FORSMAN ENGINEERING
30014 2nd Court South
Federal Way, WA 98003
(253) 815-9182

STRUCTURAL CALCULATIONS
for
Farzad Ghazvinian & Farnaz Ghods House
At
2929 72nd Ave SE
Mercer Island, WA 98040

Project #20017

Codes:

2015 International Building Code

Loads:

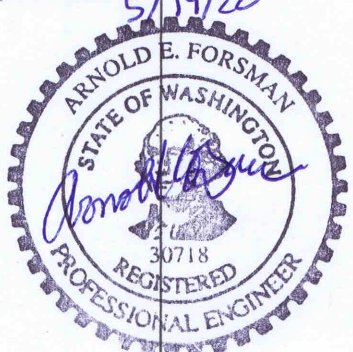
Roof	15 psf dead load	25 psf live load, snow
Walls	10 psf dead load	
Floor	14 psf dead load	40 psf live load
Deck	10 psf dead load	60 psf live load

Wind ASCE 7-10 Simple diaphragm, 110 mph wind speed, Exp "B", Risk category II, Kzt=1.9

Seismic ASCE 7-10 Importance factor 1.00, Site Category D, Sds=0.924, S1=0.534

Foundation: All values assumed
footings 1500 psf allowable bearing pressure
0.35 friction
Walls 35 psf/ft active pressure
350 psf/ft passive pressure

5/19/20



Sheets 1-46

The items designed herein represent the entire scope of structural investigation performed. No other portions of the structure have been reviewed. These calculations apply to the location specified above. The site was not investigated and no judgment on the suitability of the site was made.

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SCOPE OF WORK

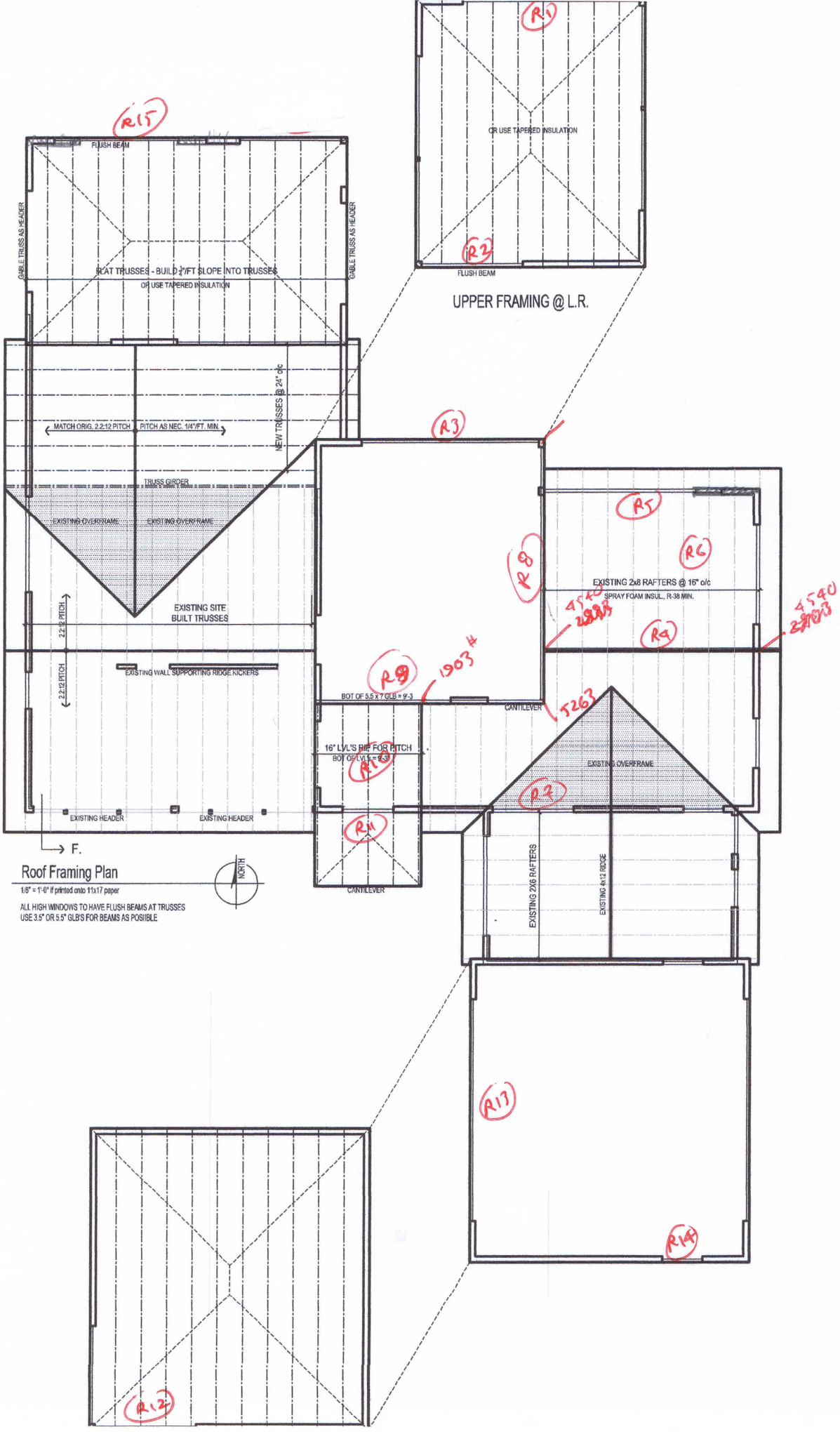
Forsman Engineering was asked to provide a lateral load analysis, shear wall design review of major framing members, and drawings review for a wood framed single family residence. The roof framing is primarily manufactured trusses, the floor framing is stick framed joists or T&G decking over beams, and the foundation is typical concrete strip footings with a crawl space.

The attached calculations are to be used as a submittal for one potential building site. The cover sheet should have an original signature in blue ink over the seal.

Forsman Engineering will use that degree of care and skill ordinarily exercised under similar circumstances by members of the engineering profession in this local. No other warranty, either expressed or implied is made in connection with our rending of professional services. For any dispute, claim, or action arising out of this design, Forsman Engineering shall have liability limited to the amount of the fee received by Forsman Engineering.

Questions regarding the attached should be addressed to Forsman Engineering.

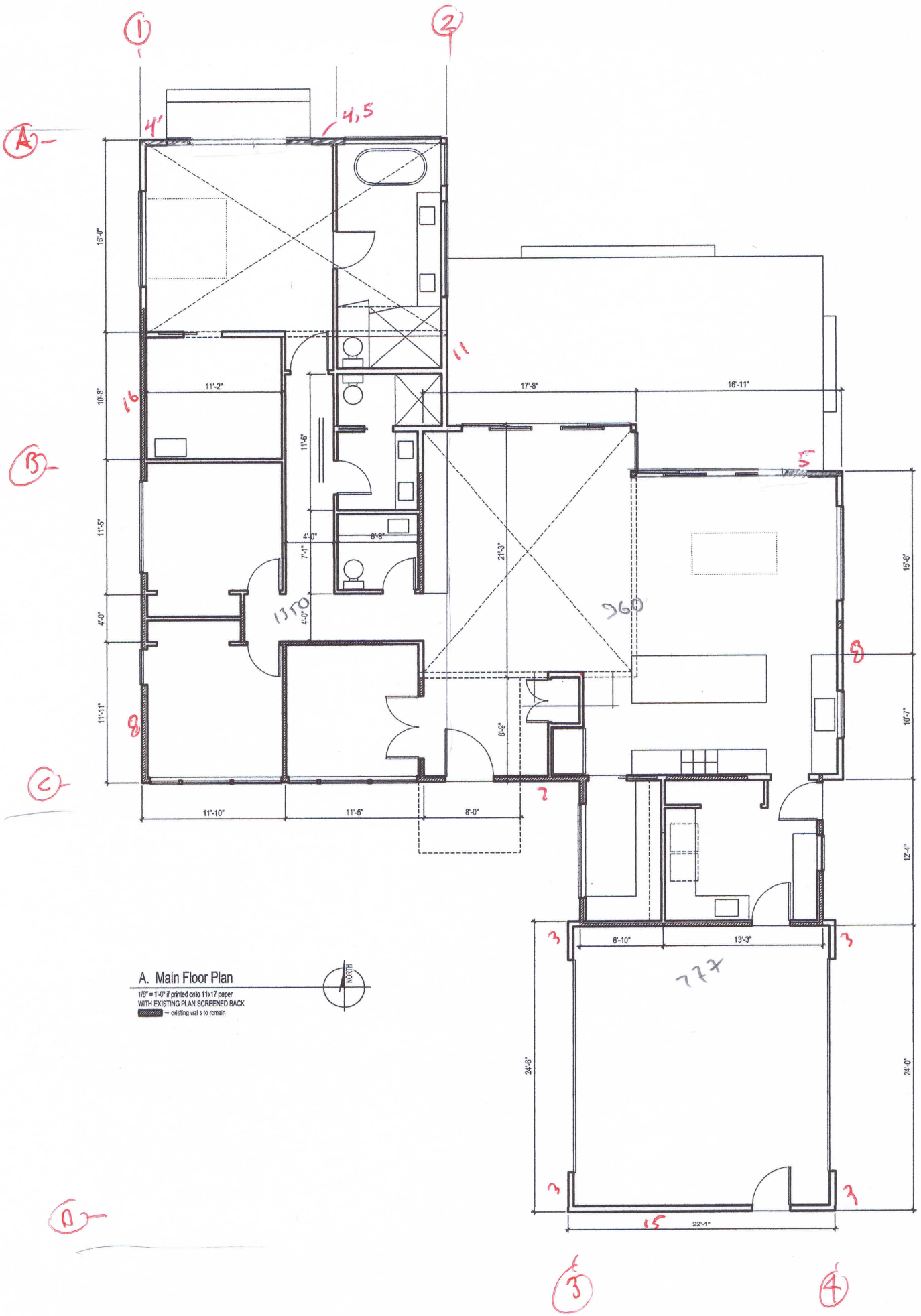
Arnold E. Forsman, P.E.
Forsman Engineering

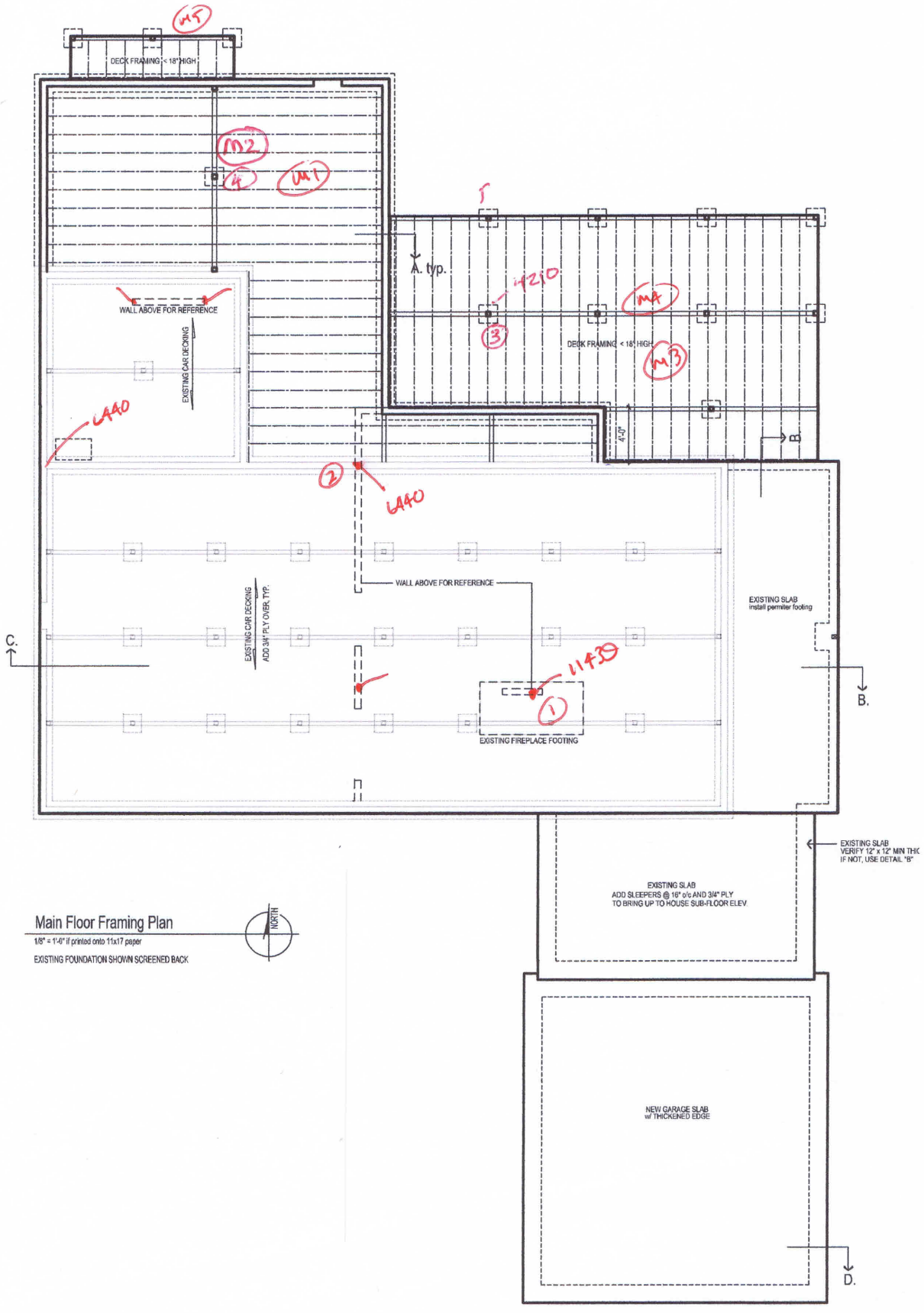


Roof Framing Plan

1/8" = 1'-0" if printed onto 11x17 paper

ALL HIGH WINDOWS TO HAVE FLUSH BEAMS AT TRUSSES
USE 3.5" OR 5.5" GLB'S FOR BEAMS AS POSIBLE


1
2
A
B
C
D
3
4
4'
4,5
16'-8"
10'-5"
11'-5"
4'-0"
11'-11"
11'-2"
11'-6"
4'-0"
7'-1"
6'-8"
4'-0"
17'-8"
16'-11"
21'-3"
8'-5"
15'-6"
10'-7"
12'-4"
11'-10"
11'-5"
8'-0"
6'-10"
13'-3"
24'-6"
24'-0"
22'-1"
1370
960
777
A. Main Floor Plan
1/8" = 1'-0" if printed onto 11x17 paper
WITH EXISTING PLAN SCREENED BACK
= existing wal s to romain
NORTH



Main Floor Framing Plan

1/8" = 1'-0" if printed onto 11x17 paper

EXISTING FOUNDATION SHOWN SCREENED BACK

NORTH

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JOB 20017
SHEET NO. 6 OF
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SCALE

Roof Framing

R1 L = 14.5'

$w_{DL} = 15 \cdot 22/2 = 165$ plf
$w_{LL} = 25 \cdot 22/2 = 275$ plf
⇒ 3 1/8 x 12 GLB

R2 L = 8.5'

$w_{DL} = 165$ plf
$w_{LL} = 275$ plf
⇒ 4 x 10 DF #2

RJ L = 14'

$w_{DL} = 80$ plf + 100 plf = 180 plf
⇒ 3 1/8 x 9 GLB

R4 L = 17'

$w_{DL} = 15 \cdot 26/2 = 195$ plf
$w_{LL} = 25 \cdot 26/2 = 325$ plf
⇒ 5 1/8 x 12 GLB

R5 L = 14'

$w_{DL} = \frac{15}{2 \cdot 13}(13+2)^2 = 130$ plf
$w_{LL} = \frac{25}{2 \cdot 13}(13+2)^2 = 216$ plf
⇒ 3 1/8 x 10 1/2 GLB

R6 L = 13' + 2' cant

$w_{DL} = 15$ psf
$w_{LL} = 25$ psf
⇒ 2 x 10 HF #2

R7 L = 6.5'

$w_{DL} = 130$ plf
$w_{LL} = 216$ plf
⇒ 4 x 6 DF #2

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JOB 20017
SHEET NO. 7 OF
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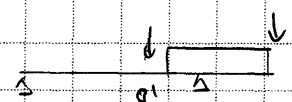
R8 L= 17'

$w_{DL} = 15.4 + 40 = 100$ plf
$w_{LL} = 25.4 = 100$ plf
P = 4540# @ 4'
⇒ 3 1/8 x 15 GLB

R9 L= 13' + 4' cant



$w_{DL} = 15\ 22/2 + 40 = 205$ plf
$w_{LL} = 25.22/2 = 275$ plf
$P_1 = 1903$# @ 8'
$P_2 = 5263$# @ 17'
⇒ 5 1/8 x 13 1/2 GLB

R10 L= 8' + 6' cant

$w_{DL} = 15$ psf
$w_{LL} = 25$ psf
⇒ 1 3/4 LVL @ 24" o.c.
7 1/4" min. depth

R11 L= 4'

$w_{DL} = \frac{15}{2(8)}(8+6)^2 = 184$ plf
$w_{LL} = \frac{25}{2(8)}(8+6)^2 = 306$ plf
⇒ 4x6 DF #2

R12 L= 8'

$w_{DL} = 15.24/2 = 180$ plf
$w_{LL} = 25.24/2 = 300$ plf
⇒ 4x10 DF #2

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JOB 20017
SHEET NO. 9 OF
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SCALE

√ R13 L=18' w_{DL} = 15.4 = 60 plf
w_{LL} = 25.4 = 100 plf
⇒ 3½×12 GLB

√ R14 L= 3' w_{DL} = 180 plf
w_{LL} = 300 plf
⇒ 4×6 DF #2

√ R15 L=8' w_{DL} = 15.16/2 = 120 plf
w_{LL} = 25.16/2 = 200 plf
⇒ 3½×9 GLB

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COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 04:51:56	2928 72nd BeamR1

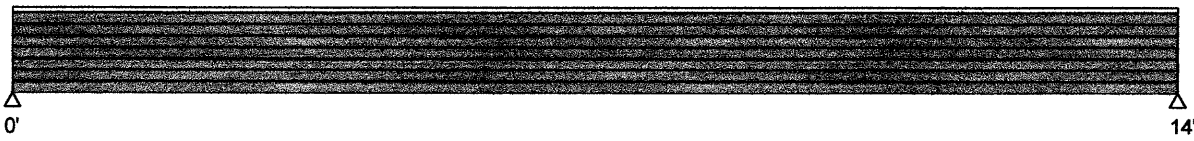
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	165.0				No
wll	Snow	Full UDL	275.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	1259		1259
Live	1994		1994
Total	3253		3253
Bearing:			
LC number	2		2
Length	1.6		1.6

Glulam-Unbal., West Species, 24F-1.8E WS, 3-1/8x12"

Self Weight of 8.63 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 112	Fv' = 276	fv/Fv' = 0.41
Bending(+)	fb = 1887	Fb' = 2760	fb/Fb' = 0.68
Live Defl'n	0.34 = L/515	0.48 = L/360	0.70
Total Defl'n	0.55 = L/315	0.73 = L/240	0.76

ADDITIONAL DATA:

FACTORS: F		CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn	LC#
Fb'+	2400	1.15	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	-	2
Fv'	240	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2

Bending(+): LC# 2 = D+S, M = 11791 lbs-ft
Shear : LC# 2 = D+S, V = 3253, V design = 2804 lbs
Deflection: LC# 2 = D+S EI= 809.99e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Glulam design values are for materials conforming to AITC 117-2001 and manufactured in accordance with ANSI/AITC A190.1-1992
3. GLULAM: bxd = actual breadth x actual depth.
4. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
5. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

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COMPANY	PROJECT	
Forsman Engineering 20017 May 6, 2020 04:52:55	2928 72nd BeamR2	16/

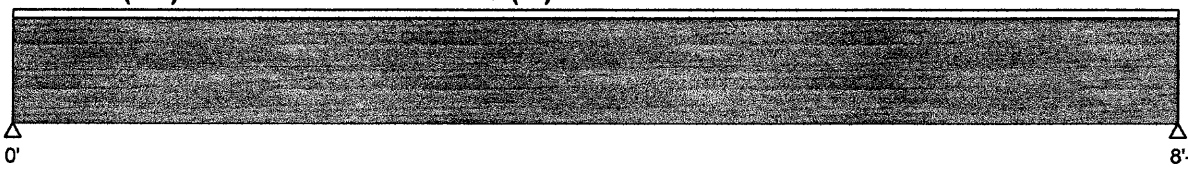
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	165.0				No
wll	Snow	Full UDL	275.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	734		734
Live	1169		1169
Total	1903		1903
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x10"

Self Weight of 7.69 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 72	Fv' = 207	fv/Fv' = 0.35
Bending(+)	fb = 972	Fb' = 1242	fb/Fb' = 0.78
Live Defl'n	0.09 = <L/999	0.28 = L/360	0.31
Total Defl'n	0.14 = L/716	0.43 = L/240	0.33

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.15	1.00	1.00	1.000	1.200	1.00	1.00	1.00	1.00	-	2
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+S, M = 4043 lbs-ft
Shear : LC# 2 = D+S, V = 1903, V design = 1558 lbs
Deflection: LC# 2 = D+S EI= 369.34e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

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COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 04:54:17	2928 72nd BeamR3

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Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	180.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :

	0'	14'-6"
Dead	1352	1352
Live		
Total	1352	1352
Bearing:		
LC number	1	1
Length	1.0	1.0

Glulam-Unbal., West Species, 24F-1.8E WS, 3-1/8x9"

Self Weight of 6.48 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 65	Fv' = 216	fv/Fv' = 0.30
Bending(+)	fb = 1394	Fb' = 2160	fb/Fb' = 0.65
Live Defl'n	negligible		
Total Defl'n	0.54 = L/320	0.73 = L/240	0.75

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn	LC#
Fb'+	2400	0.90	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	-	1
Fv'	240	0.90	1.00	1.00	-	-	-	-	1.00	1.00	1.00	1
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	1

Bending(+): LC# 1 = D only, M = 4901 lbs-ft
Shear : LC# 1 = D only, V = 1352, V design = 1212 lbs
Deflection: LC# 1 = D only EI= 341.71e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Glulam design values are for materials conforming to AITC 117-2001 and manufactured in accordance with ANSI/AITC A190.1-1992
3. GLULAM: bxd = actual breadth x actual depth.
4. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
5. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

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Forsman Engineering 20017 May 6, 2020 05:04:23	2928 72nd BeamR4

Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	195.0				No
wll	Snow	Full UDL	325.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :

Dead	1778		1778
Live	2762		2762
Total	4540		4540
Bearing:			
LC number	2		2
Length	1.4		1.4

Glulam-Unbal., West Species, 24F-1.8E WS, 5-1/8x12"

Self Weight of 14.16 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 98	Fv' = 276	fv/Fv' = 0.35
Bending(+)	fb = 1883	Fb' = 2760	fb/Fb' = 0.68
Live Defl'n	0.46 = L/443	0.57 = L/360	0.81
Total Defl'n	0.76 = L/269	0.85 = L/240	0.89

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn	LC#
Fb'+	2400	1.15	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	-	2
Fv'	240	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2

Bending(+): LC# 2 = D+S, M = 19297 lbs-ft
Shear : LC# 2 = D+S, V = 4540, V design = 4006 lbs
Deflection: LC# 2 = D+S EI=1328.38e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Glulam design values are for materials conforming to AITC 117-2001 and manufactured in accordance with ANSI/AITC A190.1-1992
3. GLULAM: bxd = actual breadth x actual depth.
4. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
5. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

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COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:05:26	2928 72nd BeamR5

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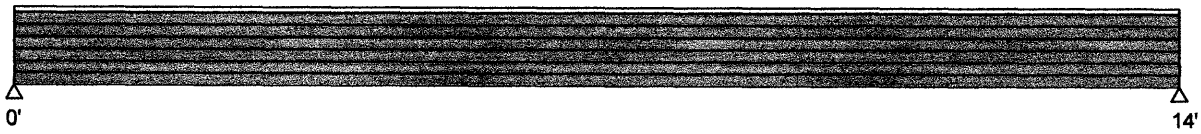
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	130.0				No
wll	Snow	Full UDL	216.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	963		963
Live	1512		1512
Total	2475		2475
Bearing:			
LC number	2		2
Length	1.2		1.2

Glulam-Unbal., West Species, 24F-1.8E WS, 3-1/8x10-1/2"

Self Weight of 7.55 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 99	Fv' = 276	fv/Fv' = 0.36
Bending(+)	fb = 1810	Fb' = 2760	fb/Fb' = 0.66
Live Defl'n	0.34 = L/488	0.47 = L/360	0.74
Total Defl'n	0.56 = L/298	0.70 = L/240	0.80

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn	LC#
Fb'+	2400	1.15	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	-	2
Fv'	240	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2

Bending(+): LC# 2 = D+S, M = 8662 lbs-ft
Shear : LC# 2 = D+S, V = 2475, V design = 2166 lbs
Deflection: LC# 2 = D+S EI= 542.63e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Glulam design values are for materials conforming to AITC 117-2001 and manufactured in accordance with ANSI/AITC A190.1-1992
3. GLULAM: bxd = actual breadth x actual depth.
4. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
5. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

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COMPANY	PROJECT	
Forsman Engineering 20017 May 6, 2020 05:06:46	2928 72nd BeamR6	14

Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full Area	15.00 (24.0)*				No
wll	Snow	Full Area	25.00 (24.0)*				Yes

*Tributary Width (in)

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :

Dead	209		285		
Live	321		433		
Total	530		718		
Bearing:					
LC number	3		2		1
Length	1.0		1.0		0.0
Cb	1.00		1.47		0.00

Lumber-soft, Hem-Fir, No.2, 2x10"

Spaced at 24" c/c; Self Weight of 2.87 plf automatically included in loads;
Lateral support: top= full, bottom= at supports; Repetitive factor: applied where permitted (refer to online help); Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 53	Fv' = 172	fv/Fv' = 0.31
Bending(+)	fb = 950	Fb' = 1237	fb/Fb' = 0.77
Bending(-)	fb = 93	Fb' = 1199	fb/Fb' = 0.08
Deflection:			
Interior Live	0.24 = L/642	0.65 = L/240	0.37
Total	0.40 = L/392	0.87 = L/180	0.46
Cantil. Live	0.12 = L/205	0.20 = L/120	0.58
Total	0.19 = L/127	0.27 = L/90	0.71

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	850	1.15	1.00	1.00	1.000	1.100	1.00	1.15	1.00	1.00	-	3
Fb'-	850	1.15	1.00	1.00	0.969	1.100	1.00	1.15	1.00	1.00	-	2
Fv'	150	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	405	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.3 million		1.00	1.00	-	-	-	-	1.00	1.00	-	3

Bending(+): LC# 3 = D+S (pattern: Ss), M = 1694 lbs-ft
Bending(-): LC# 2 = D+S, M = 166 lbs-ft
Shear : LC# 2 = D+S, V = 552, V design = 488 lbs
Deflection: LC# 3 = D+S (pattern: Ss) EI= 128.61e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)
(Load Pattern: s=S/2, X=L+S or L+C, _=no pattern load in this span)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. The critical deflection value has been determined using maximum back-span deflection. Cantilever deflections do not govern design.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:08:15	2928 72nd BeamR7

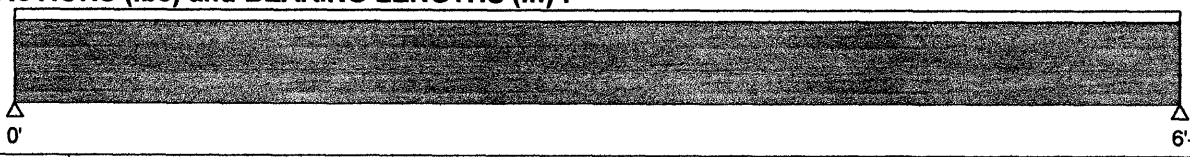
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	130.0				No
wll	Snow	Full UDL	216.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	437		437
Live	702		702
Total	1139		1139
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x6"

Self Weight of 4.57 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 76	Fv' = 207	fv/Fv' = 0.37
Bending(+)	fb = 1259	Fb' = 1345	fb/Fb' = 0.94
Live Defl'n	0.11 = L/698	0.22 = L/360	0.52
Total Defl'n	0.18 = L/430	0.32 = L/240	0.56

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.15	1.00	1.00	1.000	1.300	1.00	1.00	1.00	1.00	-	2
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+S, M = 1851 lbs-ft
Shear : LC# 2 = D+S, V = 1139, V design = 979 lbs
Deflection: LC# 2 = D+S EI= 77.64e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:12:05	2928 72nd BeamR8

Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wd1	Dead	Full UDL	100.0				No
wl1	Snow	Full UDL	100.0				No
p	Dead	Point	4540		4.00		No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :

Dead	4413		2010
Live	850		850
Total	5263		2860
Bearing:			
LC number	2		2
Length	2.6		1.4

Glulam-Unbal., West Species, 24F-1.8E WS, 3-1/8x15"

Self Weight of 10.79 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 137	Fv' = 216	fv/Fv' = 0.63
Bending(+)	fb = 1717	Fb' = 2160	fb/Fb' = 0.79
Live Defl'n	0.12 = <L/999	0.57 = L/360	0.21
Total Defl'n	0.58 = L/350	0.85 = L/240	0.68

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn	LC#
Fb'+	2400	0.90	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	-	1
Fv'	240	0.90	1.00	1.00	-	-	-	-	1.00	1.00	1.00	1
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2

Bending(+): LC# 1 = D only, M = 16766 lbs-ft
Shear : LC# 1 = D only, V = 4413, V design = 4275 lbs
Deflection: LC# 2 = D+S EI=1582.01e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Glulam design values are for materials conforming to AITC 117-2001 and manufactured in accordance with ANSI/AITC A190.1-1992
3. GLULAM: bxd = actual breadth x actual depth.
4. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
5. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN	COMPANY Forsman Engineering May 18, 2020 18:29	PROJECT 2928 72nd BeamR9	17

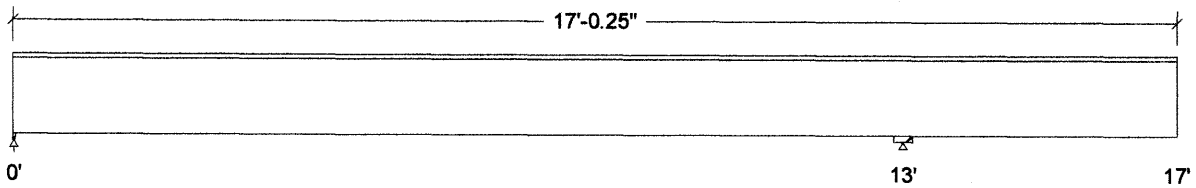
Design Check Calculation Sheet

WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
wdl	Dead	Partial UDL	No	8.02	17.02	205.0	205.0	plf
wll	Snow	Partial UDL	Yes	8.02	17.02	275.0	275.0	plf
p1	Dead	Point	No	8.02		1903		lbs
p2	Dead	Point	No	17.02		5263		lbs
Self-weight	Dead	Full UDL	No			15.9		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:					
Dead	94		10005		
Snow	180		2380		
Factored:					
Uplift	-760				
Total	94		12384		
Bearing:					
Capacity					
Beam	1666		12384		
Des ratio					
Beam	0.06		1.00		
Load comb	#1		#2		
Length	0.50*		3.34		
Min req'd	0.50*		3.34		
Cb	1.00		1.11		
Cb min	1.00		1.11		

*Minimum bearing length setting used: 1/2" for end supports

Maximum reaction on at least one support is from a different load combination than the critical one for bearing design, shown here, due to Kd factor. See Analysis results for reaction from critical load combination.

Glulam-Bal., West Species, 24F-1.8E WS, 5-1/8"x13-1/2"

9 laminations, 5-1/8" maximum width,

Supports: All - Non-wood

Total length: 17'-0.25"; Clear span: 12'-10.08", 3'-10.33"; volume = 8.2 cu.ft.

Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 128	Fv' = 238	psi	fv/Fv' = 0.54
Bending(-)	fb = 1759	Fb' = 2118	psi	fb/Fb' = 0.83
Deflection:				
Interior Live	-0.01 = <L/999	0.43 = L/360	in	0.02
Total	-0.13 = <L/999	0.65 = L/240	in	0.20
Cantil. Live	0.03 = <L/999	0.27 = L/180	in	0.09
Total	0.39 = L/123	0.40 = L/120	in	0.97

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn*Cvr	LC#
Fv'	265	0.90	1.00	1.00	-	-	-	-	1.00	1.00	1.00	1
Fb'-	2400	0.90	1.00	1.00	0.981	1.000	1.00	1.00	1.00	1.00	-	1
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	4
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	4

CRITICAL LOAD COMBINATIONS:

```
Shear      : LC #1  = D only, V max =   6147, V design =   5908 lbs
Bending(-): LC #1  = D only, M =  22819 lbs-ft
Deflection: LC #3  =   (live)
            LC #4  =   (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load Patterns: s=S/2,  X=L+S or L+Lr,  _=no pattern load in this span
Load combinations: ICC-IBC
```

CALCULATIONS:

```
Deflection:  EI =   1891e06 lb-in2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow…)
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
Lateral stability(-):  Lu = 13'  Le = 22'-1.13"  RB = 11.7
```

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. Grades with equal bending capacity in the top and bottom edges of the beam cross-section are recommended for continuous beams.
5. GLULAM: bxd = actual breadth x actual depth.
6. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
7. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).
8. The critical deflection value has been determined using maximum back-span deflection. Cantilever deflections do not govern design.

Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full Area	15.00 (2.00)*				No
wll	Snow	Full Area	25.00 (2.00)*				Yes

*Tributary Width (ft)

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :

Dead	59		412		
Live	144		613		
Total	203		1025		
Bearing:					
LC number	3		2		1
Length	1.0		1.0		0.0
Cb	1.00		1.92		0.00

LVL n-ply, 1.8E, 2400Fb, 1-3/4x7-1/4", 1-ply

Self Weight of 3.66 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (lbs, lbs-ft, or in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 56	Fv' = 328	fv/Fv' = 0.17
Bending(+)	fb = 192	Fb' = 2956	fb/Fb' = 0.06
Bending(-)	fb = 1179	Fb' = 2625	fb/Fb' = 0.45
Deflection:			
Interior Live	0.04 = <L/999	0.27 = L/360	0.16
Total	0.06 = <L/999	0.40 = L/240	0.14
Cantil. Live	0.33 = L/215	0.40 = L/180	0.83
Total	0.52 = L/138	0.60 = L/120	0.87

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	2400	1.15	-	1.00	1.000	1.07	-	1.00	1.00	-	-	3
Fb'-	2400	1.15	-	1.00	0.888	1.07	-	1.00	1.00	-	-	4
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		-	1.00	-	-	-	-	1.00	-	-	4

Bending(+): LC# 3 = D+S (pattern: Ss), M = 245 lbs-ft
Bending(-): LC# 4 = D+S (pattern: sS), M = 1506 lbs-ft
Shear : LC# 2 = D+S, V = 523, V design = 472 lbs
Deflection: LC# 4 = D+S (pattern: sS) EI= 100.03e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)
(Load Pattern: s=S/2, X=L+S or L+C, _=no pattern load in this span)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
3. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
4. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.
5. The critical deflection value has been determined using maximum back-span deflection. Cantilever deflections do not govern design.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:32:17	2928 72nd BeamR11

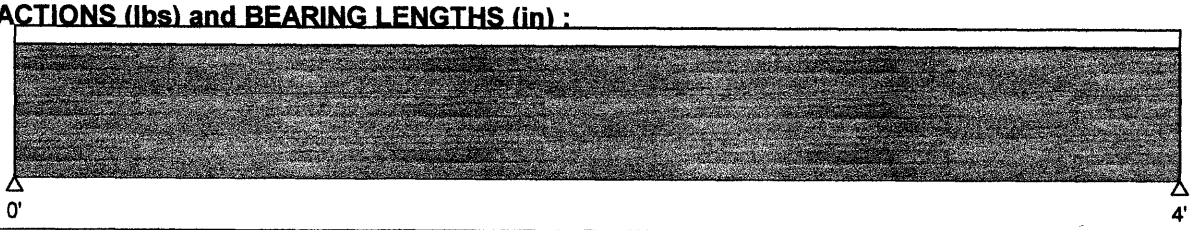
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	184.0				No
wll	Snow	Full UDL	306.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	377		377
Live	612		612
Total	989		989
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x6"

Self Weight of 4.57 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 59	Fv' = 207	fv/Fv' = 0.29
Bending(+)	fb = 673	Fb' = 1345	fb/Fb' = 0.50
Live Defl'n	0.02 = <L/999	0.13 = L/360	0.17
Total Defl'n	0.04 = <L/999	0.20 = L/240	0.18

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.15	1.00	1.00	1.000	1.300	1.00	1.00	1.00	1.00	-	2
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+S, M = 989 lbs-ft
Shear : LC# 2 = D+S, V = 989, V design = 762 lbs
Deflection: LC# 2 = D+S EI= 77.64e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:33:23	2928 72nd BeamR12

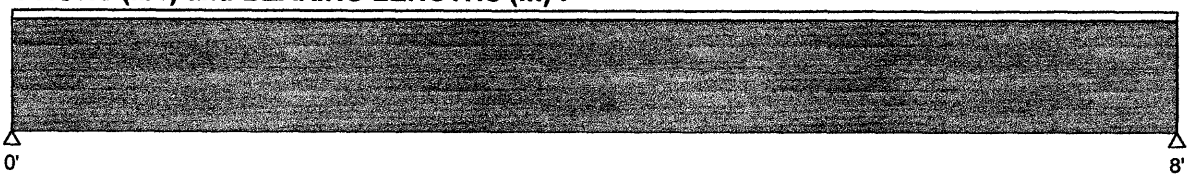
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	180.0				No
wll	Snow	Full UDL	300.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	751		751
Live	1200		1200
Total	1951		1951
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x10"

Self Weight of 7.69 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 73	Fv' = 207	fv/Fv' = 0.35
Bending(+)	fb = 938	Fb' = 1242	fb/Fb' = 0.76
Live Defl'n	0.07 = <L/999	0.27 = L/360	0.28
Total Defl'n	0.12 = L/788	0.40 = L/240	0.30

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.15	1.00	1.00	1.000	1.200	1.00	1.00	1.00	1.00	-	2
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+S, M = 3902 lbs-ft
Shear : LC# 2 = D+S, V = 1951, V design = 1575 lbs
Deflection: LC# 2 = D+S EI= 369.34e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:34:20	2928 72nd BeamR13

Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	60.0				No
wll	Snow	Full UDL	100.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :

Dead	618		618
Live	900		900
Total	1518		1518
Bearing:			
LC number	2		2
Length	1.0		1.0

Glulam-Unbal., West Species, 24F-1.8E WS, 3-1/8x12"

Self Weight of 8.63 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 54	Fv' = 276	fv/Fv' = 0.20
Bending(+)	fb = 1093	Fb' = 2760	fb/Fb' = 0.40
Live Defl'n	0.29 = L/740	0.60 = L/360	0.49
Total Defl'n	0.49 = L/439	0.90 = L/240	0.55

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn	LC#
Fb'+	2400	1.15	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	-	2
Fv'	240	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2

Bending(+): LC# 2 = D+S, M = 6830 lbs-ft
Shear : LC# 2 = D+S, V = 1518, V design = 1349 lbs
Deflection: LC# 2 = D+S EI= 809.99e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Glulam design values are for materials conforming to AITC 117-2001 and manufactured in accordance with ANSI/AITC A190.1-1992
3. GLULAM: bxd = actual breadth x actual depth.
4. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
5. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:35:08	2928 72nd BeamR14

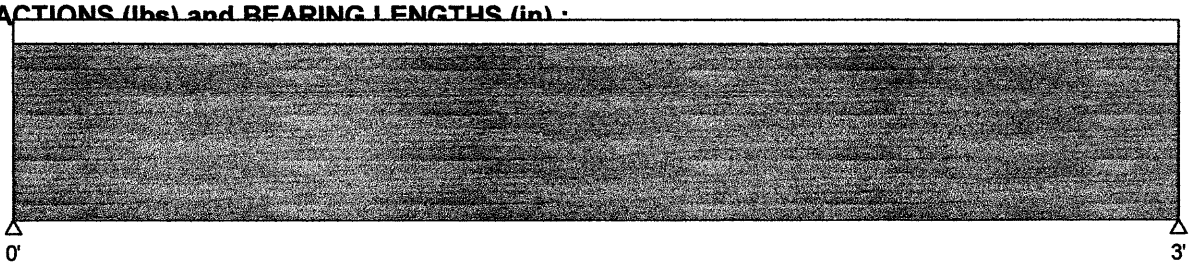
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	180.0				No
wll	Snow	Full UDL	300.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	277		277
Live	450		450
Total	727		727
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x6"

Self Weight of 4.57 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 39	Fv' = 207	fv/Fv' = 0.19
Bending(+)	fb = 371	Fb' = 1345	fb/Fb' = 0.28
Live Defl'n	0.01 = <L/999	0.10 = L/360	0.07
Total Defl'n	0.01 = <L/999	0.15 = L/240	0.08

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.15	1.00	1.00	1.000	1.300	1.00	1.00	1.00	1.00	-	2
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+S, M = 545 lbs-ft
Shear : LC# 2 = D+S, V = 727, V design = 505 lbs
Deflection: LC# 2 = D+S EI= 77.64e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering May 18, 2020 18:42	2928 72nd BeamR15

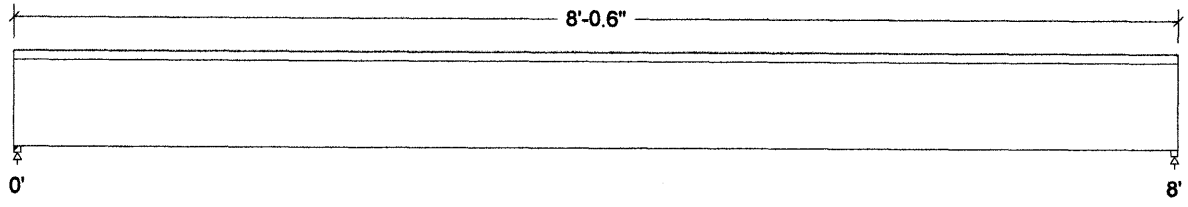
Design Check Calculation Sheet

WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
wdl	Dead	Full UDL				120.0		plf
wll	Snow	Full UDL				200.0		plf
Self-weight	Dead	Full UDL				6.0		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	504		504
Snow	800		800
Factored:			
Total	1304		1304
Bearing:			
Capacity			
Beam	1304		1304
Des ratio			
Beam	1.00		1.00
Load comb	#2		#2
Length	0.60		0.60
Min req'd	0.60		0.60
Cb	1.00		1.00
Cb min	1.00		1.00

Lumber-soft, D.Fir-L, No.2, 4x8 (3-1/2"x7-1/4")

Supports: All - Non-wood

Total length: 8'-0.6"; Clear span: 7'-11.4"; volume = 1.4 cu.ft.

Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 65	Fv' = 207	psi	fv/Fv' = 0.31
Bending(+)	fb = 1021	Fb' = 1345	psi	fb/Fb' = 0.76
Live Defl'n	0.10 = L/926	0.27 = L/360	in	0.39
Total Defl'n	0.17 = L/568	0.40 = L/240	in	0.42

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	900	1.15	1.00	1.00	1.000	1.300	1.00	1.00	1.00	1.00	-	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2
Emin'	0.58 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S, V max = 1304, V design = 1099 lbs

Bending(+): LC #2 = D+S, M = 2608 lbs-ft

Deflection: LC #2 = D+S (live)

LC #2 = D+S (total)

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ICC-IBC

CALCULATIONS:

Deflection: EI = 178e06 lb-in2

"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

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JOB 20017
SHEET NO. 26 OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Main Floor Framing

m1 L = 12'
w_{DL} = 14 psf
w_{LL} = 40 psf
⇒ 2x10 HF #2 @ 16" o.c.

m2 L = 6.5'
w_{DL} = 14 · 25/2 = 175 plf
w_{LL} = 40 · 25/2 = 500 plf
⇒ 4x10 DF #2

m3 L = 7'
w_{DL} = 14 psf
w_{LL} = 60 psf
⇒ 2x8 HF #2 @ 16" o.c.

m4 L = 6'
w_{DL} = 14 · 14/2 = 98 plf
w_{LL} = 60 · 14/2 = 420 plf
⇒ 4x8 DF #2 P.T.
- OR - 8 span 4x12

m5 L = 6'
w_{DL} = 14 · 4/2 = 28 plf
w_{LL} = 60 · 4/2 = 120 plf
⇒ 4x6 DF #2 P.T.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:49:47	2928 72nd BeamM1

Design Check Calculation Sheet

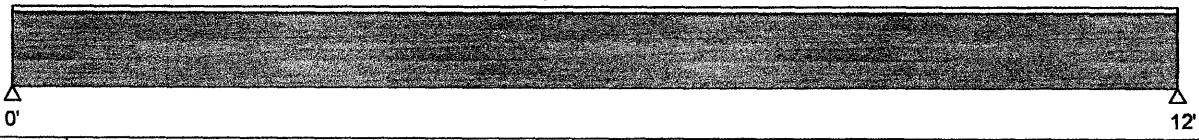
Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full Area	14.00 (16.0)*				No
wll	Live	Full Area	40.00 (16.0)*				No

*Tributary Width (in)

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



	0'	12'
Dead	129	129
Live	320	320
Total	449	449
Bearing:		
LC number	2	2
Length	1.0	1.0

Lumber-soft, Hem-Fir, No.2, 2x10"

Spaced at 16" c/c; Self Weight of 2.87 plf automatically included in loads;
Lateral support: top= full, bottom= at supports; Repetitive factor: applied where permitted (refer to online help); Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 42	Fv' = 150	fv/Fv' = 0.28
Bending(+)	fb = 755	Fb' = 1075	fb/Fb' = 0.70
Live Defl'n	0.19 = L/744	0.40 = L/360	0.48
Total Defl'n	0.27 = L/530	0.60 = L/240	0.45

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	850	1.00	1.00	1.00	1.000	1.100	1.00	1.15	1.00	1.00	-	2
Fv'	150	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	405	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.3 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+L, M = 1346 lbs-ft
Shear : LC# 2 = D+L, V = 449, V design = 391 lbs
Deflection: LC# 2 = D+L EI= 128.61e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN	COMPANY Forsman Engineering 20017 May 6, 2020 05:50:44	PROJECT 2928 72nd BeamM2	28

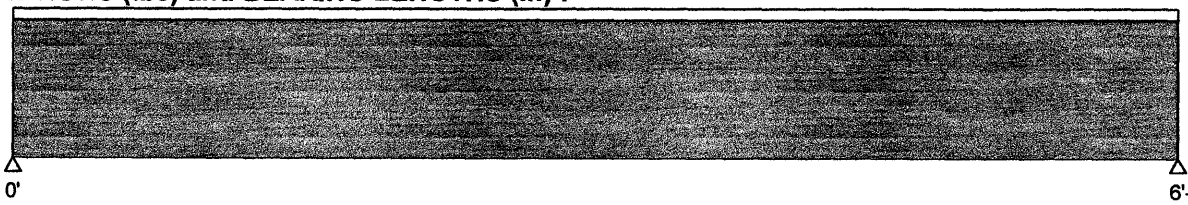
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	175.0				No
wll	Live	Full UDL	500.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	594		594
Live	1625		1625
Total	2219		2219
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x10"

Self Weight of 7.69 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 78	Fv' = 180	fv/Fv' = 0.44
Bending(+)	fb = 867	Fb' = 1080	fb/Fb' = 0.80
Live Defl'n	0.05 = <L/999	0.22 = L/360	0.25
Total Defl'n	0.07 = <L/999	0.32 = L/240	0.23

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.00	1.00	1.00	1.000	1.200	1.00	1.00	1.00	1.00	-	2
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+L, M = 3605 lbs-ft
Shear : LC# 2 = D+L, V = 2219, V design = 1693 lbs
Deflection: LC# 2 = D+L EI= 369.34e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:52:16	2928 72nd BeamM3

Design Check Calculation Sheet

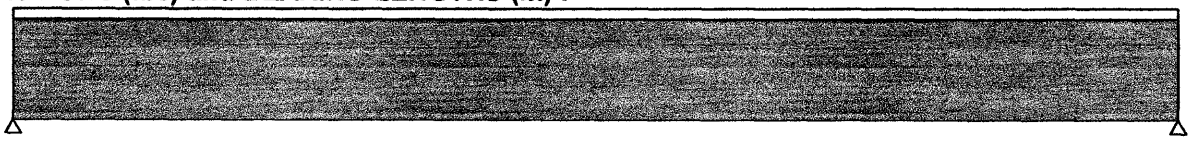
Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full Area	14.00 (16.0)*				No
wll	Live	Full Area	60.00 (16.0)*				No

*Tributary Width (in)

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	73		73
Live	280		280
Total	353		353
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, Hem-Fir, No.2, 2x8"

Spaced at 16" c/c; Self Weight of 2.25 plf automatically included in loads;
Lateral support: top= full, bottom= at supports; Repetitive factor: applied where permitted (refer to online help); Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 40	Fv' = 150	fv/Fv' = 0.27
Bending(+)	fb = 564	Fb' = 1173	fb/Fb' = 0.48
Live Defl'n	0.07 = <L/999	0.23 = L/360	0.30
Total Defl'n	0.09 = L/955	0.35 = L/240	0.25

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	850	1.00	1.00	1.00	1.000	1.200	1.00	1.15	1.00	1.00	-	2
Fv'	150	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fcp'	405	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.3 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

Bending(+): LC# 2 = D+L, M = 617 lbs-ft
Shear : LC# 2 = D+L, V = 353, V design = 292 lbs
Deflection: LC# 2 = D+L EI= 61.92e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:53:29	2928 72nd BeamM4

37

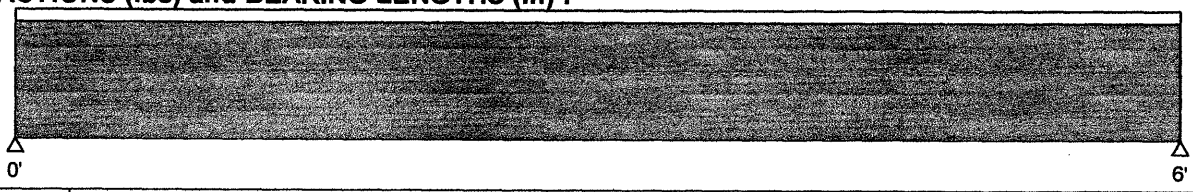
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	98.0				No
wll	Live	Full UDL	420.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	312		312
Live	1260		1260
Total	1572		1572
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x8"

Self Weight of 6.03 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 74	Fv' = 144	fv/Fv' = 0.52
Bending(+)	fb = 923	Fb' = 936	fb/Fb' = 0.99
Live Defl'n	0.07 = L/993	0.20 = L/360	0.36
Total Defl'n	0.09 = L/796	0.30 = L/240	0.30

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.00	1.00	1.00	1.000	1.300	1.00	1.00	1.00	0.80	-	2
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	0.80	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million	1.00	1.00	-	-	-	-	1.00	0.95	-	2	

Bending(+): LC# 2 = D+L, M = 2358 lbs-ft
Shear : LC# 2 = D+L, V = 1572, V design = 1255 lbs
Deflection: LC# 2 = D+L EI= 177.83e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

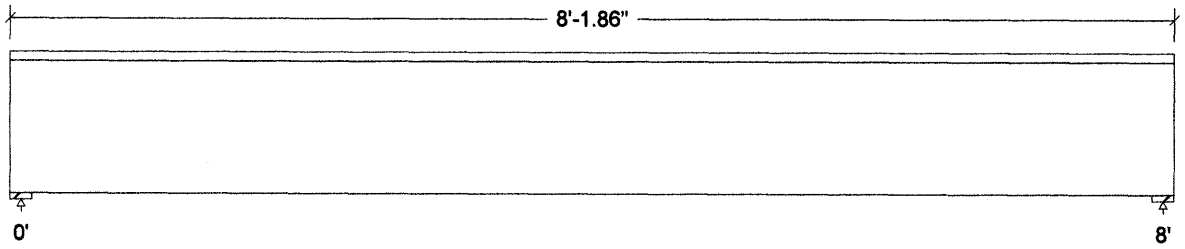
Design Check Calculation Sheet

WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
wdl	Dead	Full UDL				98.0		plf
wll	Live	Full UDL				420.0		plf
Self-weight	Dead	Full UDL				8.1		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	425		425
Live	1680		1680
Factored:			
Total	2105		2105
Bearing:			
Capacity			
Beam	2105		2105
Des ratio			
Beam	1.00		1.00
Load comb	#2		#2
Length	1.86		1.86
Min req'd	1.86		1.86
Cb	1.00		1.00
Cb min	1.00		1.00

Lumber-soft, Hem-Fir, No.2, 4x12 (3-1/2"x11-1/4")
Supports: All - Non-wood
Total length: 8'-1.86"; Clear span: 7'-10.14"; volume = 2.2 cu.ft.
Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 60	Fv' = 120	psi	fv/Fv' = 0.50
Bending(+)	fb = 684	Fb' = 748	psi	fb/Fb' = 0.91
Live Defl'n	0.08 = <L/999	0.27 = L/360	in	0.28
Total Defl'n	0.09 = <L/999	0.40 = L/240	in	0.24

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	150	1.00	1.00	1.00	-	-	-	-	1.00	0.80	1.00	2
Fb'+	850	1.00	1.00	1.00	1.000	1.100	1.00	1.00	1.00	0.80	-	2
Fcp'	405	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.3 million		1.00	1.00	-	-	-	-	1.00	0.95	-	2
Emin'	0.47 million		1.00	1.00	-	-	-	-	1.00	0.95	-	2

CRITICAL LOAD COMBINATIONS:
Shear : LC #2 = D+L, V max = 2105, V design = 1571 lbs
Bending(+): LC #2 = D+L, M = 4209 lbs-ft
Deflection: LC #2 = D+L (live)
LC #2 = D+L (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC

CALCULATIONS:
Deflection: EI = 540e06 lb-in2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow…)
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Forsman Engineering 20017 May 6, 2020 05:54:14	2928 72nd BeamM5

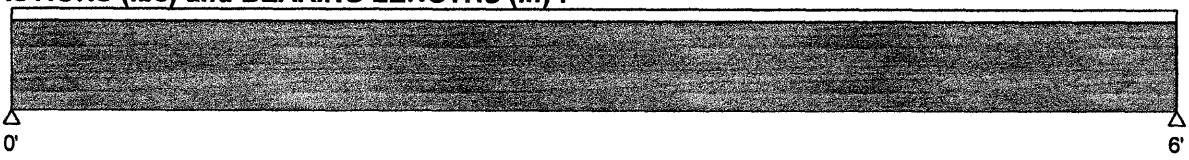
Design Check Calculation Sheet

Sizer 2004

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
wdl	Dead	Full UDL	28.0				No
wll	Live	Full UDL	120.0				No

MAXIMUM REACTIONS (lbs) and BEARING LENGTHS (in) :



Dead	98		98
Live	360		360
Total	458		458
Bearing:			
LC number	2		2
Length	1.0		1.0

Lumber-soft, D.Fir-L, No.2, 4x6"

Self Weight of 4.57 plf automatically included in loads;

Lateral support: top= full, bottom= at supports; Load combinations: ICC-IBC;

SECTION vs. DESIGN CODE NDS-2001: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 30	Fv' = 144	fv/Fv' = 0.21
Bending(+)	fb = 467	Fb' = 936	fb/Fb' = 0.50
Live Defl'n	0.05 = <L/999	0.20 = L/360	0.24
Total Defl'n	0.06 = <L/999	0.30 = L/240	0.20

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fb'+	900	1.00	1.00	1.00	1.000	1.300	1.00	1.00	1.00	0.80	-	2
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	0.80	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million	1.00	1.00		-	-	-	-	1.00	0.95	-	2

Bending(+): LC# 2 = D+L, M = 687 lbs-ft
Shear : LC# 2 = D+L, V = 458, V design = 388 lbs
Deflection: LC# 2 = D+L EI= 77.64e06 lb-in2
Total Deflection = 1.00(Dead Load Deflection) + Live Load Deflection.
(D=dead L=live S=snow W=wind I=impact C=construction CLd=concentrated)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

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JOB _____

SHEET NO. 39 OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Footings –

① P = 11439 # ⇒ F3

② P = 6440 # ⇒ F2.5

③ P = 4210 # ⇒ F2.0

④ P = 4400 # ⇒ F2.0

FOOTING CAPACITY PONT LOAD

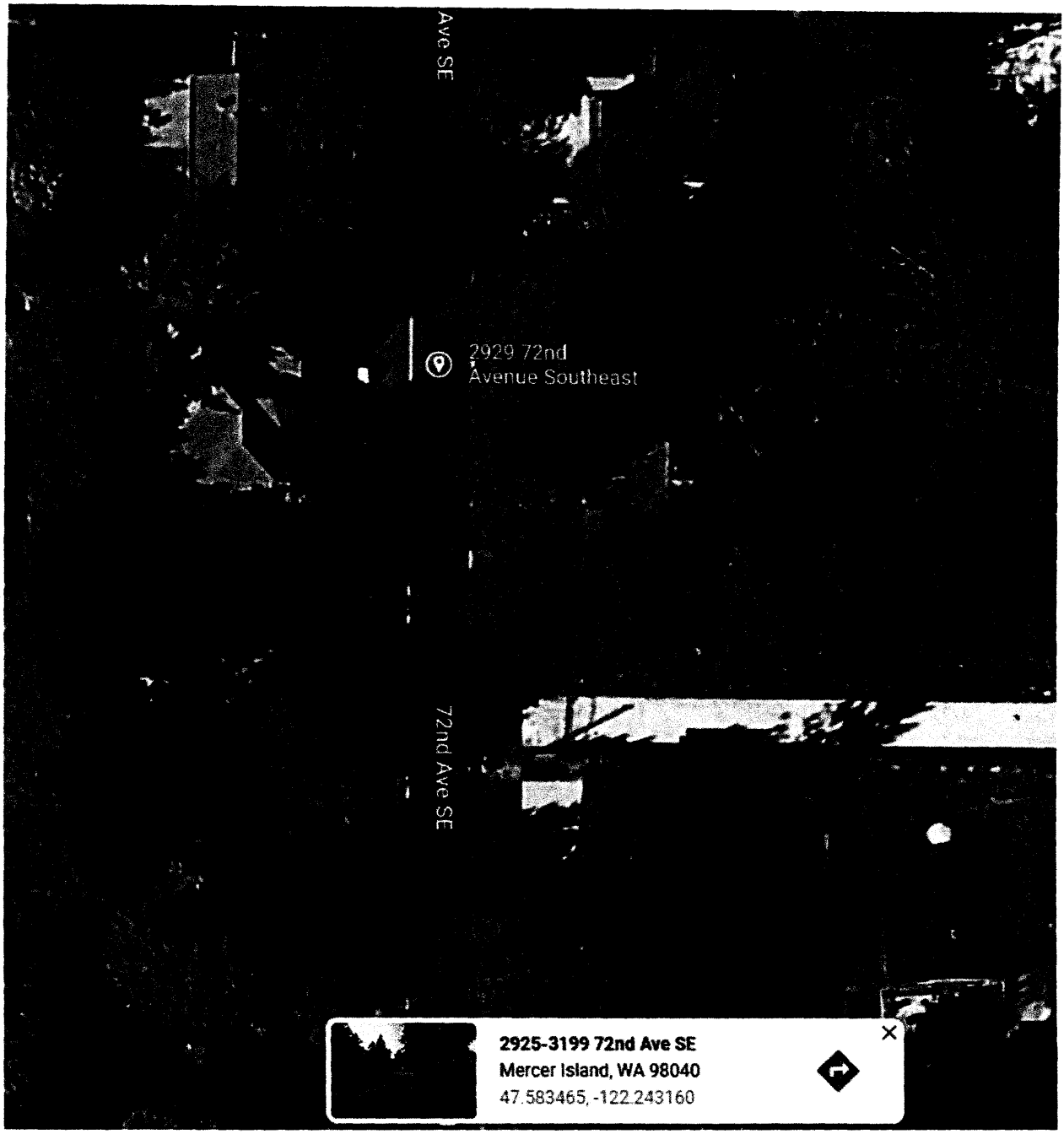
Allowable Soil Bearing Pressure 1500 psf

Name	Rebar ea way *	Width (ft)	Length (ft)	Thickness (in)	Area (ft^2)	Capacity (lbs)
F1.5	(2) #4	1.5	1.5	8	2.25	3375
F2	(2) #4	2	2	10	4.00	6000
F2.5	(3) #4	2.5	2.5	10	6.25	9375
F3	(3) #4	3	3	10	9.00	13500
F3.5	(4) #4	3.5	3.5	10	12.25	18375
F4	(4) #4	4	4	12	16.00	24000
F4.5	(5) # 5	4.5	4.5	12	20.25	30375
F5	(5) # 5	5	5	12	25.00	37500
F6	(6) #5	6	6	12	36.00	54000
F-Dia 12		12" Dia		8	0.79	1185
F-Dia 18		18" Dia		8	1.77	2655
F-Dia 24		24" Dia		8	3.14	4710
12" Cont		12" Continuous	3	8	3	4500
16" Cont		16" Continuous	3	8	4	6000
24" Cont		24" Continuous	4	8	8	12000

* Rebar mats to be 3" cover at bottom of footing


SE 27th St
SE 28th St
SE 29th St
71st Ave SE
72nd Ave SE
73rd Ave SE
74th Ave SE
75th Ave SE
76th Ave SE
77th Pl SE
78th Ave SE

$K_{zt} = 1.9$


Ave SE
2929 72nd
Avenue Southeast
72nd Ave SE
2925-3199 72nd Ave SE
Mercer Island, WA 98040
47.583465, -122.243160

2010 ASCE 7 Wind Forces - Simple Diaphragm Low Rise Buildings

Based on ASCE7-10 Chapter 28

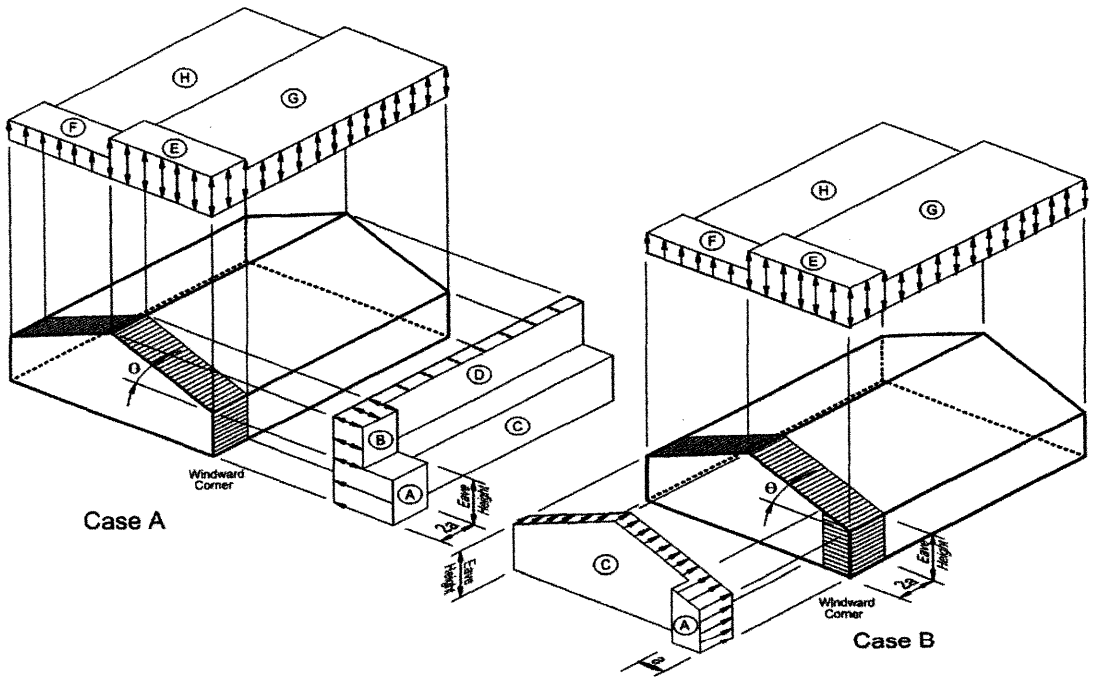
Risk Category	II	Table 1.5-1	Project	20017
Wind Speed	110	mph		**2928 72nd**
Exposure Category	B		Date	5/6/2020
Topographic Factor	1.90	K_{zt}		
Mean Roof Height	15	ft		
Roof Pitch	15	degrees		
Adjustment Factor	1.00	λ, Figure 28.6-1		

Zone	λ	K_{zt}	P_{s30}	Total	
A	1.00	1.90	24.1	45.8	psf
B	1.00	1.90	-8.0	-15.2	psf
C	1.00	1.90	16.0	30.4	psf
D	1.00	1.90	-4.6	-8.7	psf

P_{s30} values from Figure 28.6-1

Calculate End Zone Distance, a

Least horizontal distance	25	ft	
10% Least Horizontal Distance	2.5	ft	
0.4h	6	ft	2.5
0.04 Least Horizontal Distance	1	ft	
3ft min	3	ft	3
End Zone Distance a:	3	ft	



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JOB 20017
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Lateral Analysis

Wind 110 mph exp. B K_{zt} = 1.9 per M.I. wind map

end zone (45.8) 8/2 = 183 plf
middle zone (30.9) 8/2 = 122 plf

				ASD
A	183 (6) + 122 16/2	= 2074	x .6 =	1244 #
B	122 54/2	= 3294	x .6 =	1976 #
C	122 66/2	= 4026	x .6 =	2416 #
D	183 (6) + 122 24/2	= 2562	x .6 =	1537 #
1	183(6) + 122 11/2	= 1769	x .6 =	1061 #
2	183(6) + 122(11/2 + 32/2)	= 3721	x .6 =	2233 #
3	183 (6) + (122) 11/2	= 1769	x .6 =	1061 #
4	183 (6) + 122 20/2	= 2318	x .6 =	1391 #

OSHPD

20017 2929 72nd Ave SE Mercer Island

2929 72nd Ave SE, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.5834401, -122.2431518

Date	4/26/2020, 2:15:33 PM
Design Code Reference Document	ASCE7-10
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.386	MCE_R ground motion. (for 0.2 second period)
S_1	0.534	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.386	Site-modified spectral acceleration value
S_{M1}	0.8	Site-modified spectral acceleration value
S_{DS}	0.924	Numeric seismic design value at 0.2 second SA
S_{D1}	0.534	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	1.5	Site amplification factor at 1.0 second
PGA	0.571	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.571	Site modified peak ground acceleration
T_L	6	Long-period transition period in seconds
SsRT	1.386	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.443	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.658	Factored deterministic acceleration value. (0.2 second)
S1RT	0.534	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.571	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.099	Factored deterministic acceleration value. (1.0 second)
PGAd	1.018	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.961	Mapped value of the risk coefficient at short periods
C_{R1}	0.935	Mapped value of the risk coefficient at a period of 1 s

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Seismic $S_{DS} = 0.924$ $C_S = 0.924 / 6.5/1.0 = 0.142$

$V = (15)(3087)(.142) = 6575 \times 1.3 \times .7 = 5984\#$

A	5984	12/91 =	789 #
B	5984	27/91 =	1775 #
C	5984	33/91 =	2170 #
D	5984	18/91 =	1184 #
1	5984	13/58 =	1341 #
2	5984	18/58 =	1857 #
3	5984	16/58 =	1651 #
4	5984	11/58 =	1135 #

Shear Wall Summary 2928 72nd

Project: **20017**
Date: 5/18/2020

S_{DS}= 0.924

Dead Loads:
Roof: 15 PSF
Wall: 10 PSF
Floor: 14 PSF

Grid Line	Total Wall Length (ft)	Plate Height (ft)	Total Forces (lb) Wind	Seismic	Wall Forces (PLF) Wind	Seismic	Check Length (ft)	OTM (lb-ft) Wind	Seismic	Dead Load Trib (ft) Roof	Wall	Floor	DLRM (lb-ft)	Net uplift (lb) Wind	Seismic	Wall Type	Hold-down	Post	Anchor
Main Floor Shear Walls																			
A	8.5	8	1244	789	146	93	4	4683	2970	8	1.5		1200	991	601	P1-6	HDU 2	(2)2x	
B	5	8	1976	1775	395	355	5	15808	14200	6	2		1525	2979	2696	P1-4	HDU 2	(2)2x	
C	7	8	2416	2170	345	310	12	33134	29760	4	12		10080	2257	2085	P1-4	HDU 4	(2)2x	
D	15	8	1537	1184	102	79	15	12296	9472	12	15		29250	-350	-286	P1-6			
1	24	8	1061	1341	44	56	8	2829	3576	4	8		4480	18	183	P1-6			
2	11	8	2233	1857	203	169	11	17864	14856	12	11		15730	766	678	P1-6	HDU 2	(2)2x	
3	6	8	1061	1651	177	275	3	4244	6604	4	3		630	1289	2102	P1-6	HDU 2	(2)2x	
4	14	8	1391	1135	99	81	3	2385	1946	4	3		630	669	550	P1-6	HDU 2	(2)2x	

Overturning Load Combinations based on ASCE 7-10	
0.6D + 0.6W	ASCE 7-10 section2.4
$(0.6-0.14S_{DS})D + 0.7Q_E$	ASCE 7-10 Section 12.4.2.3

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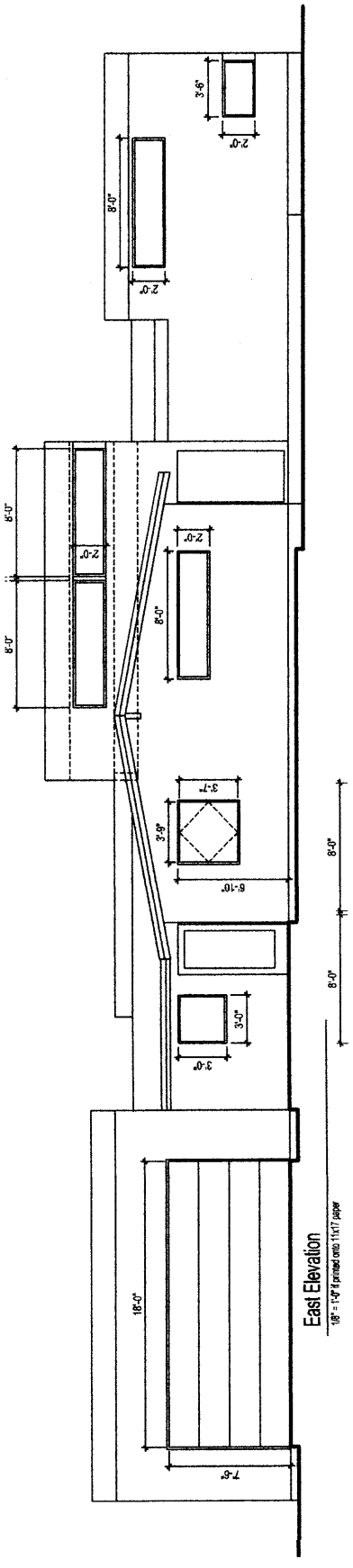
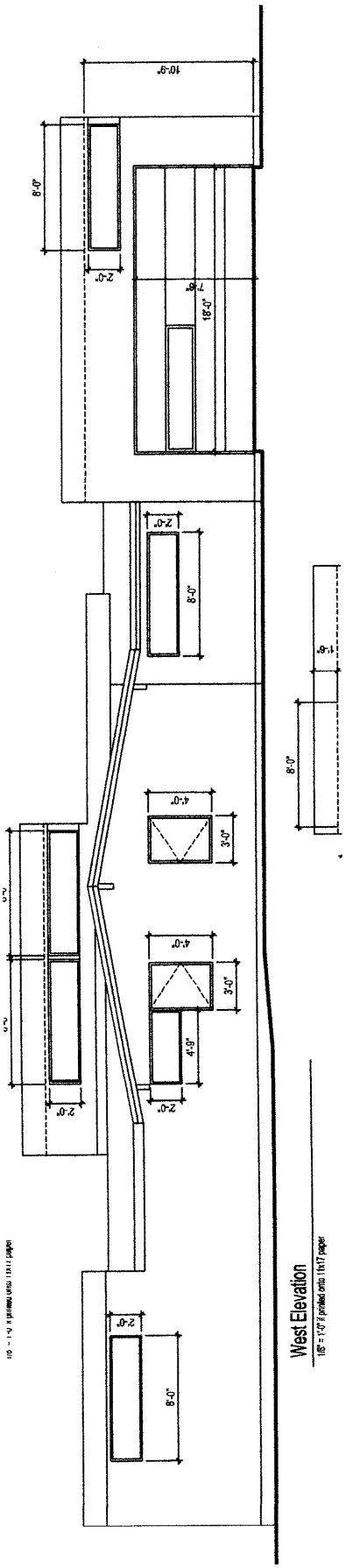


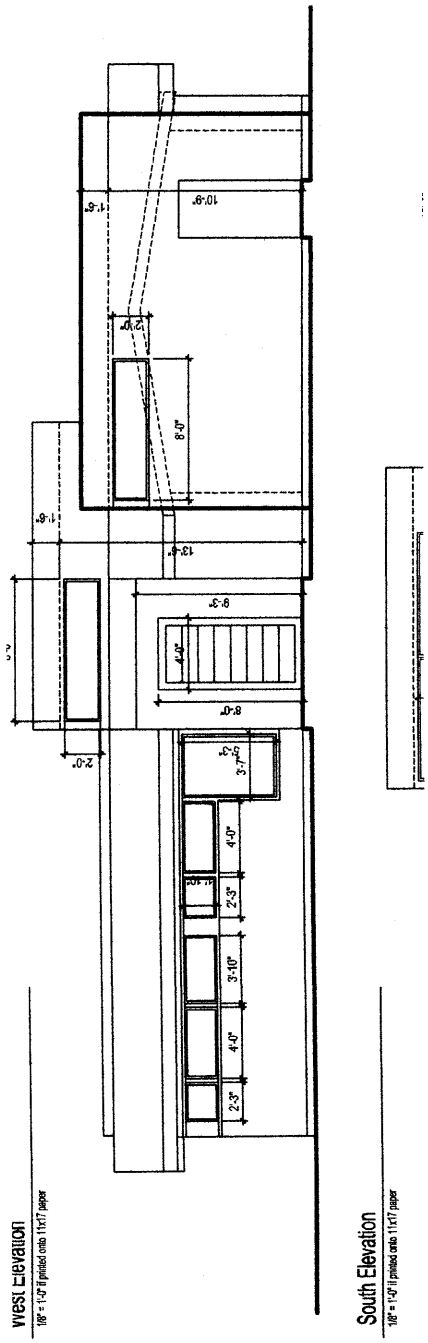
East Elevation

1/8" = 1'-0" if printed onto 11x17 paper



West Elevation

1/8" = 1'-0" if printed onto 11x17 paper



West Elevation

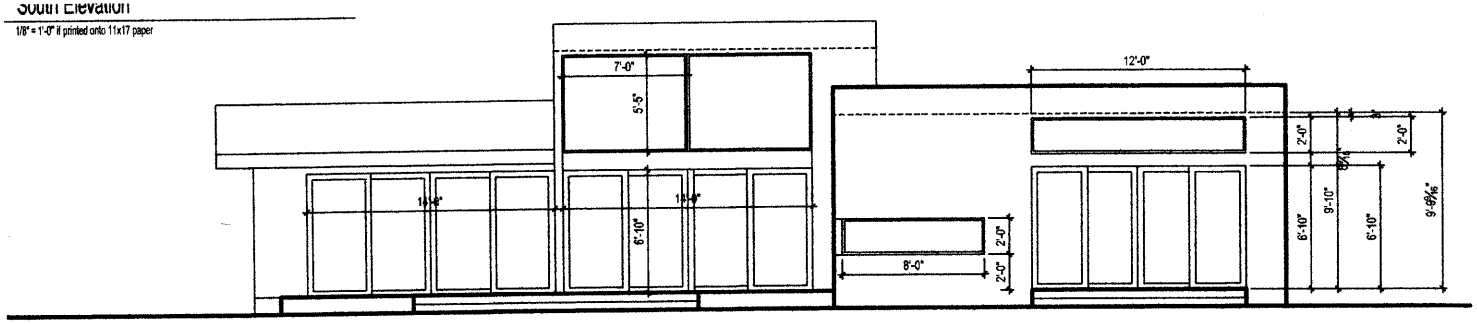
1/8" = 1'-0" if printed onto 11x17 paper

South Elevation

1/8" = 1'-0" if printed onto 11x17 paper

South Elevation

1/8" = 1'-0" if printed onto 11x17 paper



North Elevation

1/8" = 1'-0" if printed onto 11x17 paper

4/6/17