 psi	18.49 psi	18.49 psi	18.49 psi	18.49 psi	75.00 psi	0.25	OK
+1.20D+1.60S+0.50W+1.60H	16.52 psi	16.52 psi	16.52 psi	16.52 psi	16.52 psi	75.00 psi	0.22	OK
+1.20D+0.50Lr+L+W+1.60H	8.55 psi	8.55 psi	8.55 psi	8.55 psi	8.55 psi	75.00 psi	0.11	OK
+1.20D+L+0.50S+W+1.60H	11.66 psi	11.66 psi	11.66 psi	11.66 psi	11.66 psi	75.00 psi	0.16	OK
+0.90D+W+1.60H	4.94 psi	4.94 psi	4.94 psi	4.94 psi	4.94 psi	75.00 psi	0.07	OK
+1.20D+L+0.20S+E+1.60H	9.79 psi	9.79 psi	9.79 psi	9.79 psi	9.79 psi	75.00 psi	0.13	OK

General Footing

DESCRIPTIO FTNG#3

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	4.94 psi	4.94 psi	4.94 psi	4.94 psi	4.94 psi	75.00 psi	0.07	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	30.16 psi	150.00 psi	0.201	OK
+1.20D+0.50Lr+1.60L+1.60H	38.23 psi	150.00 psi	0.2548	OK
+1.20D+1.60L+0.50S+1.60H	50.42 psi	150.00 psi	0.3362	OK
+1.20D+1.60Lr+L+1.60H	33.58 psi	150.00 psi	0.2239	OK
+1.20D+1.60Lr+0.50W+1.60H	25.85 psi	150.00 psi	0.1723	OK
+1.20D+L+1.60S+1.60H	72.62 psi	150.00 psi	0.4841	OK
+1.20D+1.60S+0.50W+1.60H	64.88 psi	150.00 psi	0.4326	OK
+1.20D+0.50Lr+L+W+1.60H	33.58 psi	150.00 psi	0.2239	OK
+1.20D+L+0.50S+W+1.60H	45.78 psi	150.00 psi	0.3052	OK
+0.90D+W+1.60H	19.39 psi	150.00 psi	0.1292	OK
+1.20D+L+0.20S+E+1.60H	38.46 psi	150.00 psi	0.2564	OK
+0.90D+E+0.90H	19.39 psi	150.00 psi	0.1292	OK

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
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General Footing

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DESCRIPTIO FTNG#4

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Beari	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	150.0	pcf
Soil/Concrete Friction Coeff.	=	0.250	

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

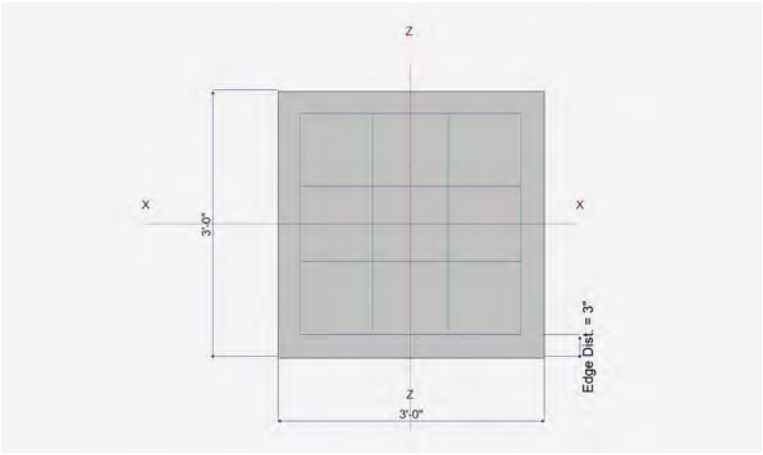
Width parallel to X-X Axis	=	3.0	ft
Length parallel to Z-Z Axis	=	3.0	ft
Footing Thickness	=	14.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=		in
pz : parallel to Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



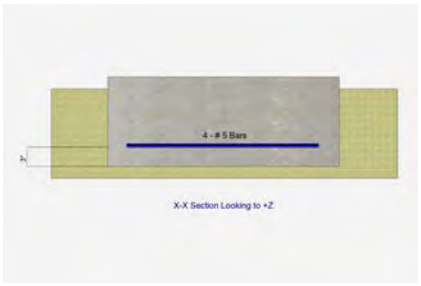
Reinforcing

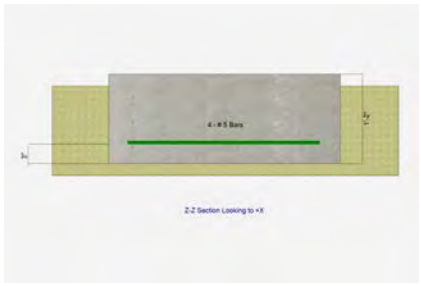
Bars parallel to X-X Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio

	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	3.70			8.140				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Feaster Residence
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General Footing

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DESCRIPTIO FTNG#4

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.990	Soil Bearing	1.485 ksf	1.50 ksf	+D+S+H about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1116	Z Flexure (+X)	2.183 k-ft/ft	19.556 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1116	Z Flexure (-X)	2.183 k-ft/ft	19.556 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1116	X Flexure (+Z)	2.183 k-ft/ft	19.556 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1116	X Flexure (-Z)	2.183 k-ft/ft	19.556 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.1117	1-way Shear (+X)	8.379 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1117	1-way Shear (-X)	8.379 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1117	1-way Shear (+Z)	8.379 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1117	1-way Shear (-Z)	8.379 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.2189	2-way Punching	32.835 psi	150.0 psi	+1.20D+L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+L+H	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+Lr+H	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+S+H	1.50	n/a	0.0	1.485	1.485	n/a	n/a	0.990
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	1.259	1.259	n/a	n/a	0.839
X-X, +D+0.60W+H	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	1.259	1.259	n/a	n/a	0.839
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.3482	0.3482	n/a	n/a	0.232
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.5803	0.5803	n/a	n/a	0.387
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	1.259	1.259	n/a	n/a	0.839
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.3482	0.3482	n/a	n/a	0.232
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	1.485	1.485	0.990
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	1.259	1.259	0.839
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	1.259	1.259	0.839
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.3482	0.3482	0.232
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.5803	0.5803	0.387
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	1.259	1.259	0.839
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.3482	0.3482	0.232

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

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DESCRIPTIO FTNG#4

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.6475	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.40D+1.60H	0.6475	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.5550	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.5550	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.064	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.064	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.5550	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.5550	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.5550	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.5550	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+L+1.60S+1.60H	2.183	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+L+1.60S+1.60H	2.183	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60S+0.50W+1.60H	2.183	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+1.60S+0.50W+1.60H	2.183	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.5550	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.5550	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.064	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.064	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +0.90D+W+1.60H	0.4163	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +0.90D+W+1.60H	0.4163	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.7585	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.7585	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +0.90D+E+0.90H	0.4163	+Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
X-X, +0.90D+E+0.90H	0.4163	-Z	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.40D+1.60H	0.6475	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.40D+1.60H	0.6475	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.5550	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.5550	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.064	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.064	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.5550	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.5550	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.5550	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.5550	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.183	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.183	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	2.183	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	2.183	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.5550	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.5550	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.064	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.064	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +0.90D+W+1.60H	0.4163	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +0.90D+W+1.60H	0.4163	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.7585	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.7585	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +0.90D+E+0.90H	0.4163	-X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK
Z-Z, +0.90D+E+0.90H	0.4163	+X	Bottom	0.3024	Min Temp %	0.4133	19.556	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.49 psi	2.49 psi	2.49 psi	2.49 psi	2.49 psi	75.00 psi	0.03	OK
+1.20D+0.50Lr+1.60L+1.60H	2.13 psi	2.13 psi	2.13 psi	2.13 psi	2.13 psi	75.00 psi	0.03	OK
+1.20D+1.60L+0.50S+1.60H	4.08 psi	4.08 psi	4.08 psi	4.08 psi	4.08 psi	75.00 psi	0.05	OK
+1.20D+1.60Lr+L+1.60H	2.13 psi	2.13 psi	2.13 psi	2.13 psi	2.13 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+0.50W+1.60H	2.13 psi	2.13 psi	2.13 psi	2.13 psi	2.13 psi	75.00 psi	0.03	OK
+1.20D+L+1.60S+1.60H	8.38 psi	8.38 psi	8.38 psi	8.38 psi	8.38 psi	75.00 psi	0.11	OK
+1.20D+1.60S+0.50W+1.60H	8.38 psi	8.38 psi	8.38 psi	8.38 psi	8.38 psi	75.00 psi	0.11	OK
+1.20D+0.50Lr+L+W+1.60H	2.13 psi	2.13 psi	2.13 psi	2.13 psi	2.13 psi	75.00 psi	0.03	OK
+1.20D+L+0.50S+W+1.60H	4.08 psi	4.08 psi	4.08 psi	4.08 psi	4.08 psi	75.00 psi	0.05	OK
+0.90D+W+1.60H	1.60 psi	1.60 psi	1.60 psi	1.60 psi	1.60 psi	75.00 psi	0.02	OK
+1.20D+L+0.20S+E+1.60H	2.91 psi	2.91 psi	2.91 psi	2.91 psi	2.91 psi	75.00 psi	0.04	OK

General Footing

DESCRIPTIO FTNG#4

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	1.60 psi	1.60 psi	1.60 psi	1.60 psi	1.60 psi	75.00 psi	0.02	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	9.74 psi	150.00 psi	0.06493	OK
+1.20D+0.50Lr+1.60L+1.60H	8.35 psi	150.00 psi	0.05565	OK
+1.20D+1.60L+0.50S+1.60H	16.00 psi	150.00 psi	0.1067	OK
+1.20D+1.60Lr+L+1.60H	8.35 psi	150.00 psi	0.05565	OK
+1.20D+1.60Lr+0.50W+1.60H	8.35 psi	150.00 psi	0.05565	OK
+1.20D+L+1.60S+1.60H	32.84 psi	150.00 psi	0.2189	OK
+1.20D+1.60S+0.50W+1.60H	32.84 psi	150.00 psi	0.2189	OK
+1.20D+0.50Lr+L+W+1.60H	8.35 psi	150.00 psi	0.05565	OK
+1.20D+L+0.50S+W+1.60H	16.00 psi	150.00 psi	0.1067	OK
+0.90D+W+1.60H	6.26 psi	150.00 psi	0.04174	OK
+1.20D+L+0.20S+E+1.60H	11.41 psi	150.00 psi	0.07606	OK
+0.90D+E+0.90H	6.26 psi	150.00 psi	0.04174	OK

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 12 JAN 2020, 10:15AM

General Footing

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO FTNG#5

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	40.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Beari	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	150.0	pcf
Soil/Concrete Friction Coeff.	=	0.250	

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

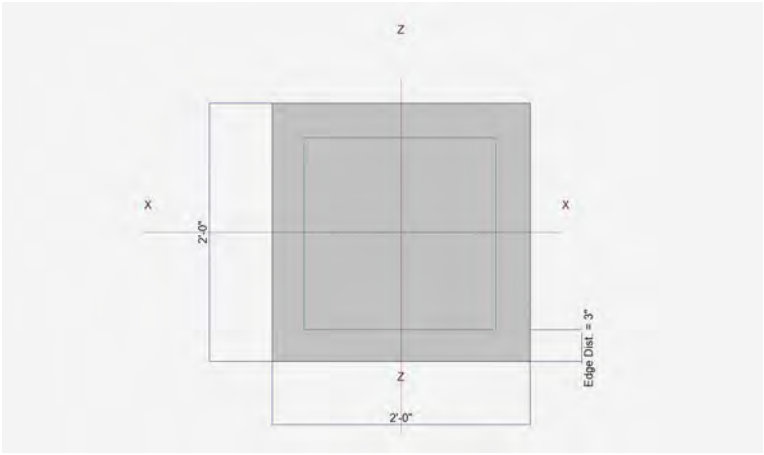
Width parallel to X-X Axis	=	2.0 ft
Length parallel to Z-Z Axis	=	2.0 ft
Footing Thickness	=	10.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.30			2.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

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DESCRIPTIO FTNG#5

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6428	Soil Bearing	0.9642 ksf	1.50 ksf	+D+S+H about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.09773	Z Flexure (+X)	0.5950 k-ft/ft	6.088 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.09773	Z Flexure (-X)	0.5950 k-ft/ft	6.088 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.09773	X Flexure (+Z)	0.5950 k-ft/ft	6.088 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.09773	X Flexure (-Z)	0.5950 k-ft/ft	6.088 k-ft/ft	+1.20D+L+1.60S+1.60H
PASS	0.07933	1-way Shear (+X)	5.950 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.07933	1-way Shear (-X)	5.950 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.07933	1-way Shear (+Z)	5.950 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.07933	1-way Shear (-Z)	5.950 psi	75.0 psi	+1.20D+L+1.60S+1.60H
PASS	0.1473	2-way Punching	22.10 psi	150.0 psi	+1.20D+L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+L+H	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+Lr+H	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+S+H	1.50	n/a	0.0	0.9642	0.9642	n/a	n/a	0.643
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	0.8392	0.8392	n/a	n/a	0.560
X-X, +D+0.60W+H	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	0.8392	0.8392	n/a	n/a	0.560
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.2785	0.2785	n/a	n/a	0.186
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.4642	0.4642	n/a	n/a	0.310
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	0.8392	0.8392	n/a	n/a	0.560
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.2785	0.2785	n/a	n/a	0.186
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	0.9642	0.9642	0.643
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	0.8392	0.8392	0.560
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	0.8392	0.8392	0.560
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.2785	0.2785	0.186
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.4642	0.4642	0.310
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	0.8392	0.8392	0.560
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.2785	0.2785	0.186

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Feaster Residence
7544 31st Ave NW
Seattle, WA 98117
Permit # 6736413 - CM

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 12 JAN 2020, 10:15AM

General Footing

File = C:\Users\pasko\Desktop\test.ec6 .

Lic. # : KW-06009431 CK Engineering LLC

DESCRIPTIO FTNG#5

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.2275	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.40D+1.60H	0.2275	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.1950	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.1950	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.320	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.320	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.1950	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.1950	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.1950	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.1950	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+1.60S+1.60H	0.5950	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+1.60S+1.60H	0.5950	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5950	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5950	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.1950	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.1950	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.320	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.320	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+W+1.60H	0.1463	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+W+1.60H	0.1463	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.2450	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.2450	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+E+0.90H	0.1463	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+E+0.90H	0.1463	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.40D+1.60H	0.2275	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.40D+1.60H	0.2275	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.1950	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.1950	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.320	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.320	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.1950	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.1950	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.1950	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.1950	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.5950	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.5950	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5950	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5950	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.1950	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.1950	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.320	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.320	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+W+1.60H	0.1463	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+W+1.60H	0.1463	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.2450	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.2450	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+E+0.90H	0.1463	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+E+0.90H	0.1463	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.28 psi	2.28 psi	2.28 psi	2.28 psi	2.28 psi	75.00 psi	0.03	OK
+1.20D+0.50Lr+1.60L+1.60H	1.95 psi	1.95 psi	1.95 psi	1.95 psi	1.95 psi	75.00 psi	0.03	OK
+1.20D+1.60L+0.50S+1.60H	3.20 psi	3.20 psi	3.20 psi	3.20 psi	3.20 psi	75.00 psi	0.04	OK
+1.20D+1.60Lr+L+1.60H	1.95 psi	1.95 psi	1.95 psi	1.95 psi	1.95 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+0.50W+1.60H	1.95 psi	1.95 psi	1.95 psi	1.95 psi	1.95 psi	75.00 psi	0.03	OK
+1.20D+L+1.60S+1.60H	5.95 psi	5.95 psi	5.95 psi	5.95 psi	5.95 psi	75.00 psi	0.08	OK
+1.20D+1.60S+0.50W+1.60H	5.95 psi	5.95 psi	5.95 psi	5.95 psi	5.95 psi	75.00 psi	0.08	OK
+1.20D+0.50Lr+L+W+1.60H	1.95 psi	1.95 psi	1.95 psi	1.95 psi	1.95 psi	75.00 psi	0.03	OK
+1.20D+L+0.50S+W+1.60H	3.20 psi	3.20 psi	3.20 psi	3.20 psi	3.20 psi	75.00 psi	0.04	OK
+0.90D+W+1.60H	1.46 psi	1.46 psi	1.46 psi	1.46 psi	1.46 psi	75.00 psi	0.02	OK
+1.20D+L+0.20S+E+1.60H	2.45 psi	2.45 psi	2.45 psi	2.45 psi	2.45 psi	75.00 psi	0.03	OK

General Footing

DESCRIPTIO FTNG#5

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	1.46 psi	1.46 psi	1.46 psi	1.46 psi	1.46 psi	75.00 psi	0.02	OK
							All units k	

Two-Way "Punching" Shear

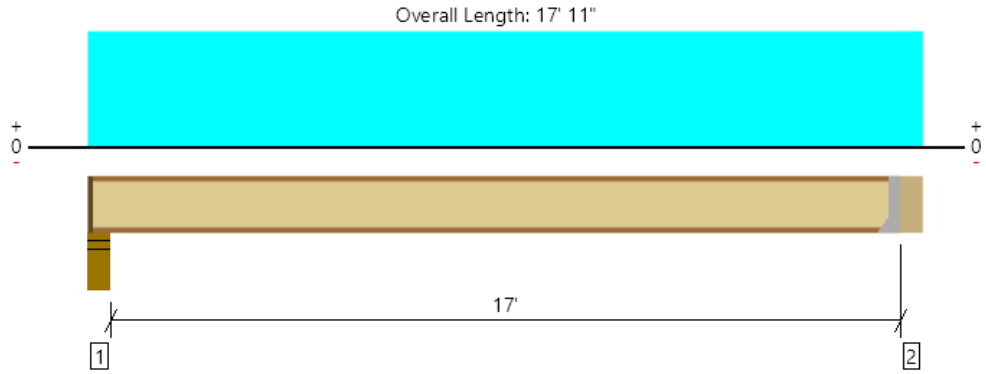
Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	8.45 psi	150.00 psi	0.05633	OK
+1.20D+0.50Lr+1.60L+1.60H	7.24 psi	150.00 psi	0.04829	OK
+1.20D+1.60L+0.50S+1.60H	11.89 psi	150.00 psi	0.07924	OK
+1.20D+1.60Lr+L+1.60H	7.24 psi	150.00 psi	0.04829	OK
+1.20D+1.60Lr+0.50W+1.60H	7.24 psi	150.00 psi	0.04829	OK
+1.20D+L+1.60S+1.60H	22.10 psi	150.00 psi	0.1473	OK
+1.20D+1.60S+0.50W+1.60H	22.10 psi	150.00 psi	0.1473	OK
+1.20D+0.50Lr+L+W+1.60H	7.24 psi	150.00 psi	0.04829	OK
+1.20D+L+0.50S+W+1.60H	11.89 psi	150.00 psi	0.07924	OK
+0.90D+W+1.60H	5.43 psi	150.00 psi	0.03621	OK
+1.20D+L+0.20S+E+1.60H	9.10 psi	150.00 psi	0.06067	OK
+0.90D+E+0.90H	5.43 psi	150.00 psi	0.03621	OK

FORTE WEB

MEMBER REPORT

PASSED

Level, Main floor joist
1 piece(s) 11 7/8" TJI® 230 @ 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)	626 @ 17' 5 1/2"	1060 (1.75")	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	626 @ 17' 5 1/2"	1655	Passed (38%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2675 @ 8' 11"	4215	Passed (63%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.299 @ 8' 11"	0.427	Passed (L/686)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.411 @ 8' 11"	0.854	Passed (L/499)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	41	40	Passed	--	--

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

- Deflection criteria: LL (L/480) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 5' 2" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 17' 4" o/c based on loads applied, unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of decking_1932EdgeGold that is nailedDown.
- Additional considerations for the TJ-Pro™ Rating include: 1/2" Gypsum ceiling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	5.50"	4.25"	1.75"	178	476	654	1 1/4" Rim Board
2 - Hanger on 11 7/8" SPF beam	5.50"	Hanger[1]	1.75" / - [2]	180	480	660	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.37/11.88	2.00"	N/A	10-10d	2-Strong-Grip	

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 17' 11"	16"	15.0	40.0	Default Load

Member Notes

Upper floor joist

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
Pasko Kesovija CK Engineering LLC (206) 660-5189 pasko@ckengineeringllc.net	

Weyerhaeuser

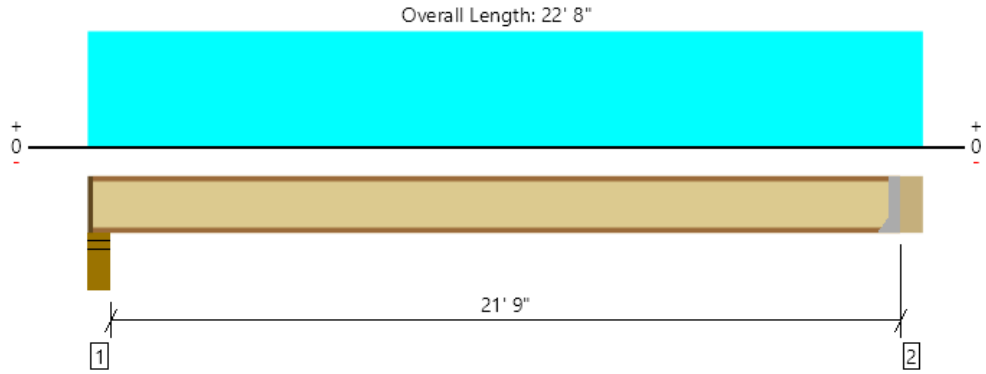
1/11/2020 9:42:35 PM UTC
ForteWEB v2.3, Engine: V8.0.0.21, Data: V7.3.1.1
File Name: floor joist

FORTE WEB

MEMBER REPORT

PASSED

Level, Roof joist, others
1 piece(s) 14" TJI® 360 @ 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)	801 @ 22' 2 1/2"	1080 (1.75")	Passed (74%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	801 @ 22' 2 1/2"	1955	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4370 @ 11' 3 1/2"	7335	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.455 @ 11' 3 1/2"	0.546	Passed (L/576)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.626 @ 11' 3 1/2"	1.092	Passed (L/419)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	37	37	Passed	--	--

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

- Deflection criteria: LL (L/480) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 10" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 22' 1" o/c based on loads applied, unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of decking_1932EdgeGold that is nailedDown.
- Additional considerations for the TJ-Pro™ Rating include: 1/2" Gypsum ceiling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	5.50"	4.25"	1.75"	226	602	828	1 1/4" Rim Board
2 - Hanger on 14" SPF beam	5.50"	Hanger[1]	1.75" / - [2]	228	607	835	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.37/14	2.00"	N/A	12-10d	2-Strong-Grip	

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 22' 8"	16"	15.0	40.0	Default Load

Member Notes

Upper floor joist

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
Pasko Kesovija CK Engineering LLC (206) 660-5189 pasko@ckengineeringllc.net	

Weyerhaeuser

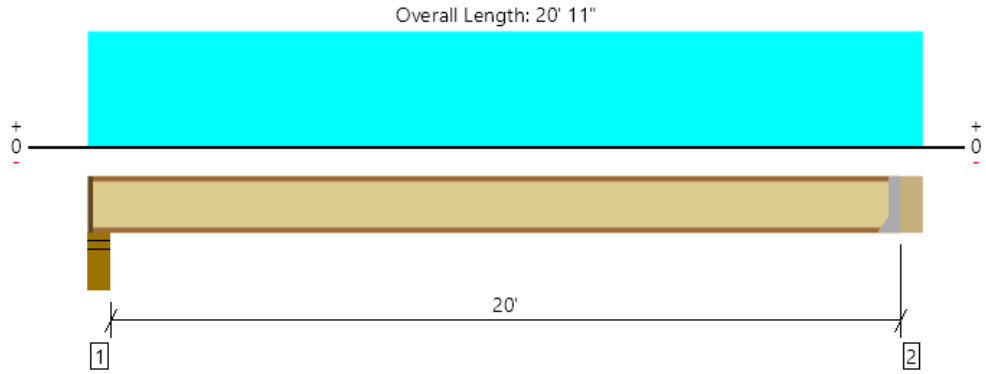
1/11/2020 9:38:16 PM UTC
ForteWEB v2.3, Engine: V8.0.0.21, Data: V7.3.1.1
File Name: floor joist

FORTE WEB

MEMBER REPORT

PASSED

Level, Upper floor joist 2
1 piece(s) 14" TJI® 230 @ 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)	736 @ 20' 5 1/2"	1060 (1.75")	Passed (69%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	736 @ 20' 5 1/2"	1945	Passed (38%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3697 @ 10' 5"	4990	Passed (74%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.387 @ 10' 5"	0.502	Passed (L/624)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.531 @ 10' 5"	1.004	Passed (L/453)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	41	40	Passed	--	--

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

- Deflection criteria: LL (L/480) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 9" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 20' 4" o/c based on loads applied, unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of decking_1932EdgeGold that is nailedDown.
- Additional considerations for the TJ-Pro™ Rating include: 1/2" Gypsum ceiling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	5.50"	4.25"	1.75"	208	556	764	1 1/4" Rim Board
2 - Hanger on 14" SPF beam	5.50"	Hanger[1]	1.75" / - [2]	210	560	770	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.37/14	2.00"	N/A	12-10d	2-Strong-Grip	

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 20' 11"	16"	15.0	40.0	Default Load

Member Notes

Upper floor joist

Weyerhaeuser Notes

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ForteWEB Software Operator	Job Notes
Pasko Kesovija CK Engineering LLC (206) 660-5189 pasko@ckengineeringllc.net	

Weyerhaeuser

1/11/2020 9:43:56 PM UTC
ForteWEB v2.3, Engine: V8.0.0.21, Data: V7.3.1.1
File Name: floor joist

This Wall in File: D:\Dropbox\CK PROJECTS\Design\Retaining Walls\1500 psf\1500 psf wall.RPX

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License : KW-06059957
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Cantilevered Retaining Wall

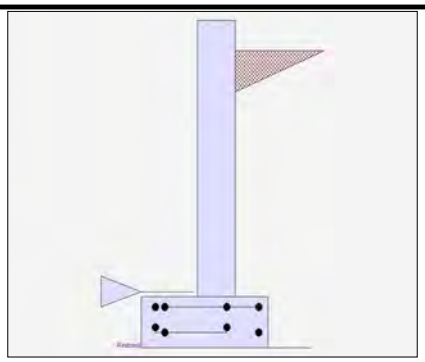
Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	500.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform

Multiplier Used	=	6.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	29.000
Total Seismic Force	=	140.167

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 63.0 lbs

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Design Summary

Wall Stability Ratios

Overturning	=	1.91	OK

Slab Resists All Sliding !

Total Bearing Load	=	1,488	lbs
...resultant ecc.	=	5.47	in
Soil Pressure @ Toe	=	1,482 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	2,075 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	8.1 psi	OK
Footing Shear @ Heel	=	4.1 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	569.9	lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	12.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	**0.281**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	654.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	1,031.8
Moment.....Allowable	=	3,655.6
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	8.7
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Rebar Depth 'd'	in =	6.25
Masonry Data		
f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Wall Weight	psf =	100.0
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	40,000.0

This Wall in File: D:\Dropbox\CK PROJECTS\Design\Retaining Walls\1500 psf\1500 psf wall.RPX

Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.058 in2/ft	
(4/3) * As :	0.0773 in2/ft	Min Stem T&S Reinf Area 0.864 in2
200bd/fy : 200(12)(6.25)/40000 :	0.375 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.2 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	1.27 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	1.00 ft
Heel Width	=	1.25
Total Footing Width	=	2.25
Footing Thickness	=	10.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.00 ft

f'c = 2,500 psi Fy = 40,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,075	0	psf
Mu' : Upward	=	10,384	0	ft-#
Mu' : Downward	=	900	1,384	ft-#
Mu: Design	=	388	115	ft-#
Actual 1-Way Shear	=	8.06	4.12	psi
Allow 1-Way Shear	=	40.00	40.00	psi

Toe Reinforcing = # 4 @ 16.00 in
Heel Reinforcing = # 4 @ 16.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Min footing T&S reinf Area 0.49 in2
Min footing T&S reinf Area per foot 0.22 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 11.11 in	#4@ 22.22 in
#5@ 17.22 in	#5@ 34.44 in
#6@ 24.44 in	#6@ 48.89 in

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		408.8	1.61	658.7	Soil Over HL (ab. water tbl)	256.7	1.96	502.6
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		1.96	502.6
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	= 500.0	1.33	666.7
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	98.1	2.42	237.1	Surcharge Over Toe	=		
Seismic Stem Self Wt	=	63.0	3.08	194.3	Stem Weight(s)	= 450.0	1.33	600.0
					Earth @ Stem Transitions	=		
Total	=	569.9	**O.T.M.** =	1,090.0	Footing Weight	= 281.3	1.13	316.4
					Key Weight	=	2.50	
					Vert. Component	=		
					Total =	1,487.9 lbs	**R.M.=**	2,085.7

Resisting/Overturning Ratio = **1.91**
Vertical Loads used for Soil Pressure = 1,487.9 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios be 1.1 per section 1807.2.3 of IBC 2009 or IBC 201

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.000	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

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Cantilevered Retaining Wall

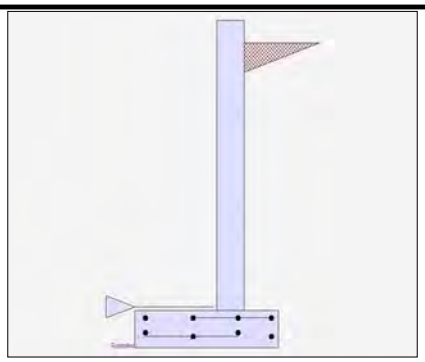
Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	500.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform

Multiplier Used	=	6.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	41.000
Total Seismic Force	=	280.167

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 91.0 lbs

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Design Summary

Wall Stability Ratios

Overturning	=	1.77	OK

Slab Resists All Sliding !

Total Bearing Load	=	2,138	lbs
...resultant ecc.	=	8.41	in
Soil Pressure @ Toe	=	1,359 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,902 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	24.5 psi	OK
Footing Shear @ Heel	=	7.5 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	1,104.3	lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	10.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	**0.727**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	1,384.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	3,176.5
Moment.....Allowable	=	4,364.1
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	18.5
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Rebar Depth 'd'	in =	6.25
Masonry Data		
f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Wall Weight	psf =	100.0
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	40,000.0

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.1785 in2/ft	
(4/3) * As :	0.238 in2/ft	Min Stem T&S Reinf Area 1.248 in2
200bd/fy : 200(12)(6.25)/40000 :	0.375 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.238 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.24 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	1.27 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	2.00 ft
Heel Width	=	1.50
Total Footing Width	=	3.50
Footing Thickness	=	10.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.00 ft

f'c = 2,500 psi Fy = 40,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,902	0	psf
Mu' : Upward	=	35,979	134	ft-#
Mu' : Downward	=	3,600	3,925	ft-#
Mu: Design	=	1,410	30	ft-#
Actual 1-Way Shear	=	24.52	7.45	psi
Allow 1-Way Shear	=	75.00	40.00	psi

Toe Reinforcing = # 4 @ 11.11 in
Heel Reinforcing = # 4 @ 18.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Min footing T&S reinf Area 0.76 in2
Min footing T&S reinf Area per foot 0.22 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 11.11 in	#4@ 22.22 in
#5@ 17.22 in	#5@ 34.44 in
#6@ 24.44 in	#6@ 48.89 in

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		817.2	2.28	1,861.3	Soil Over HL (ab. water tbl)	550.0	3.08	1,695.8
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.08	1,695.8
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	= 500.0	2.33	1,166.7
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	196.1	3.42	670.1	Surcharge Over Toe	=		
Seismic Stem Self Wt	=	91.0	4.08	371.6	Stem Weight(s)	= 650.0	2.33	1,516.7
					Earth @ Stem Transitions	=		
					Footing Weight	= 437.5	1.75	765.6
					Key Weight	=	2.50	
					Vert. Component	=		
Total	=	1,104.3	**O.T.M.** =	2,902.9	**Total =**	2,137.5 lbs	**R.M.=**	5,144.8

Resisting/Overturning Ratio = **1.77**
Vertical Loads used for Soil Pressure = 2,137.5 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios
be 1.1 per section 1807.2.3 of IBC 2009 or IBC 201

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.000	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

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Cantilevered Retaining Wall

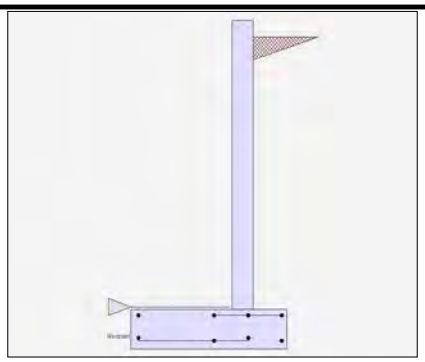
Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	500.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform

Multiplier Used	=	6.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	55.000
Total Seismic Force	=	504.167

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 119.0 lbs

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Design Summary

Wall Stability Ratios
Overturning = 1.67 OK
Slab Resists All Sliding !

Total Bearing Load = 3,178 lbs
...resultant ecc. = 12.93 in

Soil Pressure @ Toe = 1,490 psf OK
Soil Pressure @ Heel = 0 psf OK
Allowable = 1,500 psf
Soil Pressure Less Than Allowable
ACI Factored @ Toe = 2,086 psf
ACI Factored @ Heel = 0 psf

Footing Shear @ Toe = 24.4 psi OK
Footing Shear @ Heel = 9.3 psi OK
Allowable = 75.0 psi

Sliding Calcs
Lateral Sliding Force = 1,942.4 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 5
Rebar Spacing	=	12.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	**0.893**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	2,402.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	7,261.2
Moment.....Allowable	=	8,121.3
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	32.4
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Rebar Depth 'd'	in =	6.19
Masonry Data		
f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Wall Weight	psf =	100.0
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	60,000.0

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.2749 in2/ft	
(4/3) * As :	0.3666 in2/ft	Min Stem T&S Reinf Area 1.632 in2
200bd/fy : 200(12)(6.1875)/60000 :	0.2475 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.2749 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.31 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.8382 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	3.25 ft
Heel Width	=	1.75
Total Footing Width	=	5.00
Footing Thickness	=	14.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,086	0	psf
Mu' : Upward	=	98,628	42	ft-#
Mu' : Downward	=	13,309	8,915	ft-#
Mu: Design	=	3,591	221	ft-#
Actual 1-Way Shear	=	24.42	9.32	psi
Allow 1-Way Shear	=	75.00	40.00	psi

Toe Reinforcing = # 5 @ 12.30 in
Heel Reinforcing = # 5 @ 18.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Min footing T&S reinf Area 1.51 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		1,470.5	3.06	4,493.2	Soil Over HL (ab. water tbl)	953.3	4.46	4,250.3
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		4.46	4,250.3
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	= 500.0	3.58	1,791.7
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	352.9	4.58	1,617.5	Surcharge Over Toe	=		
Seismic Stem Self Wt	=	119.0	5.42	644.6	Stem Weight(s)	= 850.0	3.58	3,045.8
					Earth @ Stem Transitions	=		
Total	=	1,942.4	**O.T.M.** =	6,755.3	Footing Weight	= 875.0	2.50	2,187.5
					Key Weight	=	2.50	
					Vert. Component	=		
					Total =	3,178.3 lbs	**R.M.=**	11,275.3

Resisting/Overturning Ratio = **1.67**
Vertical Loads used for Soil Pressure = 3,178.3 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios
be 1.1 per section 1807.2.3 of IBC 2009 or IBC 201

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.000	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

This Wall in File: d:\dropbox\ck projects\new folder\retaining walls\4ft wall.rpx

RetainPro (c) 1987-2017, Build 11.17.11.03
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Cantilevered Retaining Wall

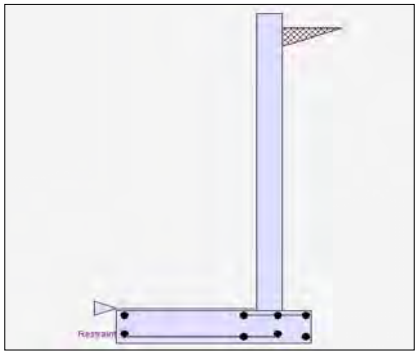
Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	100.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	500.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Method : Inverted Triangular

Load at top of Inverted Triangular Distribution . . . . . = 40.000 psf (Strength)

Total Strength-Level Seismic Load. . . . . = 223.333 lbs

Total Service-Level Seismic Load. . . . . = 156.333 lbs

Design Summary

Wall Stability Ratios

Overturning = 1.73 OK

Slab Resists All Sliding !

Total Bearing Load	=	4,006 lbs	
...resultant ecc.	=	13.84 in	
Soil Pressure @ Toe	=	1,355 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,897 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	31.8 psi	OK
Footing Shear @ Heel	=	10.4 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force = 2,609.9 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	LRFD
Thickness	=	10.00
Rebar Size	=	# 5
Rebar Spacing	=	8.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	**0.831**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	3,530.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	13,281.8
Moment.....Allowable	=	15,984.2
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	35.9
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Rebar Depth 'd'	in =	8.19
Masonry Data		
f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Wall Weight	psf =	125.0
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	60,000.0

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.3751 in2/ft		
(4/3) * As :	0.5001 in2/ft	Min Stem T&S Reinf Area 2.520 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.3751 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.465 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.1092 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Dimensions & Strengths

Toe Width	=	4.50 ft
Heel Width	=	1.75
Total Footing Width	=	6.25
Footing Thickness	=	14.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,897	0	psf
Mu' : Upward	=	14,333	11	ft-#
Mu' : Downward	=	2,126	710	ft-#
Mu: Design	=	12,206	700	ft-#
Actual 1-Way Shear	=	31.80	10.38	psi
Allow 1-Way Shear	=	75.00	40.00	psi

Toe Reinforcing = # 5 @ 10.47 in
Heel Reinforcing = # 5 @ 18.00 in
Key Reinforcing = None Spec'd

Other Acceptable Sizes & Spacings

Toe: #4@ 6.76 in, #5@ 10.47 in, #6@ 14.86 in, #7@ 20.27 in, #8@ 26.69 in, #9@ 33
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: Slab Resists Sliding - No Force on Key

Min footing T&S reinf Area 1.89 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Item									
Heel Active Pressure	=	2,182.2	3.72	8,122.5	Soil Over Heel	=	1,008.3	5.79	5,839.9
Surcharge over Heel	=	271.4	5.58	1,515.4	Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=	91.7	5.79	530.9
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=	500.0	4.92	2,458.3
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=			
Seismic Earth Load	=	156.3	7.44	1,163.8	Soil Over Toe	=			
	=				Surcharge Over Toe	=			
Total		2,609.9	**O.T.M.**	10,801.7	Stem Weight(s)	=	1,312.5	4.92	6,453.1
	=		=		Earth @ Stem Transitions	=			
					Footing Weight	=	1,093.8	3.13	3,418.0
					Key Weight	=		2.50	
					Vert. Component	=			
					Total =		4,006.3 lbs	**R.M.=**	18,700.3

Resisting/Overturning Ratio = 1.73
Vertical Loads used for Soil Pressure = 4,006.3 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

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Tilt

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(Deflection due to wall bending not considered)

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Horizontal Defl @ Top of Wall (approximate only)	0.063	in

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