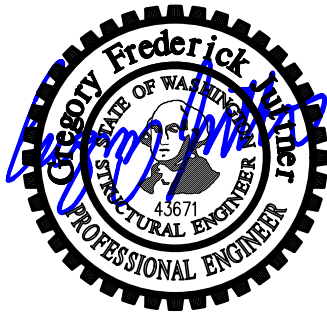




Structural Calculations For:

Shelburne II 9119

Mercer Island, Washington



Prepared for: William E. Buchan, Inc.

Job #: 01011-2021-11

Date: November 3, 2021



**SEATTLE
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○ 253.284.9470

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Criteria Sheet

Codes

Structural IBC 2018
 Loading ASCE 7-16
 Wood: NDS 2018
 Steel: AISC 360-16
 Concrete: ACI 318-14
 Masonry: TMS 402/602-16

Project Location

Street & Number 9017 SE 60th Street
 City: Mercer Island State: WA
 ZIP: 98040
 Latitude: 47.5490 N
 Longitude: -122.2182 W
 Ground Elevation 335 ft

Occupancy Category

Risk Category: II ASCE 7 Table 1.5-1

Seismic Load Summary:

Analysis Procedure: Equivalent Lateral Force Procedure
 Lateral System: Light-frame (wood) Walls Sheathed with Wood
 Structural Panels Rated for Shear Resistance
 R: 6.50 $C_d= 4$
 Base Shear V = 19 kips $\Omega_o= 2.5$
 $S_s= 1.455$ $S_1= 0.504$
 $S_{DS}= 1.16$ $S_{D1}= 0.57$
 $C_s= 0.179$ $I_e= 1.0$



Story Information

Stories Above Grade (Including Mezzanine Levels) 2

Horizontal and Vertical Irregularities:

Is the building a "Regular Structure"? (No horizontal or vertical irregularities) No

Wind Load Summary:

V = 110 $K_{z1}= 1.30$
 Exposure = B

Dead Loads:

Roof			Wall		
Roofing	2.5	psf	Siding	2	psf
1/2" Sheathing	1.5	psf	1/2" Sheathing	1.5	psf
Rafters/Trusses	2	psf	Framing	2	psf
Insulation	1	psf	Insulation	1	psf
5/8" GWB	3.1	psf	1/2" GWB	2.5	psf
Misc./Mech.	2	psf		9	psf
	12.1	psf	Use	10	psf
Use	15	psf			
Floor					
Flooring	1	psf			
3/4" Sheathing	2.3	psf			
Joists	2.6	psf			
5/8" GWB	3.1	psf			
Misc./Mech.	1	psf			
	10	psf			
Use	10	psf			

Live Loads:

Snow 25 psf
 Floor 40 psf

Soils:

Soils Report Provided? No To be approved by the authority having jurisdiction, per 11.8.2 exception.

Allowable Bearing 1500 psf Active 55/35 pcf (Restrained/Unrestrained)
 Sliding, μ 0.45 Seismic Surcharge 7H
 Passive 350 pcf



Shelburne II 9119
 Mercer Island, Washington

DATE 10/31/2021
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Seismic Design

ASCE 7-16 Seismic Analysis Equivalent Lateral Force Procedure

Seismic Force Resisting System Per Table 12.2-1	System	Bearing Wall Systems
	Type:	Light-frame (wood) Walls Sheathed with Wood Structural Panels Rated for Shear Resistance

Seismic Design Cat.	D
Risk Category	II
Site Class	D (Default)
Diaphragm Flexibility	Flexible

I, II, or III, or IV per Table 1.5-1
Assumed default soil properties, per 11.4.3.

Section 12.8.1.3 Exceptions

Regular Structure	No
≤ 5 Stories above grade	Yes
$T \leq 0.5s$	Yes
$\rho = 1.0$	No
Not Site Class E or F	Yes
Risk Category I or II	Yes

If all exceptions are met, S_{DS} may be taken as 1, but not less than $0.7 \cdot (\text{Calculated } S_{DS})$

S_s	1.455 g	2% in 50 yr, Latitude & Longitude lookup
S_1	0.504 g	2% in 50 yr, Latitude & Longitude lookup
R	6.50	
C_d	4.0	
Ω_o	2.5	
I_e	1.00	Table 1.5-2
h_n	23.9 ft	
C_t	0.02	Table 12.8-2
x	0.75	Table 12.8-2
T_a	0.22 sec	
T	0.22 sec	Eq. 12.8-7
T_o	0.10 sec	
T_s	0.49 sec	
T_L	6.00 sec	
F_a	1.20	Table 11.4-1
F_v	1.70	Table 11.4-2
S_{MS}	1.75 g	Eq. 11.4-1
S_{M1}	0.86 g	Eq. 11.4-2
S_{DS}	1.164 g	Eq. 11.4-3
S_{D1}	0.571 g	Eq. 11.4-4
C_s	0.179 Controls	Eq. 12.8-2
	0.407	Eq. 12.8-3 need not exceed, $T < T_L$
	0.010	Eq. 12.8-5 or 12.8-6 minimum
$C_s, \text{ design}$	0.179	Section 11.4.8 Exception 2 Applied
Bldg. Weight	104.0 k	
$V = C_s W$	18.6 k	Eq. 12.8-1, Strength Level Base Shear
$V = C_{s,asd} W$	13.0 k	Eq. 12.8-1 ASD Base Shear

Building Period Per Alternate Analysis

T (sec)	
---------	--

Per Geotech Report

F_a	
F_v	

$$T_a = C_t h_n^x \quad \text{Eq. 12.8.7}$$

$$S_{MS} = F_a S_s \quad \text{Eq. 11.4-1}$$

$$S_{M1} = F_v S_1 \quad \text{Eq. 11.4-2}$$

$$S_{DS} = \frac{2}{3} S_{MS} \quad \text{Eq. 11.4-3}$$

$$S_{D1} = \frac{2}{3} S_{M1} \quad \text{Eq. 11.4-4}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \quad \text{Eq. 12.8-2}$$

$$C_s = \frac{S_{D1}}{T(R/I_e)} \quad \text{Eq. 12.8-3}$$

$$C_s = \frac{S_{D1} T_L}{T^2 (R/I_e)} \quad \text{Eq. 12.8-4}$$

$$C_s \geq 0.044 S_{DS} I_e \quad \text{Eq. 12.8-5}$$

$$C_s \geq 0.01 \quad \text{Eq. 12.8-5}$$

$$C_s \geq 0.5 \frac{S_1}{(R/I_e)} \quad \text{Eq. 12.8-6}$$

$$C_{VX} = w_x h_x^k / \sum_{i=1}^n w_x h_i^k \quad \text{Eq. 12.8-12}$$

$$F_{px} = \frac{\sum_{i=x}^n F_i}{\sum_{i=x}^n w_i} w_{px} \quad \text{Eq. 12.10-1}$$

$$F_{px} \geq 0.2 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-2}$$

$$F_{px} \leq 0.4 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-3}$$

Vertical Distribution ASD $\rho = 1.3$ k = 1.000

Level	h_x (ft)	W_x (k)	h_x^k (ft)	$W_x h_x^k$	Story Shear ASD			Diaphragm Force (ρ not included)				
					C_{vx} (%)	F_x (k)	SV (k)	$F_{px, calc}$	$F_{px, min}$	$F_{px, max}$	$F_{px, design}$	$\gamma = F_{px} / F_x$
Roof	23.9	46.4	23.9	1108	0.611	10.4	10.4	8.0	7.6	15.1	8.0	0.77
Upper	12.3	57.6	12.3	706	0.389	6.6	16.9	7.2	9.4	18.8	9.4	1.42
Σ		104.0		1813		16.9						



Shelburne II 9119
Mercer Island, Washington

DATE 10/31/2021
PROJ. #
DESIGN JDT
SHEET CR2

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Wind Design - MWFRS

ASCE 7 Chapter 27 - Directional Procedure

Design Method	ASD
---------------	-----

Wind Coefficients

Exposure	B	
V=	110	mph
K_d =	0.85	Table 26.6-1
K_{zt} =	0.66	Table 26.10-1
K_e =	0.99	Table 26.9-1
G=	0.85	26.9.4

Transverse Wind Pressures

L/B = 0.62 h/L = 0.55

Pressure Coefficients from Figure 27.3-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.50
Windward Roof	-0.41 / 0.02
Leeward Roof	-0.60

Location and Building Dimensions

Calculate K_{zt} ?	No	
K_{zt}	1.30	
Roof Type	Hip	
Roof Angle - Transverse Dir	21	degrees
Roof Angle - Long Dir	21	degrees
Ground to top of roof	27.25	ft
Bot of roof to top of roof	6.75	ft
Mean Roof Height, h	23.875	ft
Short Plan Dimension	43.75	ft
Long Plan Dimension	70.75	ft
Parapet ?	No	
Ground to top of parapet		ft
Average Parapet Height		ft
Ht of 2nd Level Above Grade	0	ft

Velocity Pressure at Mean Roof Height, q_n =	22.2	psf
--	------	-----

Wall Pressures (Unfactored):

ASD

Ht	K_z	q_z	$P_{ww \text{ walls}}$	$P_{lw \text{ walls}}$	$P_{\text{walls (psf)}}$
0-15	0.57	19.28	13.11	9.43	13.5
15-20	0.62	20.97	14.26	9.43	14.2
20-25	0.66	22.32	15.18	9.43	14.8
25-30	0.7	23.67	16.10	9.43	15.3
30-40	0.76	25.70	17.48	9.43	16.1
41-50	0.81	27.39	18.63	9.43	16.8
51-60	0.85	28.74	19.55	9.43	17.4
61-70	0.89	30.10	20.47	9.43	17.9
71-80	0.93	31.45	21.39	9.43	18.5
81-90	0.96	32.46	22.07	9.43	18.9
91-100	0.99	33.48	22.76	9.43	19.3

Roof Pressures (Unfactored)

ASD

Windward		Leeward	Horiz Proj (psf)
Max	Min		
0.4	-7.7	-11.3	4.80

Longitudinal Wind Pressures

L/B = 1.62 h/L = 0.34

Pressure Coefficients from Figure 27.4-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.38
Windward Roof	-0.31 / 0.16
Leeward Roof	-0.60

Wall Pressures (Unfactored):

ASD

Ht	K_z	q_z	$P_{ww \text{ walls}}$	$P_{lw \text{ walls}}$	$P_{\text{walls (psf)}}$
0-15	0.57	19.28	13.11	7.10	12.13
15-20	0.62	20.97	14.26	7.10	12.82
20-25	0.66	22.32	15.18	7.10	13.37
25-30	0.7	23.67	16.10	7.10	13.92
30-40	0.76	25.70	17.48	7.10	14.75
41-50	0.81	27.39	18.63	7.10	15.44
51-60	0.85	28.74	19.55	7.10	15.99
61-70	0.89	30.10	20.47	7.10	16.54
71-80	0.93	31.45	21.39	7.10	17.09
81-90	0.96	32.46	22.07	7.10	17.51
91-100	0.99	33.48	22.76	7.10	17.92

Roof Pressures (Unfactored)

ASD

Windward		Leeward	Horiz Proj (psf)
Max	Min		
3.0	-5.9	-11.3	4.80



Shelburne II 9119

Mercer Island, Washington

DATE 10/31/2021

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LATERAL ANALYSIS

SEISMIC DESIGN

ROOF DIA.: 15 PSF x 2,404 SQ.FT. + 5 PSF x 2,070 SQ. FT. = 46.4 KIPS

UPPER FLOOR DIA.: 20 PSF x 2,070 SQ. FT. + 15 PSF x 933 SQ. FT. + 5 PSF x 438 SQ. FT. = 57.6 KIPS

BASE SHEAR = 16.9 KIPS

WIND DESIGN

ROOF DIA.: 4.80 PSF x 6.75 FT. x 0.75 + 14.8 PSF x 0.5 FT. + 14.2 PSF x 3.625 FT. = 83 PLF

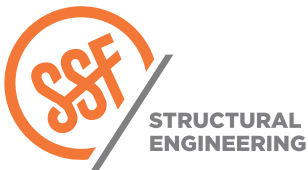
UPPER FLOOR DIA.: 14.2 PSF x 1.375 FT. + 13.5 PSF x 8.875 FT. = 139 PLF

LOW ROOF DIA.: 4.80 PSF x 2.5 FT. x 0.5 + 10.4 PSF x 6.125 FT. = 70 PLF

DIRECTION	LEVEL	PLF	WIDTH	FORCE
N/S	ROOF DIA.	83 PLF	67.75 FT.	5.6 KIPS
N/S	UPPER FLOOR DIA.	139 PLF	70.75 FT.	9.8 KIPS
E/W	ROOF DIA.	83 PLF	38 FT.	3.2 KIPS
E/W	UPPER FLOOR DIA.	139 PLF	38 FT.	5.3 KIPS
E/W	LOW ROOF DIA.	70 PLF	15.5 FT.	1.1 KIPS

N/S BASE SHEAR = 15.4 KIPS

E/W BASE SHEAR = 9.6 KIPS



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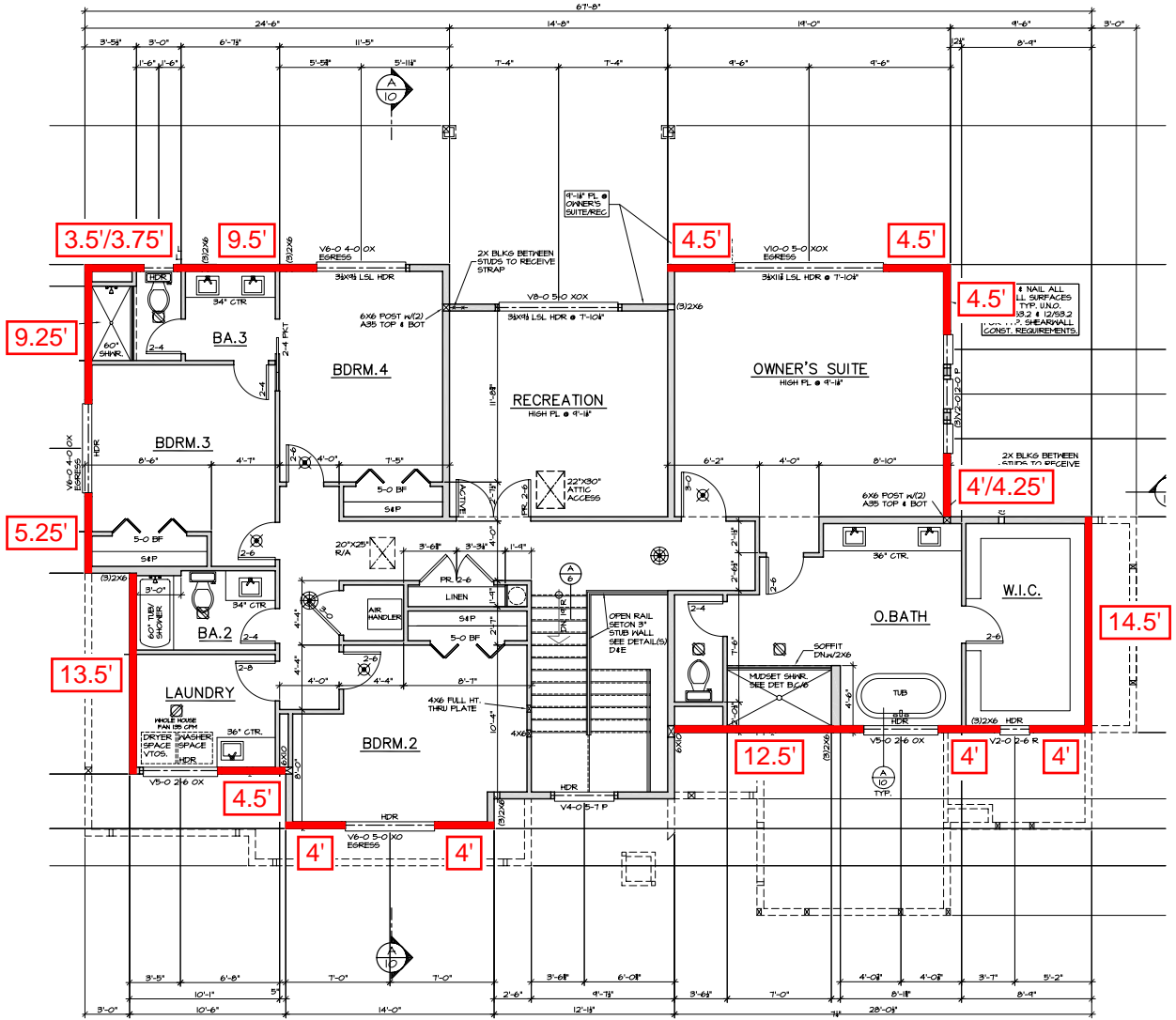
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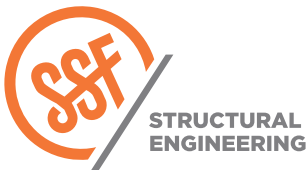
DESIGN L1

SHEET

LATERAL DESIGN KEY PLAN



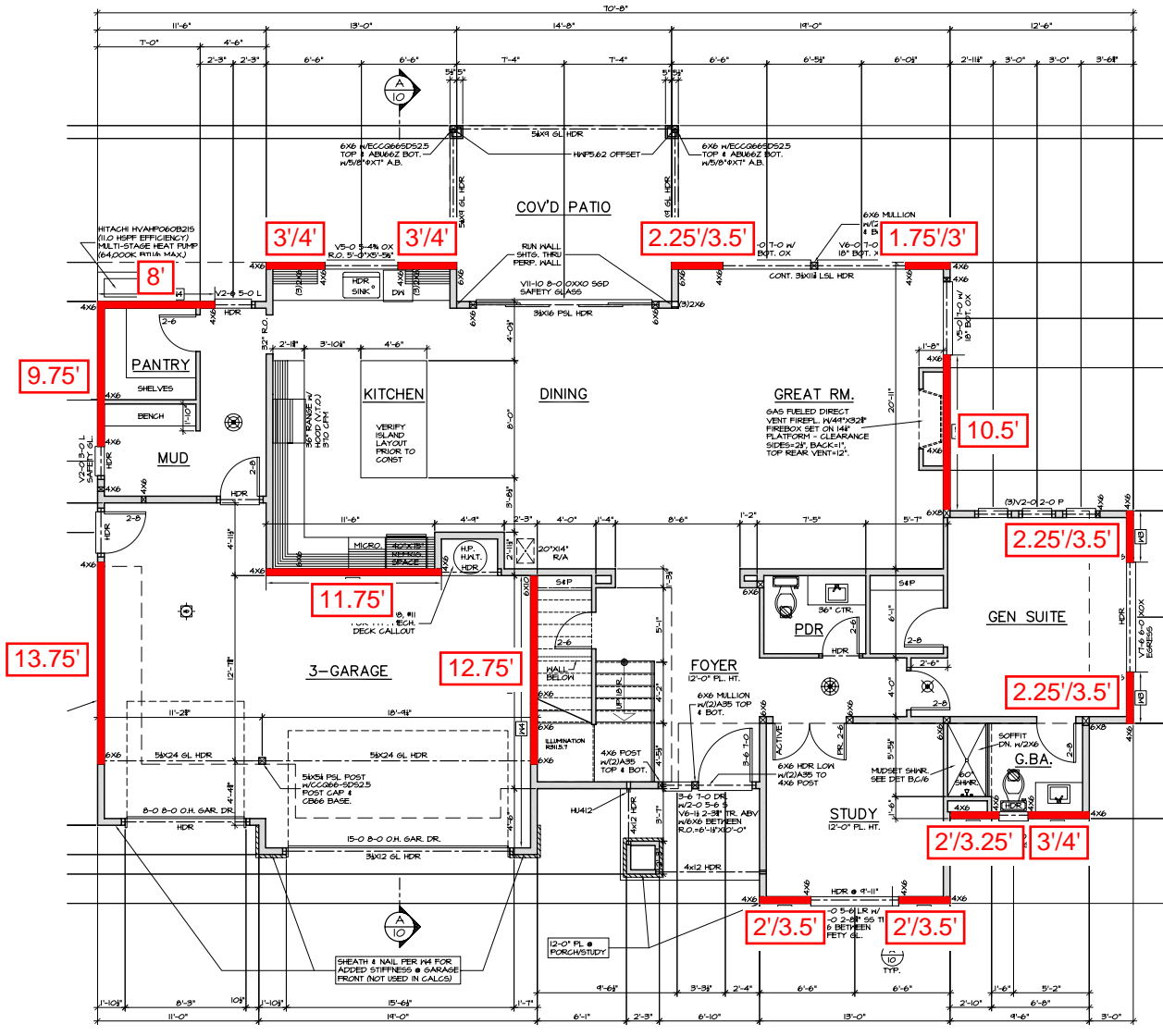
UPPER FLOOR PLAN



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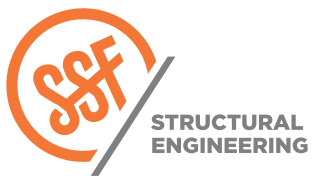
DATE _____
 PROJ. # **JDT**
 DESIGN **L2**
 SHEET _____

LATERAL DESIGN KEY PLAN



MAIN FLOOR PLAN

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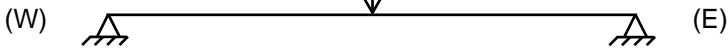


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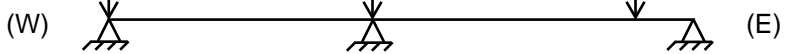
DATE _____
 PROJ. # JDT
 DESIGN L3
 SHEET _____

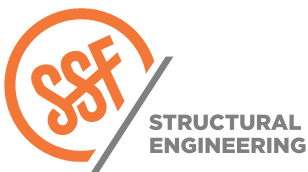
LATERAL DESIGN

N/S DIRECTION - SEISMIC DESIGN

	Fx = 10.4 KIPS	
	(W) 	(E)
ROOF DIA:	5.2 K	5.2 K
FORCE (KIPS)	5.2 K	5.2 K
SHEARWALL LENGTH (FT.)	28 FT.	23 FT./23.25 FT.
SHEAR (PLF)	186 PLF	226 PLF
SHEARWALL TYPE	W6	W6
OVERTURNING (KIPS)	1.5 K - 0.6 DL	2.0 K - 0.6 DL
HOLDOWN TYPE	CS16	(2)CS16

N/S DIRECTION - SEISMIC DESIGN

	5.2 KIPS	Fx = 6.6 KIPS	5.2 KIPS
	(W) 		(E)
UPPER FLOOR DIA:	6.6 K	3.0 K	7.3 K
FORCE (KIPS)	6.6 K	3.0 K	7.3 K
SHEARWALL LENGTH (FT.)	23.5 FT.	12.75 FT.	15 FT./17.5 FT.
SHEAR (PLF)	281 PLF	235 PLF	487 PLF
SHEARWALL TYPE	W4	W4	W2
OVERTURNING (KIPS)	4.3 K - 0.6 DL	2.4 K - 0.6 DL	6.2 K - 0.6 DL
HOLDOWN TYPE	HDU4	HDU4	HDU8



SHELBURNE II 9119

PROJECT
MERCER ISLAND, WASHINGTON

DATE

PROJ. # JDT

DESIGN L4

SHEET

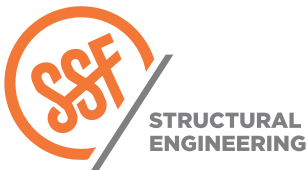
LATERAL DESIGN

E/W DIRECTION - SEISMIC DESIGN

ROOF DIA:	5.2 K	5.2 K
FORCE (KIPS)	22 FT./22.25 FT.	33 FT.
SHEARWALL LENGTH (FT.)	236 PLF	158 PLF
SHEAR (PLF)	W6	W6
SHEARWALL TYPE	2.1 K - 0.6 DL	1.3 K - 0.6 DL
OVERTURNING (KIPS)	(2)CS16	CS16
HOLDOWN TYPE		

E/W DIRECTION - SEISMIC DESIGN

UPPER FLOOR DIA:	7.0 K	5.8 K	4.2 K
FORCE (KIPS)	18 FT./22.5 FT.	11.75 FT.	9 FT./14.25 FT.
SHEARWALL LENGTH (FT.)	389 PLF	494 PLF	467 PLF
SHEAR (PLF)	W3	W2	W2
SHEARWALL TYPE	5.2 K - 0.6 DL	4.9 K - 0.6 DL	3.5 K - 0.6 DL
OVERTURNING (KIPS)	HDU5	HDU5	HDU4
HOLDOWN TYPE			



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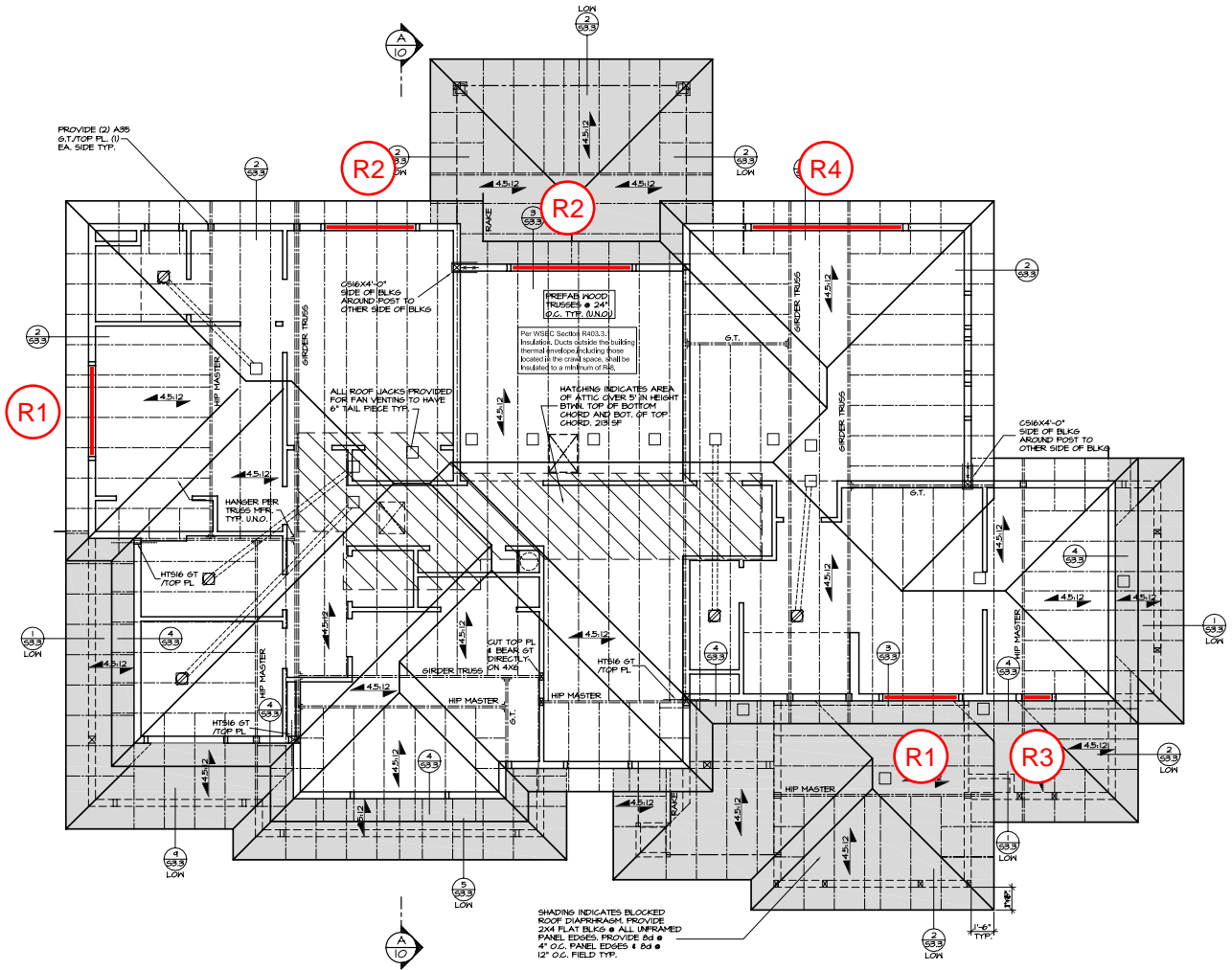
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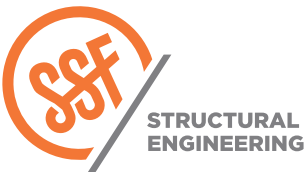
DESIGN L5

SHEET

GRAVITY DESIGN KEY PLAN



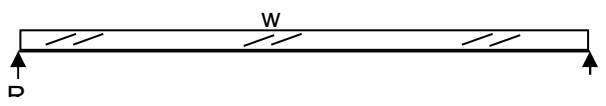
ROOF FRAMING PLAN



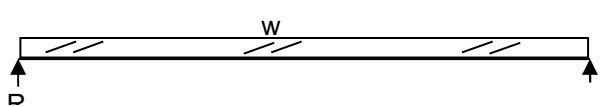
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PROJ. #	JDT
DESIGN	G1
SHEET	

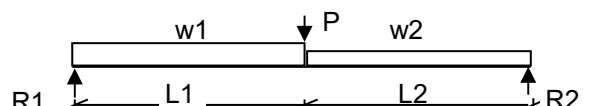
Header		R1	4x10
w=	360	plf	R= 1,125 lbs
L=	6.25	ft	M= 1,758 ft-lbs
b=	3.50	in	Fb= 423 psi
d=	9.25	in	Fv= 39 psi
E=	1700	ksi	Δ = 0.03 in
Cv=	1.00	≤ 1.0	I/I 2381



Header		R2	LSL 3 1/2x9 1/2
w=	680	plf	R= 2,805 lbs
L=	8.25	ft	M= 5,785 ft-lbs
b=	3.50	in	Fb= 1,319 psi
d=	9.50	in	Fv= 102 psi
E=	1500	ksi	Δ = 0.19 in
Cv=	1.00	≤ 1.0	I/I 524



Header		R3	4x10
w1=	120	plf	R1 = 263 lbs
w2=	360	plf	R2 = 1,187 lbs
L1=	2	ft	M = 286 lb-ft
L2=	0	ft	Fb = 69 psi
X=	1.3	ft	Fv = 42 psi
P=	1,120	lbs	Δ = 0.00 in
b=	3.50	in	I/I 46,813
d=	9.25	in	Cv= 1.00
E=	1,700	ksi	




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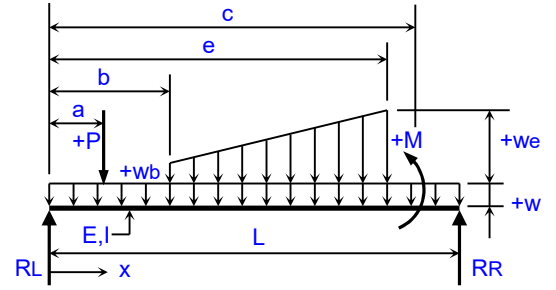
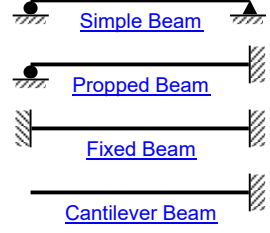
Project: Shelburne II 9119 Date: 10/31/21
Mercer Island, Washington Project #: _____
Roof Framing Design: JDT
 Sheet: G2

SINGLE-SPAN BEAM ANALYSIS
For Simple, Propped, Fixed, or Cantilever Beams

Job Name:	Shelburne II 9119	Subject:	Roof Framing - R4
Job Number:	01011-2021-11	Originator:	JDT
		Checker:	JDT

Input Data: LSL 3 1/2x11 7/8
 fb = 2446 psi
 fv = 196 psi

Beam Data:
 Span Type? **Simple**
 Span, L = **10.2500** ft.
 Modulus, E = **1500** ksi
 Inertia, I = **488.00** in.⁴



Nomenclature

Beam Loadings:

Full Uniform:

w = kips/ft.

Distributed:	Start		End	
	b (ft.)	Wb (kips/ft.)	e (ft.)	We (kips/ft.)
#1:	0.0000	0.1200	3.7500	0.1200
#2:	3.7500	0.7000	7.5000	0.7000
#3:	7.5000	0.1200	10.2500	0.1200
#4:				
#5:				
#6:				
#7:				
#8:				

Results:

Reactions:

RL =	4.57 k	RR =	5.42 k
ML =	N.A.	MR =	N.A.

Maximum Moments:

+M(max) =	16.77 ft-k	@ X =	4.92 ft.
-M(max) =	0.00 ft-k	@ X =	0.00 ft.

Maximum Deflections:

-Δ(max) =	-0.432 in.	@ X =	5.17 ft.
+Δ(max) =	0.000 in.	@ X =	0.00 ft.
Δ(ratio) =	L/285		

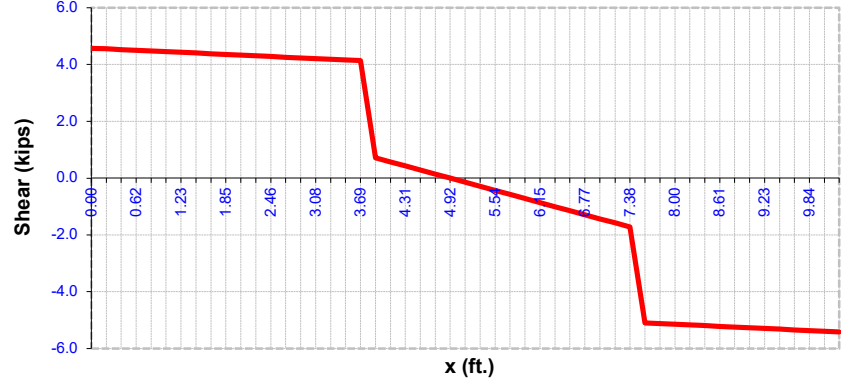
Point Loads:

#	a (ft.)	P (kips)
#1:	3.7500	3.30
#2:	7.5000	3.28
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

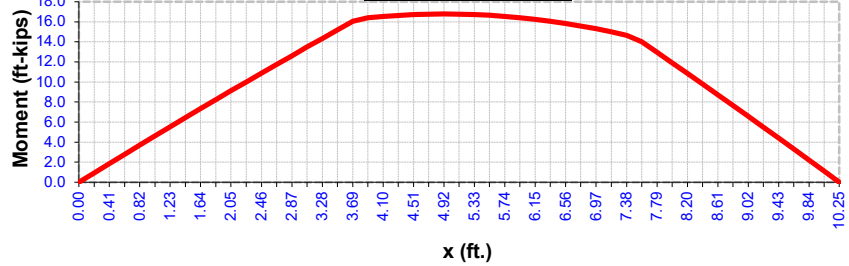
Moments:

#	C (ft.)	M (ft-kips)
#1:		
#2:		
#3:		
#4:		

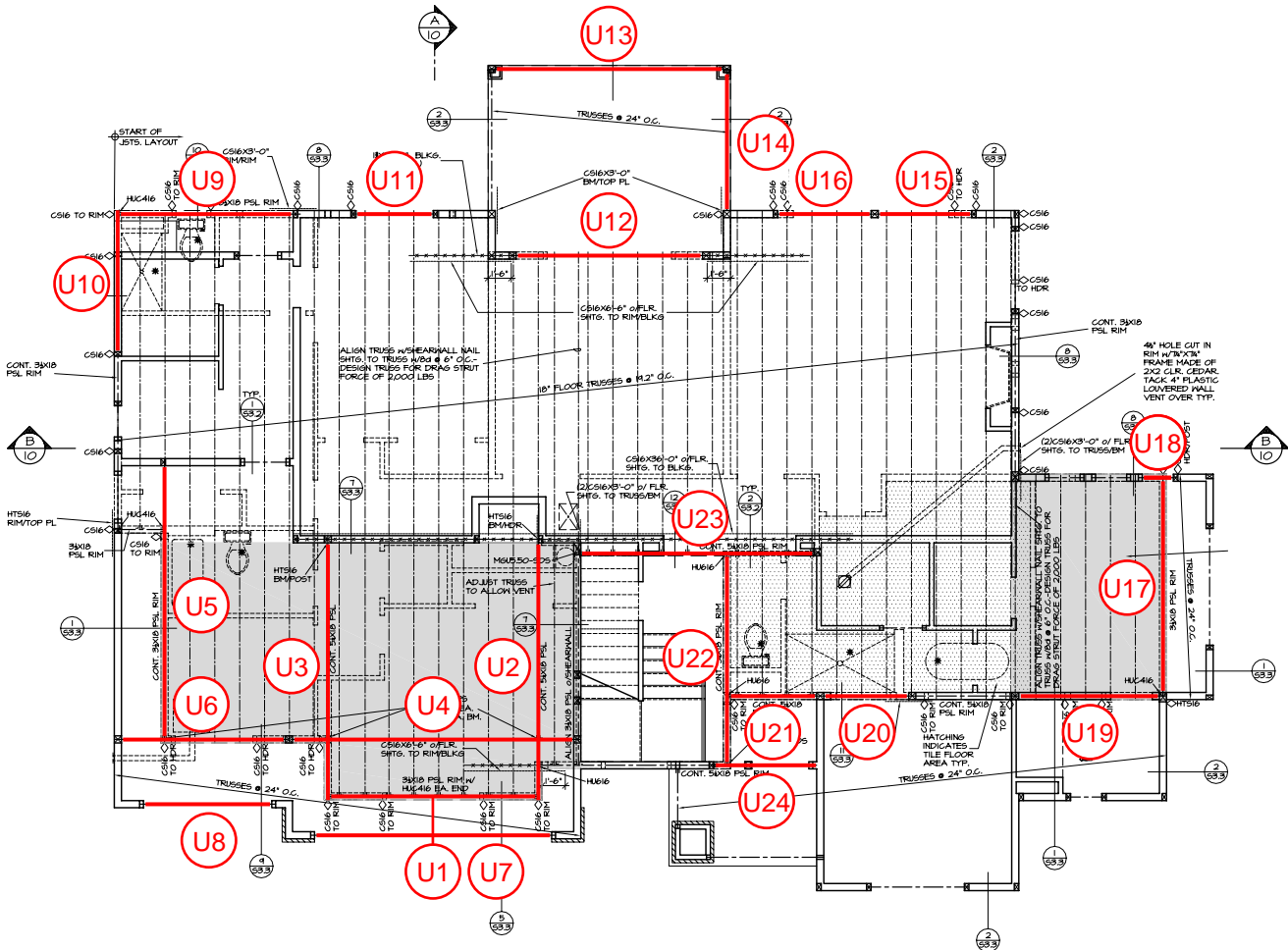
Shear Diagram



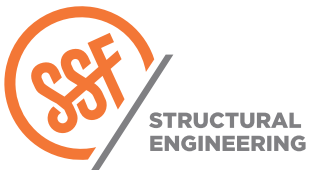
Moment Diagram



GRAVITY DESIGN KEY PLAN



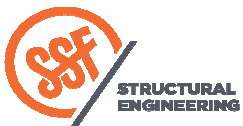
UPPER FLOOR FRAMING PLAN



SHELburne II 9119
PROJECT
MERCER ISLAND, WASHINGTON

DATE	
PROJ. #	JDT
DESIGN	G4
SHEET	

Beam		U1	LSL 3 1/2x18	
w=	440	plf	R=	2,970 lbs
L=	13.5	ft	M=	10,024 ft-lbs
b=	3.50	in	Fb=	916 psi
d=	15.00	in	Fv=	69 psi
E=	1500	ksi	Δ =	0.22 in
Cv=	1.00	≤ 1.0	I/I	727



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Project: Shelburne II 9119 Date: 10/31/21
Mercer Island, Washington Project #: _____
Upper Floor Framing Design: JDT
 _____ Sheet: G5

GRAVITY DESIGN

UPPER FLOOR FRAMING

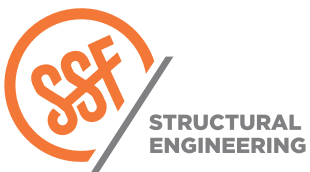
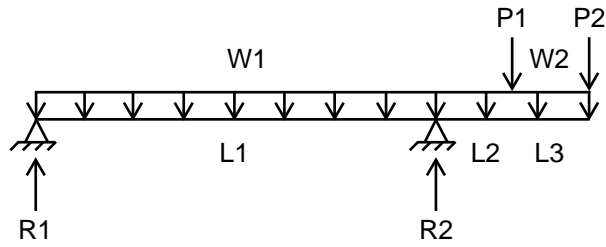
U2:

W1 = 67 PLF
W2 = 307 PLF
P1 = 1,100#
P2 = 2,970#
L1 = 13 FT.
L2 = 1.75 FT.
L3 = 2 FT.

R1 = (531)#
R2 = 6,698#
M = 15,061 FT.-#

fb = 638 PSI
fv = 117 PSI
 $\Delta_{total} = 0.09" = 2L/1000$

USE PSL 5 1/4x18



SHELBURNE II 9119

PROJECT
MERCER ISLAND, WASHINGTON

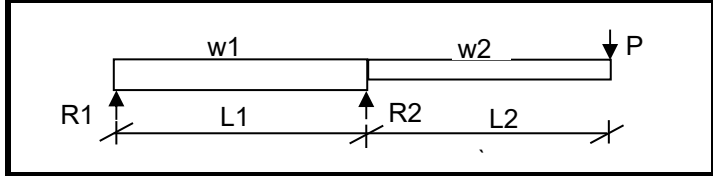
DATE

PROJ. # JDT

DESIGN G6

SHEET

Beam		U3		PSL 5 1/4x18	
w1=	67	plf		R1=	-587 lbs
w2=	307	plf		R2=	5,580 lbs
L1=	13	ft		M+=	-
L2=	4	ft		M-=	13,296 lb-ft
X=	6.50	ft		Fb=	563 psi
P=	2,970	lbs		Fv=	58 psi
b=	5.25	in		Δ span=	(0.036) in
d=	18.00	in		I span/	(4,387)
E=	2,200	ksi		Δ cant=	0.08 in
Cv=	1.00			I cant/	1,156



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Project: Shelburne II 9119 Date: 10/31/21
Mercer Island, Washington Project #: _____
Upper Floor Framing Design: JDT
Sheet: G7

SINGLE-SPAN BEAM ANALYSIS
For Simple, Propped, Fixed, or Cantilever Beams

Job Name:	Shelburne II 9119	Subject:	Upper Floor Framing - U4
Job Number:	01011-2021-11	Originator:	JDT
		Checker:	JDT

Input Data: GL 5 1/2x24

fb = 1076 psi
fv = 224 psi

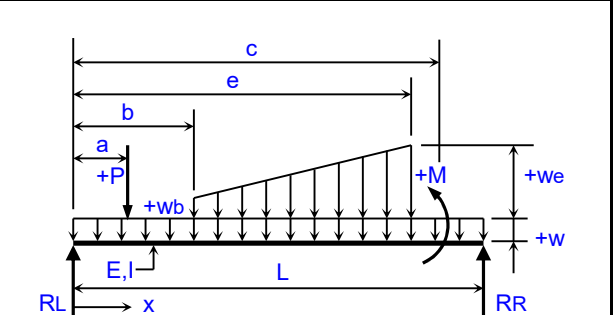
Beam Data:

Span Type? **Simple**

Span, L = **18.5000** ft.

Modulus, E = **1800** ksi

Inertia, I = **6336.00** in.^4



Beam Loadings:

Full Uniform:
w = kips/ft.

Distributed:	Start		End	
	b (ft.)	Wb (kips/ft.)	e (ft.)	We (kips/ft.)
#1:	0.0000	0.3750	2.5000	0.3750
#2:	2.5000	0.4250	16.0000	0.4250
#3:	16.0000	0.8850	18.5000	0.8850
#4:				
#5:				
#6:				
#7:				
#8:				

Results:

Reactions:

RL = **11.69 k** RR = **19.74 k**
ML = **N.A.** MR = **N.A.**

Maximum Moments:

+M(max) = **47.36 ft-k** @ X = **12.03 ft.**
-M(max) = **0.00 ft-k** @ X = **0.00 ft.**

Maximum Deflections:

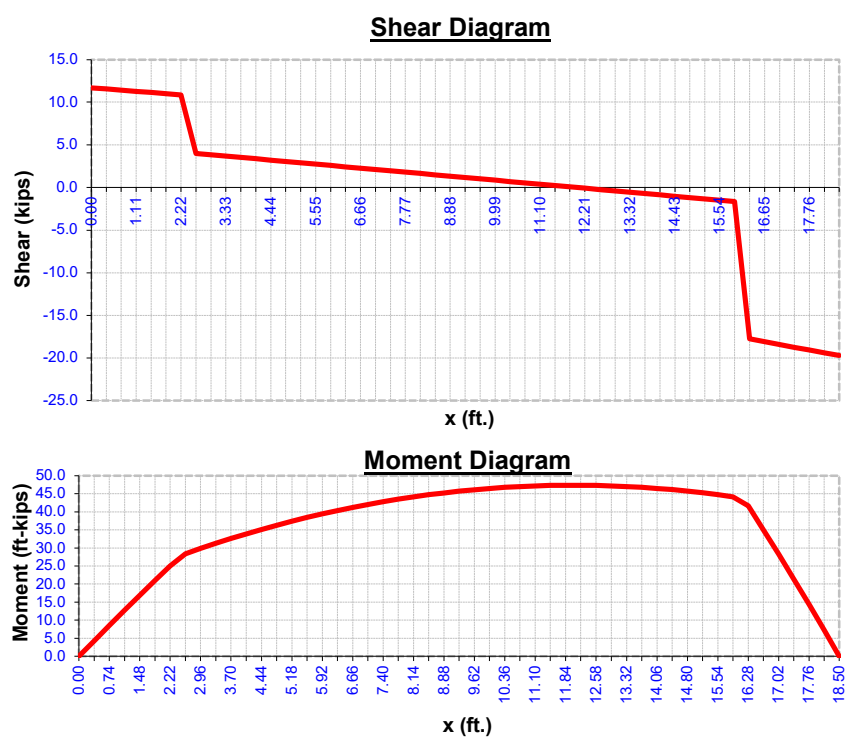
-Δ(max) = **-0.273 in.** @ X = **9.60 ft.**
+Δ(max) = **0.000 in.** @ X = **0.00 ft.**
Δ(ratio) = **L/813**

Point Loads:

#	a (ft.)	P (kips)
#1:	2.5000	6.70
#2:	16.0000	5.58
#3:	16.2500	10.26
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

Moments:

#	c (ft.)	M (ft-kips)
#1:		
#2:		
#3:		
#4:		



SINGLE-SPAN BEAM ANALYSIS

For Simple, Propped, Fixed, or Cantilever Beams

Job Name: Shelburne II 9119	Subject: Upper Floor Framing - U5
Job Number: 01011-2021-11	Originator: JDT Checker: JDT

Input Data: LSL 3 1/2x18
 $fb = 1472 \text{ psi}$
 $fv = 112 \text{ psi}$

Beam Data:

Span Type?	Simple
Span, L =	17.7500 ft.
Modulus, E =	1500 ksi
Inertia, I =	1701.00 in. ⁴

Nomenclature

Beam Loadings:

Full Uniform: w = kips/ft.

	Start		End	
	b (ft.)	Wb (kips/ft.)	e (ft.)	We (kips/ft.)
#1:	0.0000	0.4470	13.0000	0.4470
#2:	13.0000	0.0670	17.7500	0.0670
#3:				
#4:				
#5:				
#6:				
#7:				
#8:				

Results:

Reactions:

RL =	4.55 k	RR =	4.72 k
ML =	N.A.	MR =	N.A.

Maximum Moments:

+M(max) =	23.18 ft-k	@ X =	10.18 ft.
-M(max) =	0.00 ft-k	@ X =	0.00 ft.

Maximum Deflections:

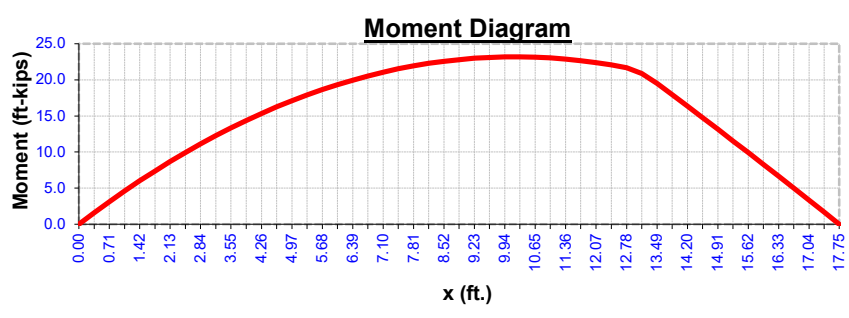
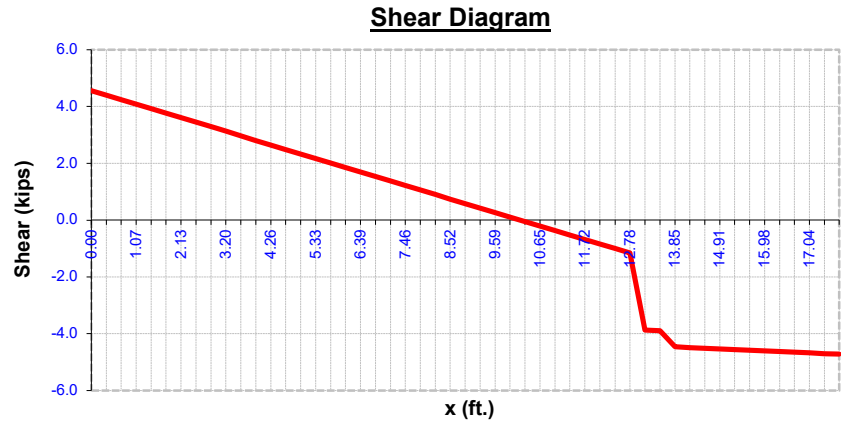
-Δ(max) =	-0.515 in.	@ X =	9.10 ft.
+Δ(max) =	0.000 in.	@ X =	0.00 ft.
Δ(ratio) =	L/414		

Point Loads:

	a (ft.)	P (kips)
#1:	13.0000	2.60
#2:	13.5000	0.55
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

Moments:

	c (ft.)	M (ft-kips)
#1:		
#2:		
#3:		
#4:		



SINGLE-SPAN BEAM ANALYSIS

For Simple, Propped, Fixed, or Cantilever Beams

Job Name: Shelburne II 9119	Subject: Upper Floor Framing - U6
Job Number: 01011-2021-11	Originator: JDT Checker: JDT

Input Data: **GL 5 1/2x24**

fb = 391 psi
fv = 73 psi

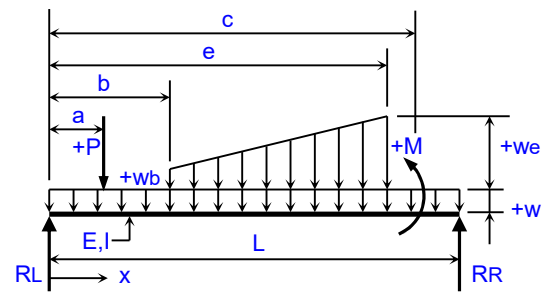
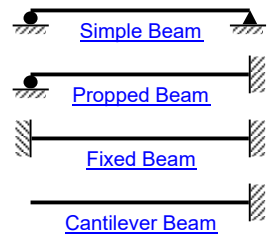
Beam Data:

Span Type? **Simple**

Span, L = **11.0000** ft.

Modulus, E = **1800** ksi

Inertia, I = **6336.00** in.⁴



Nomenclature

Beam Loadings:

Full Uniform:
w = kips/ft.

	Start		End	
	b (ft.)	Wb (kips/ft.)	e (ft.)	We (kips/ft.)
#1:	0.0000	1.0100	0.2500	1.0100
#2:	0.2500	0.7300	8.0000	0.7300
#3:	8.0000	0.0800	11.0000	0.0800
#4:				
#5:				
#6:				
#7:				
#8:				

Results:

Reactions:

RL = 6.38 k	RR = 5.67 k
ML = N.A.	MR = N.A.

Maximum Moments:

+M(max) = 17.19 ft-k	@ X = 6.79 ft.
-M(max) = 0.00 ft-k	@ X = 0.00 ft.

Maximum Deflections:

-Δ(max) = -0.032 in.	@ X = 5.69 ft.
+Δ(max) = 0.000 in.	@ X = 0.00 ft.
Δ(ratio) = L/4074	

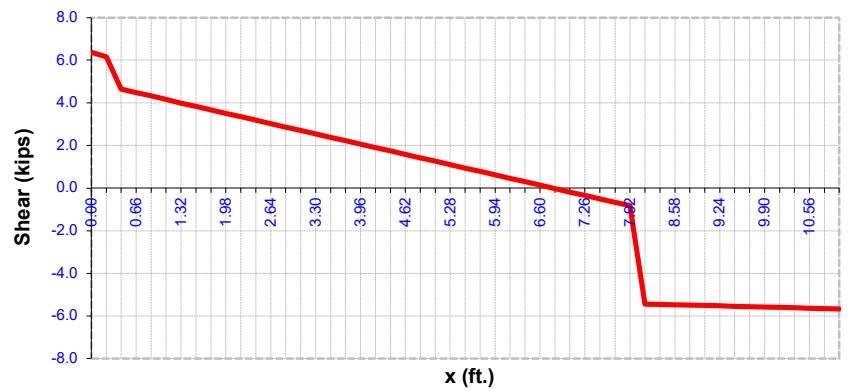
Point Loads:

	a (ft.)	P (kips)
#1:	0.2500	1.35
#2:	8.0000	4.55
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

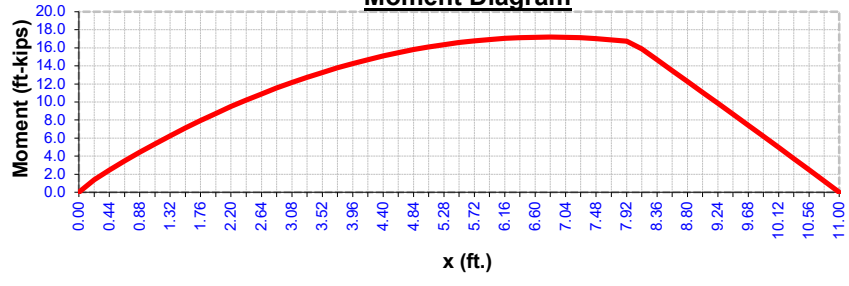
Moments:

	c (ft.)	M (ft-kips)
#1:		
#2:		
#3:		
#4:		

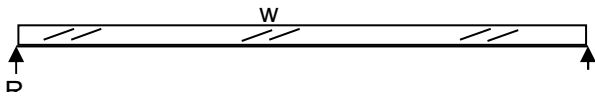
Shear Diagram



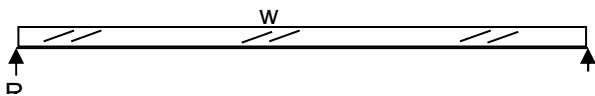
Moment Diagram



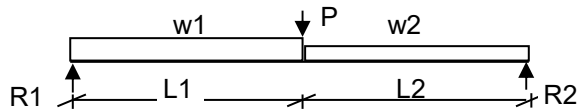
Header		U7		GL 3 1/2x12	
w=	200	plf		R=	1,550 lbs
L=	15.5	ft		M=	6,006 ft-lbs
b=	3.50	in		Fb=	858 psi
d=	12.00	in		Fv=	48 psi
E=	1800	ksi		Δ =	0.29 in
Cv=	1.00	≤ 1.0		I/	650



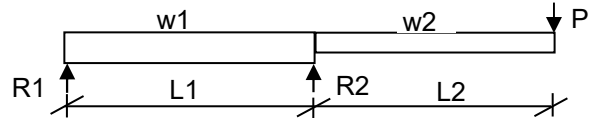
Header		U8		4x12	
w=	180	plf		R=	765 lbs
L=	8.5	ft		M=	1,626 ft-lbs
b=	3.50	in		Fb=	264 psi
d=	11.25	in		Fv=	23 psi
E=	1700	ksi		Δ =	0.03 in
Cv=	1.00	≤ 1.0		I/	3406



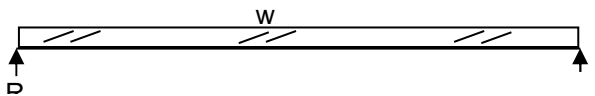
Beam		U9		LSL 3 1/2x18	
w1=	655	plf		R1 =	4,170 lbs
w2=	275	plf		R2 =	2,423 lbs
L1=	4	ft		M =	10,582 lb-ft
L2=	8	ft		Fb =	672 psi
X=	5.5	ft		Fv =	76 psi
P=	2,100	lbs		Δ =	0.09 in
b=	3.50	in		I/	1,516
d=	18.00	in		Cv=	1.00
E=	1,500	ksi			



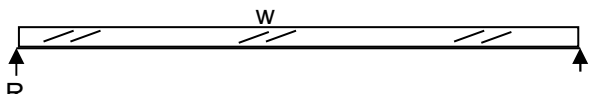
Beam		U10		LSL 3 1/2x18	
w1=	387	plf		R1=	8 lbs
w2=	387	plf		R2=	5,995 lbs
L1=	7	ft		M+=	0 lb-ft
L2=	3	ft		M-=	8,127 lb-ft
X=	3.25	ft		Fb=	516 psi
P=	2,423	lbs		Fv=	69 psi
b=	3.50	in		Δ span=	(0.008) in
d=	18.00	in		I span/	(9,240)
E=	1,500	ksi		Δ cant=	0.04 in
Cv=	1.00			I cant/	1,746



Header		U11		4x12	
w=	1285	plf		R=	3,373 lbs
L=	5.25	ft		M=	4,427 ft-lbs
b=	3.50	in		Fb=	720 psi
d=	11.25	in		Fv=	83 psi
E=	1700	ksi		Δ =	0.03 in
Cv=	1.00	≤ 1.0		I/	2025



Header		U12		PSL 3 1/2x16	
w=	1280	plf		R=	7,840 lbs
L=	12.25	ft		M=	24,010 ft-lbs
b=	3.50	in		Fb=	1,929 psi
d=	16.00	in		Fv=	164 psi
E=	2200	ksi		Δ =	0.25 in
Cv=	1.00	≤ 1.0		I/	596



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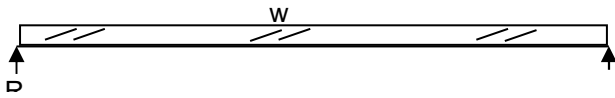
Project: Shelburne II 9119 Date: 10/31/21

Mercer Island, Washington Project #:

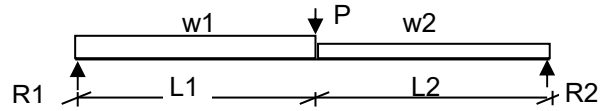
Upper Floor Framing Design: JDT

Sheet: G11

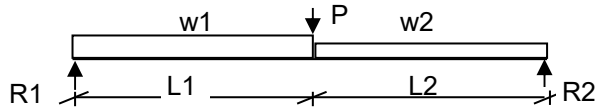
Beam		U13		GL 5 1/2x9	
w=	200	plf		R=	1,525 lbs
L=	15.25	ft		M=	5,814 ft-lbs
b=	5.50	in		Fb=	940 psi
d=	9.00	in		Fv=	42 psi
E=	1800	ksi		Δ =	0.40 in
Cv=	1.00	≤ 1.0		I/	452



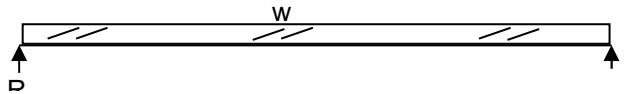
Header		U16		LSL 3 1/2x11 7/8	
w1=	630	plf		R1 =	2,891 lbs
w2=	750	plf		R2 =	6,744 lbs
L1=	6	ft		M =	6,369 lb-ft
L2=	1	ft		Fb =	929 psi
X=	3.5	ft		Fv =	217 psi
P=	5,420	lbs		Δ =	0.07 in
b=	3.50	in		I/	1,148
d=	11.88	in		Cv=	1.00
E=	1,500	ksi			



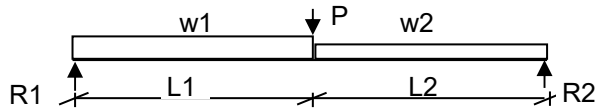
Beam		U14		GL 5 1/2x9	
w1=	120	plf		R1 =	1,210 lbs
w2=	400	plf		R2 =	2,120 lbs
L1=	6	ft		M =	4,971 lb-ft
L2=	4	ft		Fb =	803 psi
X=	5.0	ft		Fv =	55 psi
P=	1,240	lbs		Δ =	0.11 in
b=	5.50	in		I/	1,000
d=	9.00	in		Cv=	1.00
E=	1,800	ksi			



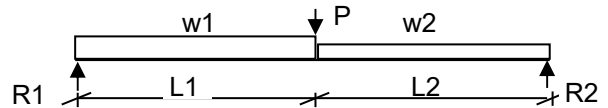
Beam		U17		LSL 3 1/2x18	
w=	407	plf		R=	2,849 lbs
L=	14	ft		M=	9,972 ft-lbs
b=	3.50	in		Fb=	633 psi
d=	18.00	in		Fv=	53 psi
E=	1500	ksi		Δ =	0.14 in
Cv=	1.00	≤ 1.0		I/	1218



Header		U15		LSL 3 1/2x11 7/8	
w1=	750	plf		R1 =	5,722 lbs
w2=	630	plf		R2 =	3,123 lbs
L1=	2	ft		M =	7,739 lb-ft
L2=	5	ft		Fb =	1,129 psi
X=	3.0	ft		Fv =	180 psi
P=	4,570	lbs		Δ =	0.08 in
b=	3.50	in		I/	1,035
d=	11.88	in		Cv=	1.00
E=	1,500	ksi			



Header		U18		4x12	
w1=	120	plf		R1 =	2,249 lbs
w2=	550	plf		R2 =	1,515 lbs
L1=	1	ft		M =	1,653 lb-ft
L2=	2	ft		Fb =	269 psi
X=	1.0	ft		Fv =	81 psi
P=	2,849	lbs		Δ =	0.00 in
b=	3.50	in		I/	15,195
d=	11.25	in		Cv=	1.00
E=	1,700	ksi			



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Project: Shelburne II 9119 Date: 10/31/21

Mercer Island, Washington Project #: _____

Upper Floor Framing Design: JDT

Sheet: G12

SINGLE-SPAN BEAM ANALYSIS

For Simple, Propped, Fixed, or Cantilever Beams

Job Name:	Shelburne II 9119	Subject:	Upper Floor Framing - U19
Job Number:	01011-2021-11	Originator:	JDT
		Checker:	JDT

Input Data: PSL 5 1/4x18
 fb = 476 psi
 fv = 77 psi

Beam Data:

Span Type?	Simple
Span, L =	9.5000 ft.
Modulus, E =	2200 ksi
Inertia, I =	2552.00 in. ⁴

Simple Beam

Propped Beam

Fixed Beam

Cantilever Beam

Nomenclature

Beam Loadings:

Full Uniform: w = kips/ft.

Distributed:	Start		End	
	b (ft.)	Wb (kips/ft.)	e (ft.)	We (kips/ft.)
#1:	0.0000	0.5900	3.7500	0.5900
#2:	3.7500	0.4700	5.7500	0.4700
#3:	5.7500	0.5700	6.0000	0.5700
#4:	6.0000	0.9300	9.5000	0.9300
#5:				
#6:				
#7:				
#8:				

Results:

Reactions:

RL =	3.70 k	RR =	4.82 k
ML =	N.A.	MR =	N.A.

Maximum Moments:

+M(max) =	11.24 ft-k	@ X =	5.75 ft.
-M(max) =	0.00 ft-k	@ X =	0.00 ft.

Maximum Deflections:

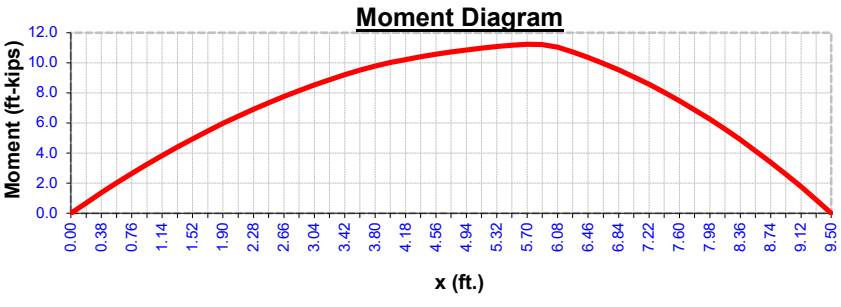
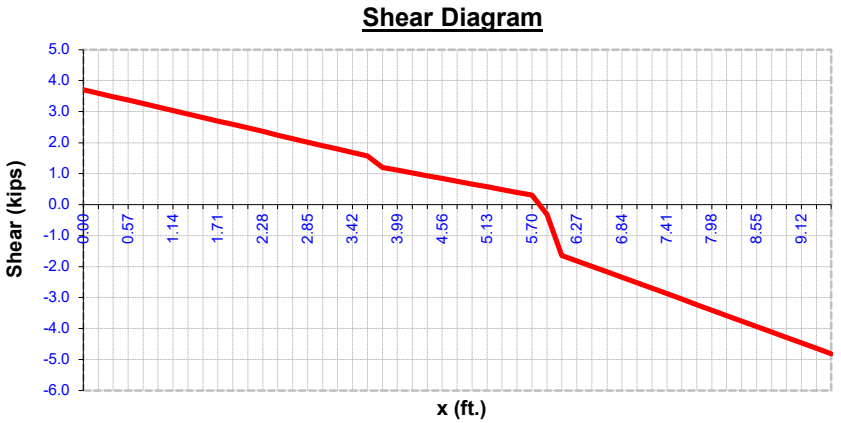
-Δ(max) =	-0.031 in.	@ X =	4.89 ft.
+Δ(max) =	0.000 in.	@ X =	0.00 ft.
Δ(ratio) =	L/3654		

Point Loads:

#	a (ft.)	P (kips)
#1:	3.7500	0.26
#2:	5.7500	0.52
#3:	6.0000	1.19
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

Moments:

#	c (ft.)	M (ft-kips)
#1:		
#2:		
#3:		
#4:		



SINGLE-SPAN BEAM ANALYSIS

For Simple, Propped, Fixed, or Cantilever Beams

Job Name:	Shelburne II 9119	Subject:	Upper Floor Framing - U20
Job Number:	01011-2021-11	Originator:	JDT
		Checker:	JDT

Input Data: PSL 5 1/4x18
 fb = 278 psi
 fv = 75 psi

Beam Data:

Span Type? **Simple**

Span, L = **6.0000** ft.

Modulus, E = **2200** ksi

Inertia, I = **2552.00** in.⁴

Beam Loadings:

Full Uniform: w = kips/ft.

#	Start		End	
	b (ft.)	Wb (kips/ft.)	e (ft.)	We (kips/ft.)
#1:	0.0000	0.6050	1.2500	0.6050
#2:	1.2500	0.9450	5.0000	0.9450
#3:	5.0000	0.8050	6.0000	0.8050
#4:				
#5:				
#6:				
#7:				
#8:				

Nomenclature

Results:

Reactions:

RL = **4.72 k** RR = **4.68 k**
 ML = **N.A.** MR = **N.A.**

Maximum Moments:

+M(max) = **6.56 ft-k** @ X = **2.80 ft.**
 -M(max) = **0.00 ft-k** @ X = **0.00 ft.**

Maximum Deflections:

-Δ(max) = **-0.008 in.** @ X = **2.97 ft.**
 +Δ(max) = **0.000 in.** @ X = **0.00 ft.**
 Δ(ratio) = **L/9114**

Point Loads:

#	a (ft.)	P (kips)
#1:	1.2500	2.50
#2:	5.0000	1.79
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

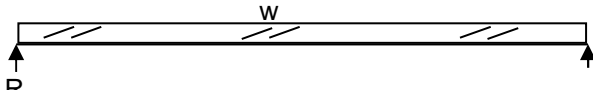
Moments:

#	c (ft.)	M (ft-kips)
#1:		
#2:		
#3:		
#4:		

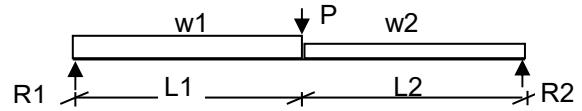
Shear Diagram

Moment Diagram

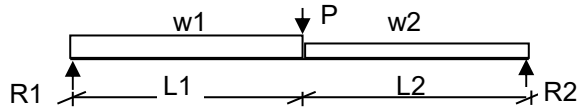
Beam	U21	PSL 5 1/4x18
w=	990	plf
L=	6	ft
b=	5.25	in
d=	18.00	in
E=	2200	ksi
Cv=	1.00	≤1.0
R=	2,970	lbs
M=	4,455	ft-lbs
Fb=	189	psi
Fv=	24	psi
Δ=	0.01	in
I/	14000	



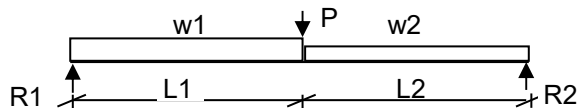
Beam	U24	PSL 5 1/4x18
w1=	220	plf
w2=	380	plf
L1=	6	ft
L2=	1	ft
X=	3.8	ft
P=	6,483	lbs
b=	5.25	in
d=	18.00	in
E=	2,200	ksi
R1 =	1,708	lbs
R2 =	6,475	lbs
M =	6,285	lb-ft
Fb =	266	psi
Fv =	94	psi
Δ=	0.01	in
I/	10,210	
Cv=	1.00	



Beam	U22	PSL 5 1/4x18
w1=	147	plf
w2=	240	plf
L1=	9	ft
L2=	5	ft
X=	7.3	ft
P=	7,615	lbs
b=	5.25	in
d=	18.00	in
E=	2,200	ksi
R1 =	3,571	lbs
R2 =	6,483	lbs
M =	26,746	lb-ft
Fb =	1,132	psi
Fv =	97	psi
Δ=	0.13	in
I/	1,250	
Cv=	1.00	



Beam	U23	PSL 5 1/4x18
w1=	880	plf
w2=	725	plf
L1=	6	ft
L2=	10	ft
X=	7.5	ft
P=	3,571	lbs
b=	5.25	in
d=	18.00	in
E=	2,200	ksi
R1 =	8,557	lbs
R2 =	7,181	lbs
M =	35,505	lb-ft
Fb =	1,503	psi
Fv =	115	psi
Δ=	0.26	in
I/	719	
Cv=	0.99	

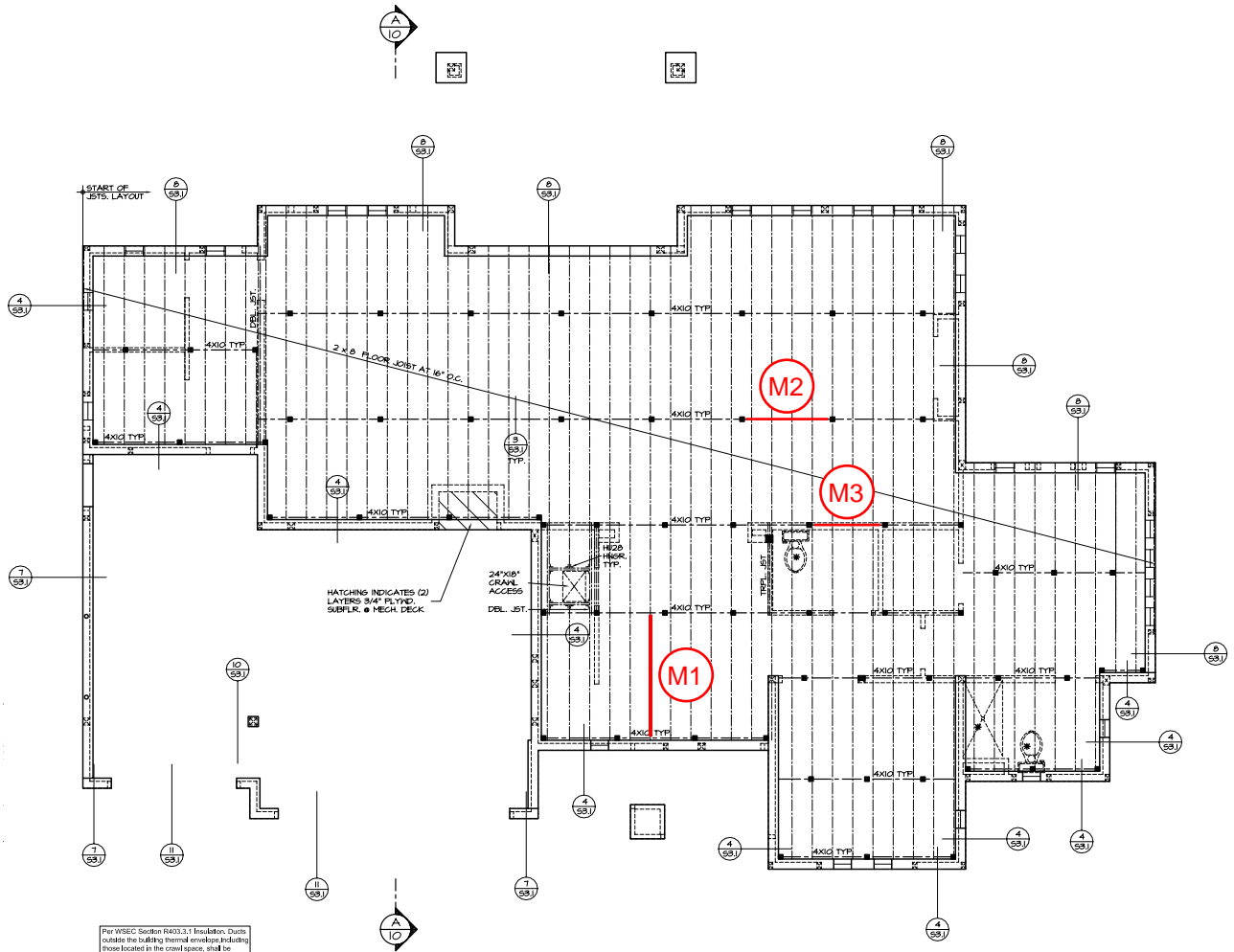


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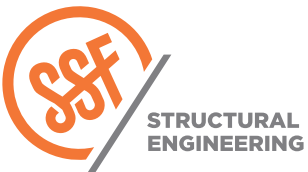
Office: 206.443.6212
Fax: 206.443.4870

Project: Shelburne II 9119 Date: 10/31/21
Mercer Island, Washington Project #: _____
Upper Floor Framing Design: JDT
Sheet: G15

GRAVITY DESIGN KEY PLAN



MAIN FLOOR FRAMING PLAN



SHELBURNE II 9119

PROJECT
MERCER ISLAND, WASHINGTON

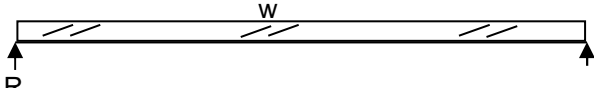
DATE

PROJ. # JDT

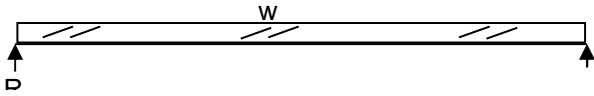
DESIGN G16

SHEET

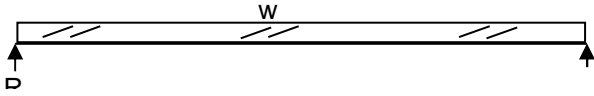
Joist		M1	2x8 @ 16" oc
w=	67	plf	R= 302 lbs
L=	9	ft	M= 678 ft-lbs
b=	1.50	in	Fb= 619 psi
d=	7.25	in	Fv= 36 psi
E=	1300	ksi	Δ = 0.16 in
Cv=	1.00	≤ 1.0	I/I 676



Beam		M2	4x10
w=	350	plf	R= 1,050 lbs
L=	6	ft	M= 1,575 ft-lbs
b=	3.50	in	Fb= 379 psi
d=	9.25	in	Fv= 36 psi
E=	1700	ksi	Δ = 0.03 in
Cv=	1.00	≤ 1.0	I/I 2768



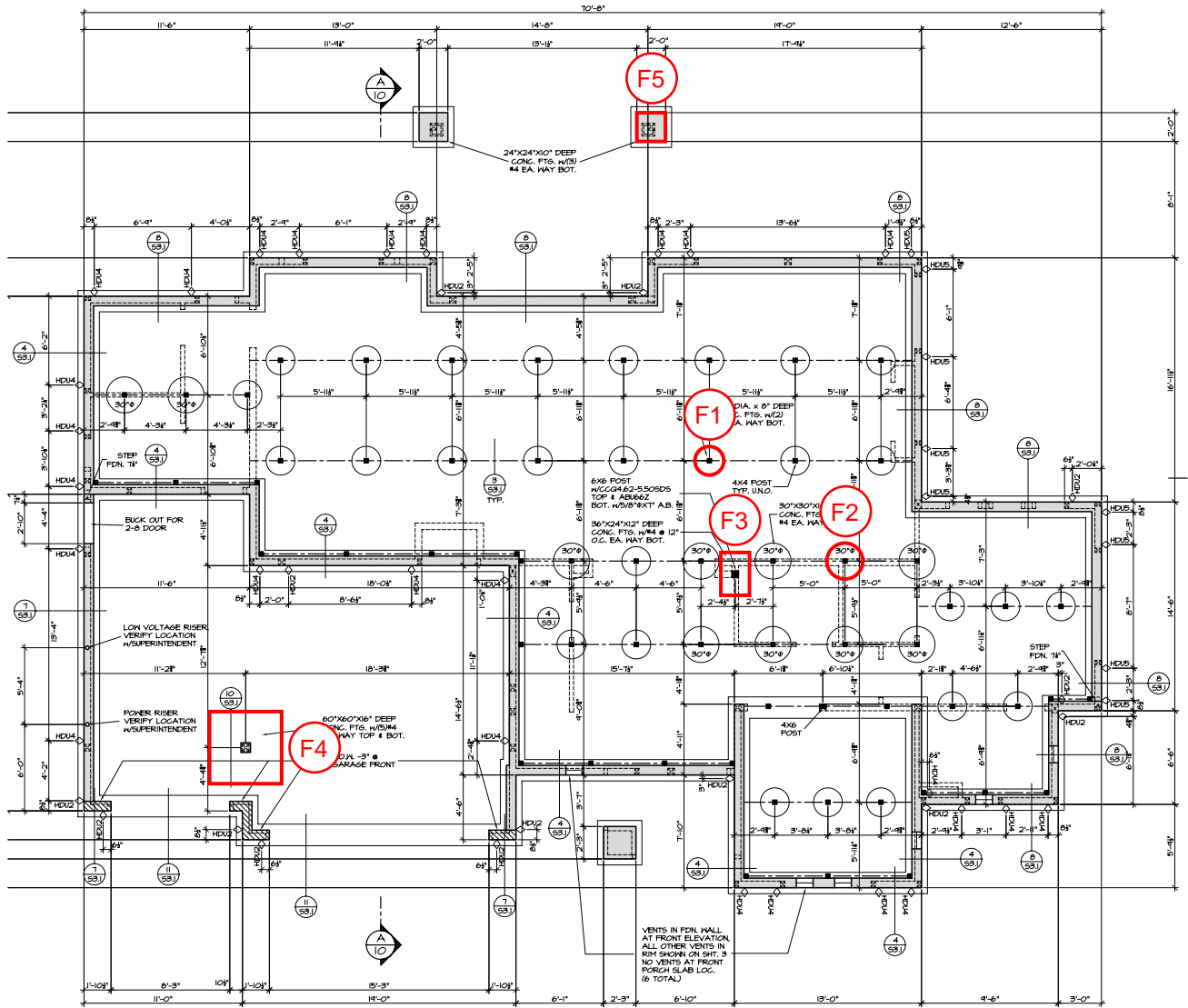
Beam		M3	4x10
w=	1080	plf	R= 2,700 lbs
L=	5	ft	M= 3,375 ft-lbs
b=	3.50	in	Fb= 811 psi
d=	9.25	in	Fv= 87 psi
E=	1700	ksi	Δ = 0.04 in
Cv=	1.00	≤ 1.0	I/I 1550



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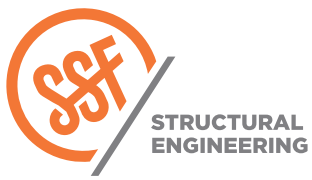
Project: Shelburne II 9119 Date: 10/31/21
Mercer Island, Washington Project #: _____
Main Floor Framing Design: JDT
 Sheet: G17

GRAVITY DESIGN KEY PLAN



FOUNDATION PLAN

SEATTLE 2124 Third Ave, Suite 100, Seattle, WA 98121 | 206.443.6212
 TACOMA 934 Broadway, Suite 100, Tacoma, WA 98402 | 253.284.9470
 SWENSON SAY FAGET | ssfengineers.com



SHELBURNE II 9119
 PROJECT
 MERCER ISLAND, WASHINGTON

DATE _____
 PROJ. # JDT
 DESIGN G18
 SHEET _____

GRAVITY DESIGN

FOUNDATION DESIGN

F1:

P = 2,415#
qallow = 1500 psf
Areq = 1.6 square feet

USE 24" DIA.x8" DP. CONCRETE PAD FOOTING WITH (2)#4's EACH WAY BOTTOM

F2:

P = 6,210#
qallow = 1500 psf
Areq = 4.1 square feet

USE 30" DIA.x10" DP. CONCRETE PAD FOOTING WITH (3)#4's EACH WAY BOTTOM

F3:

P = 8,557#
qallow = 1500 psf
Areq = 5.7 square feet

USE 3'-0"x2'-0"x12" DP. CONCRETE PAD FOOTING WITH #4's AT 12" oc EACH WAY BOTTOM

F4:

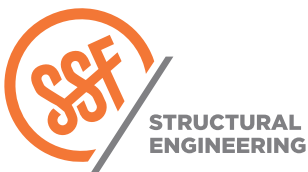
P = 32,260#
qallow = 1500 psf
Areq = 21.5 square feet

USE 5'-0"x5'-0"x16" DP. CONCRETE PAD FOOTING WITH (5)#4's EACH WAY TOP AND BOTTOM

F5:

P = 2,735#
qallow = 1500 psf
Areq = 1.8 square feet

USE 2'-0"x2'-0"x10" DP. CONCRETE PAD FOOTING WITH (3)#4's EACH WAY BOTTOM



SHELBURNE II 9119

PROJECT
MERCER ISLAND, WASHINGTON

DATE

PROJ. # JDT

DESIGN G19

SHEET