

STRUCTURAL CALCULATIONS

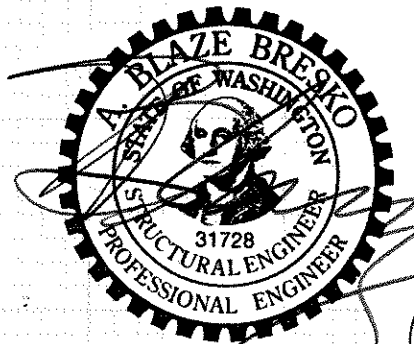
FOR THE

SIMPSON RESIDENCE

6454 E. MERCER WAY
MERCER IS. WA 98040

ARCHITECT

STURMAN ARCHITECTS
9-103rd AVE NE #203
Bellevue, WA 98004



3/16/22

REV 1/20/23



Simpson
PROJECT

DATE

DESIGN
Blaze Bresko

SHEET

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

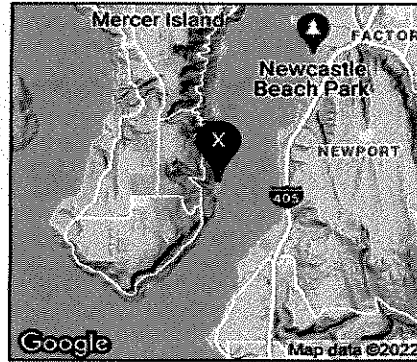
Street & Number 6454 E Mercer way
 City: mercer island State: WA
 ZIP: 98040
 Latitude: 47.5442 N
 Longitude: -122.2093 W
 Ground Elevation 31 ft

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 $C_e = 4$
 Base Shear V = 17 kips $\Omega_e = 2.5$
 $S_s = 1.448$ $S_F = 0.501$
 $S_{DS} = 1.00$ $S_{D1} = 0.57$
 $C_u = 0.154$ $I_e = 1.0$



Story Information

Stories Above Grade (Including Mezzanine Levels) 3

Horizontal and Vertical Irregularities:

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

Wind Load Summary:

V = 98 $K_{Z1} = 1.00$
 Exposure = C

Dead Loads:

Roof		Floor	
Roofing	3 psf	Finish Floor	2 psf
1/2" Sheathing	1.5 psf	3/4" Sheathing	2.3 psf
Trusses @ 24" oc	2 psf	Joists @ 16" oc	2.2 psf
Misc./Mech.	1 psf	Misc./Mech.	1 psf
Ceiling Finish	2.5 psf	Ceiling Finish	2.5 psf
Solar Panels	5 psf		10 psf
Use	15 psf	Use	10 psf
Add 5 psf for Seismic	20 psf	Add 5 psf for Seismic	15 psf

Live Loads:

Roof	20 psf
Floor	40 psf

Snow Loading Criteria:

Ground Snow, p_g	20 psf	Flat Roof Snow Load, p_f	25.0 psf
Exposure Factor, C_e	1.00	Sloped Roof Snow Load, p_s	25.0 psf
Thermal Factor, C_t	1.00		
Importance Factor, I_s	1.00		
Slope Factor, C_s	1.00		

Soils:

Soils Report Provided?	Yes		
Allowable Bearing	psf	Active	pcf (Restrained/Unrestrained)
Sliding, μ		Seismic Surcharge	
Passive	pcf		



Simpson Residence

Criteria

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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	Yes
≤ 5 Stories above grade	Yes
T ≤ 0.5s	Yes
p = 1.0	Yes
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*(Calculated S_{DS})

S _s	1.448 g	2% in 50 yr, Latitude & Longitude lookup
S ₁	0.501 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	20.0 ft	
C _t	0.02	Table 12.8-2
x	0.75	Table 12.8-2
T _a	0.19 sec	
T	0.19 sec	Eq. 12.8-7
T _o	0.11 sec	
T _s	0.57 sec	
T _L	6.00 sec	
F _a	1.20	Table 11.4-1
F _v	1.70	Table 11.4-2
S _{MS}	1.74 g	Eq. 11.4-1
S _{M1}	0.85 g	Eq. 11.4-2
S _{DS}	1.000 g	Eq. 11.4-3
S _{D1}	0.568 g	Eq. 11.4-4
C _s	0.154 Controls	Eq. 12.8-2
	0.462	Eq. 12.8-3 need not exceed, T < T _L
	0.010	Eq. 12.8-5 or 12.8-6 minimum
C _{s, design}	0.154	
Bldg. Weight	110.0 k	
V = C _s W	16.9 k	Eq. 12.8-1, Strength Level Base Shear
V = C _{s, ASD} W	11.8 k	Eq. 12.8-1 ASD Base Shear

Building Period Per Alternate Analysis

T (sec)	
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Per Geotech Report

F _a	
F _v	

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

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

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

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

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

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

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

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

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

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

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

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

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

Vertical Distribution ASD ρ = 1 k = 1.000

Level	h _x (ft)	W _x (k)	h _x ^k (ft)	W _x h _x ^k	Story Shear ASD			Diaphragm Force (p not included)				
					C _{VX} (%)	F _x (k)	SV (k)	F _{px,calc}	F _{px,min}	F _{px,max}	F _{px,design}	γ = F _{px} /F _x
Roof	20.0	50	20.0	1000	0.602	7.1	7.1	7.1	7.0	14.0	7.1	1.00
2	11.0	60	11.0	660	0.398	4.7	11.8	6.5	8.4	16.8	8.4	1.78
Σ		110.0		1660		11.8						



Simpson Residence _____
Seismic Criteria _____

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Wind Design - MWFRS

ASCE 7 Chapter 27 - Directional Procedure

Design Method	ASD
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Wind Coefficients

Exposure	C	
V=	98	mph
K _c =	0.85	Table 26.6-1
K _d =	0.94	Table 26.10-1
K _e =	1.00	Table 26.9-1
G=	0.85	26.9.4

Transverse Wind Pressures

L/B = 0.80 h/L = 0.40

Pressure Coefficients from Figure 27.3-1:

Bldg Face	C _p
Windward Wall	0.8
Leeward Wall	-0.50
Windward Roof	-0.26 / 0.24
Leeward Roof	-0.60

Location and Building Dimensions

Calculate Kzt?	Yes	
Kzt	1.00	
Roof Type	Gable	
Roof Slope - Transverse Dir	25	degrees
Roof Slope - Long Dir	25	degrees
Ground to top of roof	28	ft
Bot of roof to top of roof	8	ft
Mean Roof Height, h	24	ft
Short Plan Dimension	60	ft
Long Plan Dimension	75	ft
Parapet?	No	
Ground to top of parapet		ft
Average Parapet Height		ft

Velocity Pressure at Mean Roof Height, q _h =	19.6	psf
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Wall Pressures (Unfactored):

Ht	K _z	q _z	P _{w/w walls}	P _{hw/walls}	P _{walls (psf)}
0-15	0.85	17.74	12.07	8.31	12.2
15-20	0.9	18.79	12.78	8.31	12.7
20-25	0.94	19.62	13.34	8.31	13.0
25-30	0.98	20.46	13.91	8.31	13.3
30-40	1.04	21.71	14.76	8.31	13.8
41-50	1.09	22.75	15.47	8.31	14.3
51-60	1.13	23.59	16.04	8.31	14.6
61-70	1.17	24.42	16.61	8.31	15.0
71-80	1.21	25.26	17.18	8.31	15.3
81-90	1.24	25.88	17.60	8.31	15.5
91-100	1.26	26.30	17.89	8.31	15.7

Roof Pressures (Unfactored)

Windward			Leeward	Horiz Proj (psf)
Max	Min			
4.0	-4.3	-10.0		8.38

Longitudinal Wind Pressures

L/B = 1.25 h/L = 0.32

Pressure Coefficients from Figure 27.4-1:

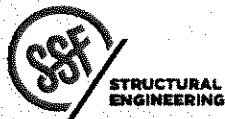
Bldg Face	C _p
Windward Wall	0.8
Leeward Wall	-0.45
Windward Roof	-0.23 / 0.27
Leeward Roof	-0.60

Wall Pressures (Unfactored):

Ht	K _z	q _z	P _{w/w walls}	P _{hw/walls}	P _{walls (psf)}
0-15	0.85	17.74	12.07	7.48	11.73
15-20	0.9	18.79	12.78	7.48	12.16
20-25	0.94	19.62	13.34	7.48	12.50
25-30	0.98	20.46	13.91	7.48	12.84
30-40	1.04	21.71	14.76	7.48	13.35
41-50	1.09	22.75	15.47	7.48	13.77
51-60	1.13	23.59	16.04	7.48	14.11
61-70	1.17	24.42	16.61	7.48	14.45
71-80	1.21	25.26	17.18	7.48	14.80
81-90	1.24	25.88	17.60	7.48	15.05
91-100	1.26	26.30	17.89	7.48	15.22

Roof Pressures (Unfactored)

Windward			Leeward	Horiz Proj (psf)
Max	Min			
4.5	-3.8	-10.0		8.70



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 Wind Criteria _____

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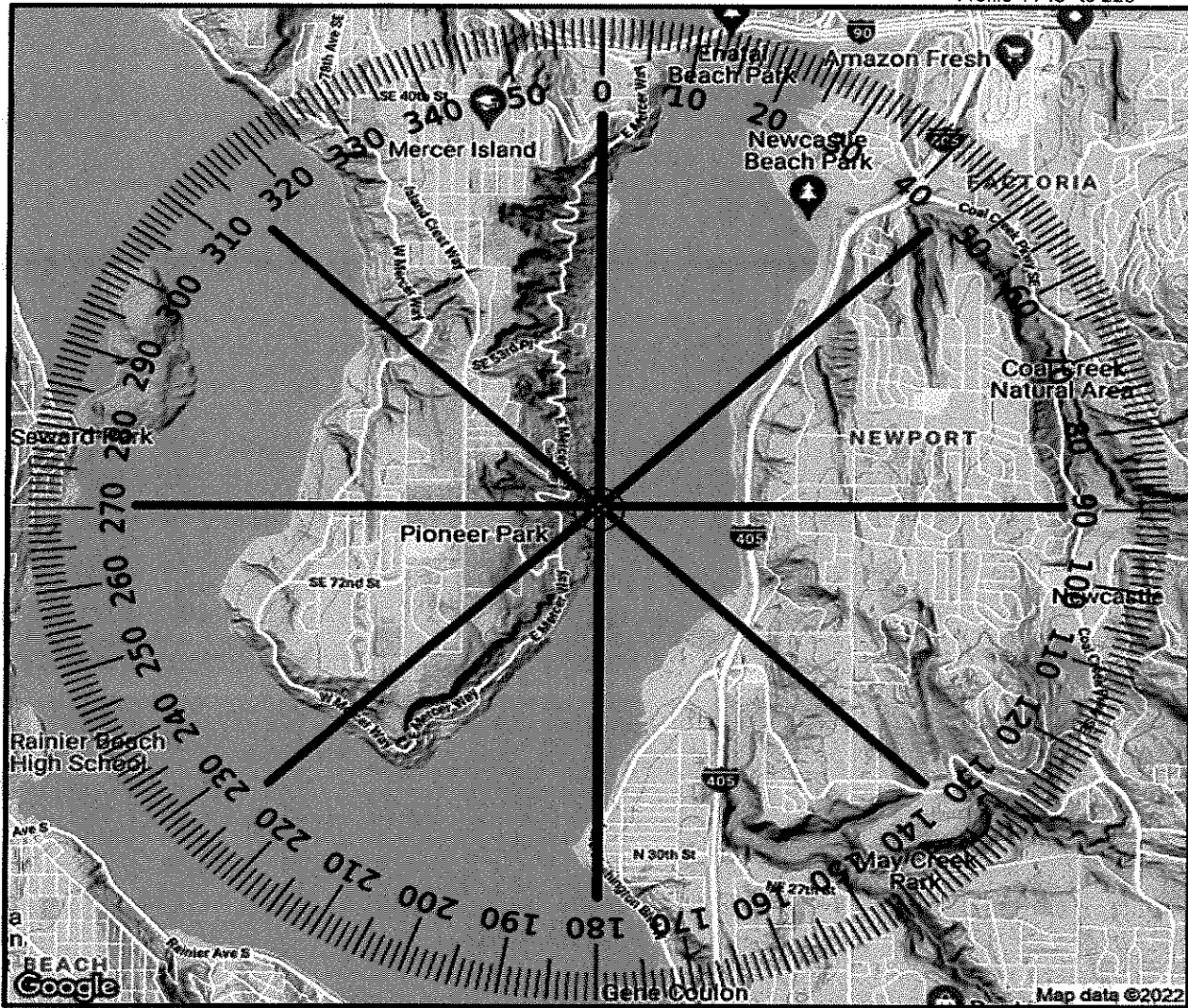
Site Address

Address 6454 E Mercer way
 City: mercer island State: WA
 Lat Long 47.54421 -122.2093

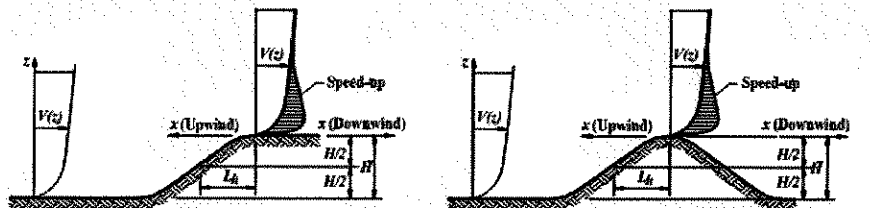
Wind Radius 2.00 Miles
 Angle 0°
 Exposure C

Profile 1: 0° to 180°
 Profile 2: 270° to 90°
 Profile 3: 315° to 135°
 Profile 4: 45° to 225°

SITE MAP



Topography from Figure 26.8-1



ESCARPMENT

2-D RIDGE OR 3-D AXISYMMETRICAL HILL

$$K_{zt} = (1 + K_1 K_2 K_3)^2$$

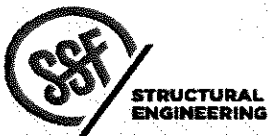
$$K_1 = \text{Per Figure}$$

$$K_2 = (1 - |x|/\mu L_h)$$

$$K_3 = e^{-\gamma z/L_h}$$

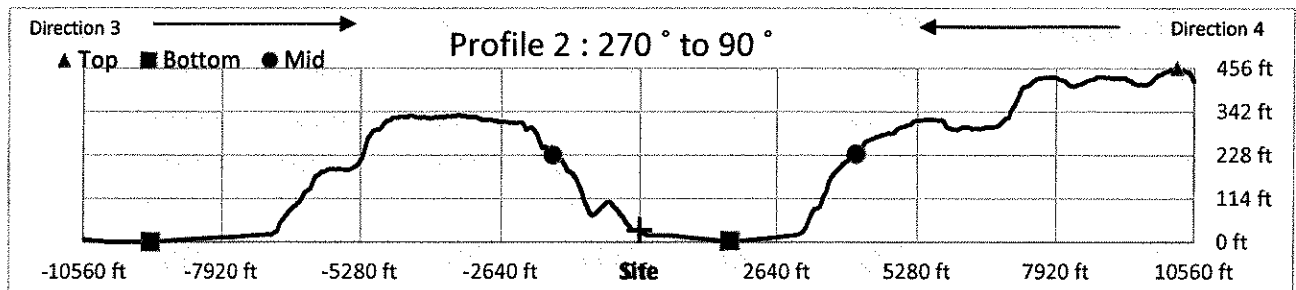
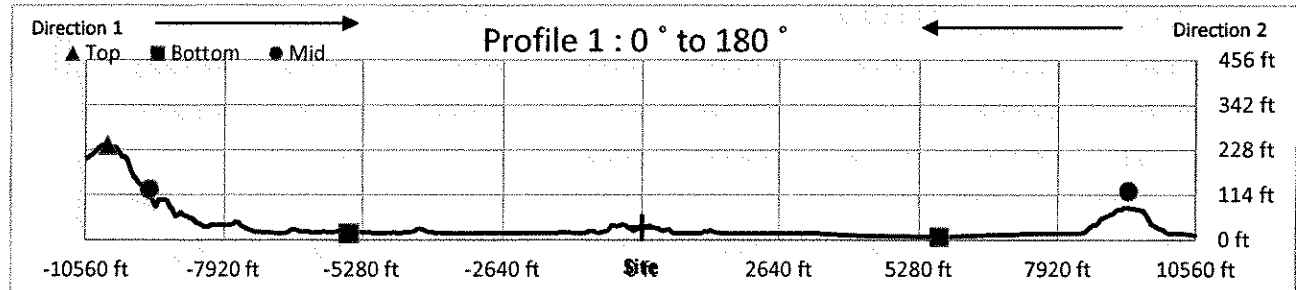
$$K_{zt} = 1, \text{ if } H/L_h \leq 0.2$$

PER FIGURE 26.8-1



Simpson Residence _____
 Kzt Calculations _____

DATE 2/17/2022
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 SHEET 4



Direction 1 - 0° to Site

Direction 2 - Site to 180°

Direction 3 - 270° to Site

Direction 4 - Site to 90°

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	Yes
5. H ≥ 15'	Yes

Kzt=1

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Terrain Data

Terrain	Ridge
Top of Hill Dist.	-10135
Bott. of Hill Dist.	-5519
L @ H/2	-9339
Site	downwnd
Top of Hill Elev.	239
Bott. of Hill Elev.	16
Site Elev.	30.9
Site Dist.	0
H/2	128

Terrain Data

Terrain	Ridge
Top of Hill Dist.	-10135
Bott. of Hill Dist.	5678
L @ H/2	9286
Site	upwind
Top of Hill Elev.	239
Bott. of Hill Elev.	7
Site Elev.	30.9
Site Dist.	0
H/2	123

Terrain Data

Terrain	Ridge
Top of Hill Dist.	10242
Bott. of Hill Dist.	-9286
L @ H/2	-1645
Site	upwind
Top of Hill Elev.	457
Bott. of Hill Elev.	0
Site Elev.	30.9
Site Dist.	0
H/2	229

Terrain Data

Terrain	Ridge
Top of Hill Dist.	10242
Bott. of Hill Dist.	1751
L @ H/2	4139
Site	downwnd
Top of Hill Elev.	457
Bott. of Hill Elev.	3
Site Elev.	30.9
Site Dist.	0
H/2	230

Kzt Calculations

H=	224
Lh=	796
x=	10135
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.41
K2=	0.00
k3=	0.91
H/Lh =	0.28
Kzt =	1.00

Kzt Calculations

H=	232
Lh=	19421
x=	10135
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.02
K2=	0.65
k3=	1.00
H/Lh =	0.01
Kzt =	1.00

Kzt Calculations

H=	457
Lh=	11887
x=	10242
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.06
K2=	0.43
k3=	0.99
H/Lh =	0.04
Kzt =	1.00

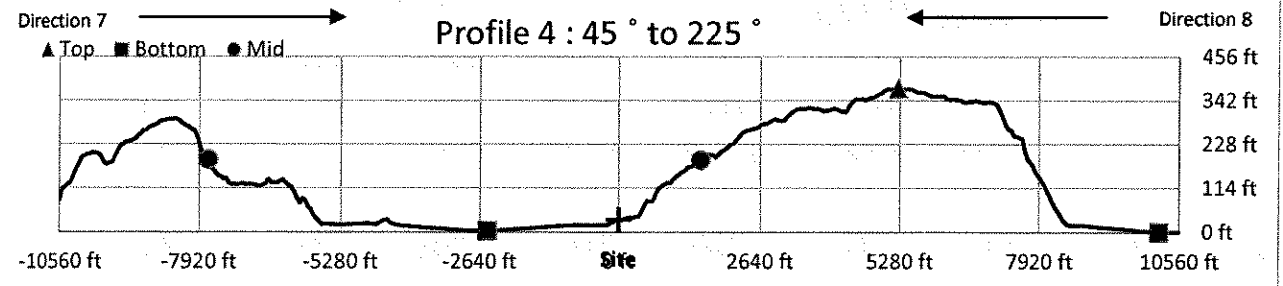
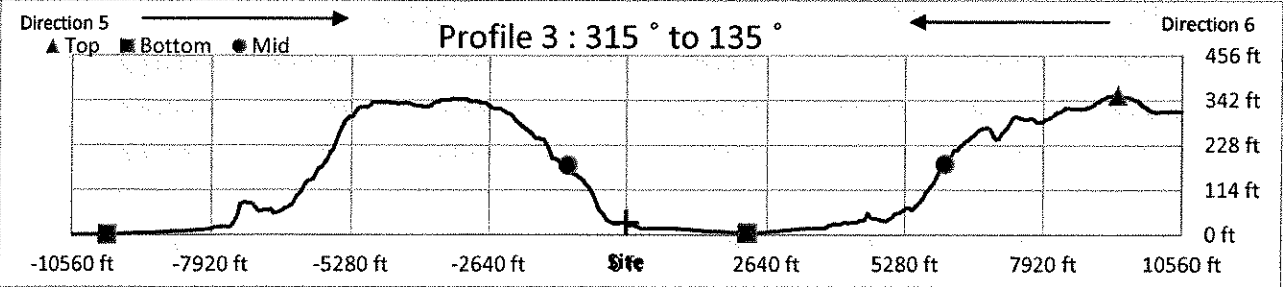
Kzt Calculations

H=	454
Lh=	6103
x=	10242
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.11
K2=	0.00
k3=	0.99
H/Lh =	0.07
Kzt =	1.00



Simpson Residence _____
Kzt Calculations _____

DATE 2/17/2022
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SHEET 5



Direction 5 - 315° to Site

Direction 6 - Site to 135°

Direction 7 - 45° to Site

Direction 8 - Site to 225°

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Site Conditions (26.8.1)

1. Unobstructed	Yes
2. Isolated	Yes
3. Upper Half Hill	No
4. H/Lh ≥ 0.2	No
5. H ≥ 15'	Yes

Kzt=1

Terrain Data

Terrain	Ridge
Top of Hill Dist.	9339
Bott. of Hill Dist.	-9870
L @ H/2	-1114
Site	upwind
Top of Hill Elev.	355
Bott. of Hill Elev.	0
Site Elev.	30.9
Site Dist.	0
H/2	177

Terrain Data

Terrain	Ridge
Top of Hill Dist.	9339
Bott. of Hill Dist.	2282
L @ H/2	6049
Site	downwind
Top of Hill Elev.	355
Bott. of Hill Elev.	4
Site Elev.	30.9
Site Dist.	0
H/2	179

Terrain Data

Terrain	Ridge
Top of Hill Dist.	5253
Bott. of Hill Dist.	-2494
L @ H/2	-7748
Site	upwind
Top of Hill Elev.	373
Bott. of Hill Elev.	3
Site Elev.	30.9
Site Dist.	0
H/2	188

Terrain Data

Terrain	Ridge
Top of Hill Dist.	5253
Bott. of Hill Dist.	10189
L @ H/2	1539
Site	downwind
Top of Hill Elev.	373
Bott. of Hill Elev.	0
Site Elev.	30.9
Site Dist.	0
H/2	187

Kzt Calculations

H=	355
Lh=	10453
x=	9339
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.05
K2=	0.40
k3=	0.99
H/Lh =	0.03
Kzt =	1.00

Kzt Calculations

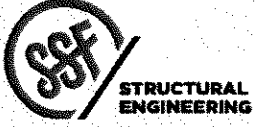
H=	351
Lh=	3290
x=	9339
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.15
K2=	0.00
k3=	0.98
H/Lh =	0.11
Kzt =	1.00

Kzt Calculations

H=	370
Lh=	13001
x=	5253
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.04
K2=	0.73
k3=	0.99
H/Lh =	0.03
Kzt =	1.00

Kzt Calculations

H=	373
Lh=	3714
x=	5253
z=	24
μ=	1.5
γ=	3
K1 value =	1.45
K1=	0.15
K2=	0.06
k3=	0.98
H/Lh =	0.10
Kzt =	1.00



Simpson Residence _____
 Kzt Calculations _____

DATE 2/17/2022
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 SHEET 6

Roof Framing

B1

$L = 8'$
 $w = .4\%$
 $R = 2.6k$
 $M = 32k$
 $F_b = 1.22 ksi$
 $F_v = 109 psi$
 $\Delta = .16" \rightarrow e/602$

2x12

B2

$L = 12.5'$
 $w = .5\%$
 $R = 3.13k$
 $M = 9.77k$
 $F_b = 1.58 ksi$
 $F_v = 84 psi$
 $\Delta = .46" \rightarrow e/328$
 OR 3 1/2 x 12

GL 5 1/2" x 9"

B3

$L = 14.5'$
 $w = .04(1.5) = .15\%$
 $R = 1.1k$
 $M = 3.95k$
 $F_b = 1.5 ksi$
 $F_v = 96 psi$
 $\Delta = .65" \rightarrow e/269$

2x12

B4

$L = 18.75'$
 $w = .04(15.5) = .31\%$
 $R = 2.91k$
 $M = 13.63k$
 $F_b = 1.62 ksi$
 $F_v = 69 psi$
 $\Delta = .91" \rightarrow e/249$

GL 5 1/2" x 10 1/2"

B5

$L = 14'$
 $M = 10.19k$
 $w_{eq} = .42\%$
 $R = 1.46k$
 $F_b = 1.66 ksi$
 $F_v = 45 psi$
 $\Delta = .48" \rightarrow e/351$

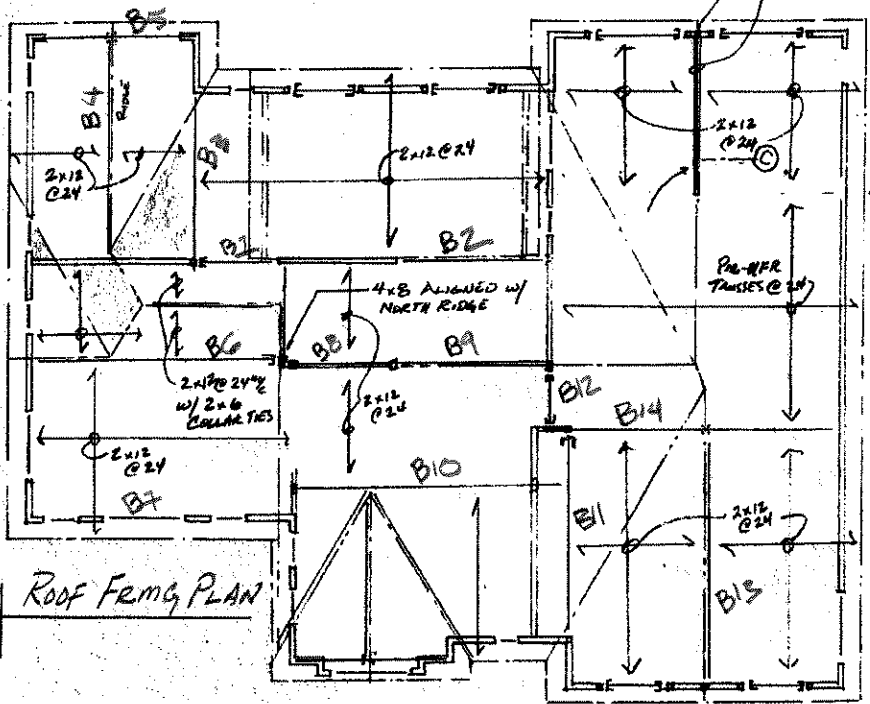
GL 5 1/2" x 9"

B6

$L = 21'$
 $w = .04(21) = .42\%$
 $R = 4.4k$
 $M = 23k$
 $F_b = 1.66 ksi$
 $\Delta = .9" \rightarrow e/278$

GL 5 1/2" x 13 1/2"

Roof Framg PLAN



B7

$L = 7.5'$
 $w = .04(7.5) = .3\%$
 $R = 1.13k$
 $M = 2.11k$
 $F_b = .8 ksi$
 $F_v = 75 psi$
 $\Delta = .1" \rightarrow e/975$

2x12

B8

$L = 10'$
 $w = .04(10) = .38\%$
 $R = 1.9k$
 $M = 4.75k$
 $F_b = 1.81 ksi$
 $F_v = 138 psi$
 $\Delta = .37" \rightarrow e/224$

2x12

B9

$L = 13'$
 $w = .38\%$
 $R = 2.47k$
 $M = 8.03k$
 $F_b = 2.04 ksi$
 $F_v = 105 psi$
 $\Delta = .64" \rightarrow e/244$

GL 3 1/2" x 9"



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PROJECT

12/28/22

DATE

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Blay
(R7)

Roof Framing (Cont.)

B10

$L = 20'$
 $w = .04 \left(\frac{25}{2} \right)$
 $= .5 \text{ k/ft}$
 $R = 5 \text{ k}$
 $M = 25 \text{ k-ft}$

GL 5 1/2" x 13 1/2"

$F_b = 1.8 \text{ ksi}$
 $F_r = 90 \text{ psi}$
 $\Delta = .89" \rightarrow \frac{1}{270}$

B11

$L = 17.5'$
 $w = .04 \left(\frac{18}{2} \right)$
 $= .24 \text{ k/ft}$
 $R = 2.1 \text{ k}$
 $M = 9.19 \text{ k-ft}$

GL 5 1/2" x 9"

$F_b = 1.49 \text{ ksi}$
 $F_r = 59 \text{ psi}$
 $\Delta = .85" \rightarrow \frac{1}{249}$

B12

$L = 5.5'$
 $w = .04 \left(\frac{25}{2} \right)$
 $= .5 \text{ k/ft}$
 $R = 1.4 \text{ k}$
 $M = 1.9 \text{ k-ft}$

2x12

$F_b = .72 \text{ ksi}$
 $F_r = 81 \text{ psi}$
 $\Delta = .05" \rightarrow \frac{1}{1483}$
 OR 4x8, $F_b = .74 \text{ ksi}$

B13

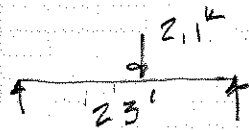
$L = 21.5'$
 $w = .04 \left(\frac{25}{2} \right)$
 $= .5 \text{ k/ft}$
 $R = 5.38 \text{ k}$
 $M = 28.90 \text{ k-ft}$

GL 5 1/2" x 15"

$F_b = 1.68 \text{ ksi}$
 $F_r = 86 \text{ psi}$
 $\Delta = .86" \rightarrow \frac{1}{300}$

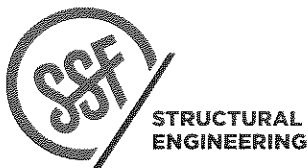
B14

$R = 1.05$
 $M =$



GL 5 1/2" x 12"

$F_b = 1.1 \text{ ksi}$
 $\Delta = .65" \rightarrow \frac{1}{428}$



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DESIGN [Signature]

SHEET [Signature]

UPP FLR FRAMING

J1 L=18' 14" TJS/210@16
 J2 L=21'-6" L_a=21'-10"
 L/480 LL

J3 W=50psf
 P=.04(24) = .96k
 =.48k, .78k, .67k
 M=4.47k', 14" TJS/210@12
 M_a=4.5(11.5)=5.2k'
 Δ=.61"=1/386

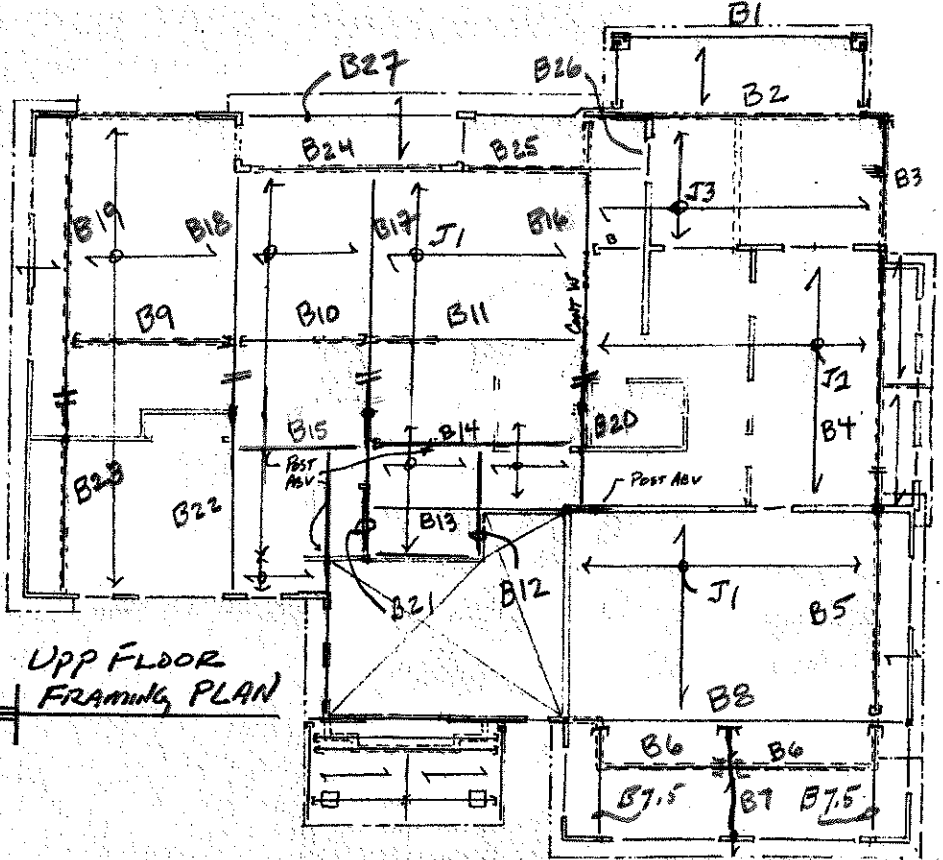
B1 L=19'
 W=.075(3.5)=.26k
 R=2.5k
 M=11.7k'
 5'1/4 x 11'1/2
 F_s=1.14 ksi
 Δ=.47"=1/482

B2 L=18'
 W=.075(3.5)+.14=.4k
 R=3.6k
 M=16.2k'
 5'1/4 x 14
 F_s=1.13 ksi
 Δ=.36"=1/603

B3 L=11'
 W=.05(10)+.04(6)=.74k
 R=4k
 M=11.2k'
 3'1/2 x 14
 F_s=1.17 ksi
 Δ=.14"=1/953

B4 L=17.5'
 W=.04(12)+.11=.58k
 R=5k
 M=22.2k'
 5'1/4 x 14
 F_s=1.55 ksi
 Δ=.46"=1/453

B5 W=.4k
 M+=8.1k'
 M-=16.8k'
 12.5' ↑ 3'
 2.5' 10.7'
 5'1/4 x 14
 F_s=1.18 ksi
 Δ+=.11"=1/1800
 Δ-=.05"=21/1465

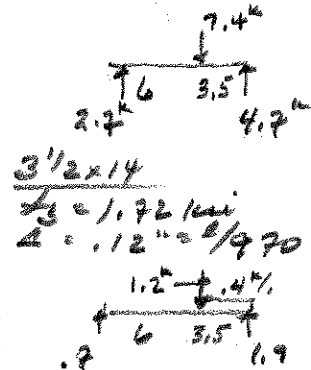


B6 L=11'
 W=.04(1/2)+.1=.22k
 R=1.2k
 M=3.3k'
 1'3/4 x 14
 F_s=.7 ksi

B7 P=5k (ROOF)
 P₂=1.2(2)=2.4k
 M=16.4k'
 7.4k
 2.7' 3.5' 4.7'

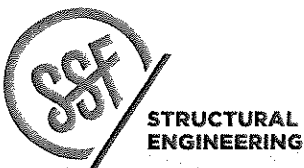
B7.5 P=1.2k
 M=4.2k'
 3'1/2 x 14
 1.2' ↑ .4k
 6' 3.5' 1.9'

B8 P₁=1.9k (11.6' red)
 P₂=4.7k (4' red)
 P₃=2.5+1.9=4.4k (3.7' red)
 W=.35k
 M=71k'
 Wog=.7k'
 12'12 x 72
 F_s=8.9 ksi
 Δ=.6"=1/570



12/28/22
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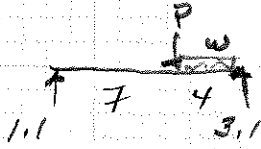
LPP FLR Fram'g (CONT)

B9 L=13.5'

$W_{ave} = .04(\frac{26}{2}) + .1 = .64$

$R = 4k$
 $M = 13.7k'$

$f_b = 1.44 ksi$
 $\Delta = .25" = e/634$

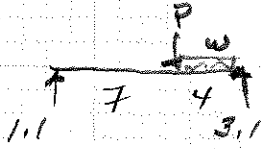


$f_b = .83 ksi$

B10 L=11'

$W = .04(\frac{23}{2}) + .1 = .56k'$

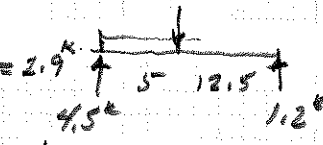
$P = 2k$
 $M = 7.9k'$



$f_b = .83 ksi$

B11 W=.56k'

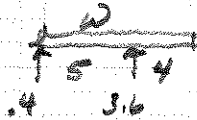
$P = .04(\frac{23}{2})(\frac{12.5}{2}) = 2.9k$
 $M = 15.3k'$



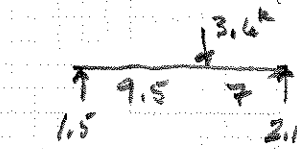
$f_b = 1.6 ksi$
 $\Delta = .34" = e/609$

B12 W=.05(9) = .45k'

$M = 3.6k'$



B13 M=14.5k'



$f_b = 1.52 ksi$
 $\Delta = .32" = e/620$

B14

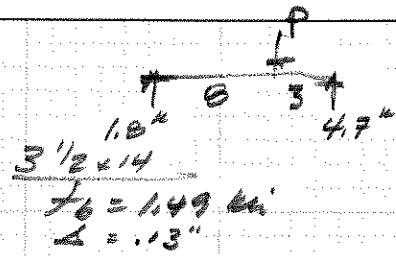
$P = .04(\frac{19}{2})(\frac{21}{2}) = 4k$
 $M = 14.3k'$



$f_b = 1.5 ksi$
 $\Delta = .3" = e/720$

B15 P=6.5k ±

$M = 14.2k'$



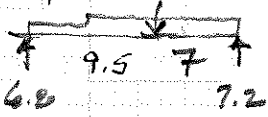
$f_b = 1.49 ksi$
 $\Delta = .13"$

B16 P=.04(23)(12.5) = 2.9k (2.5k Red)

$W = .05(9) + .04(6) = .7k'$

$W = .05(9) + .04(12) = .9k'$

$M = 33.4k'$ (Aver Red, 75 SNOW + LIVE)

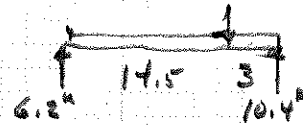


$f_b = 2.33 ksi$
 $\Delta = .59" = e/335$

B17 P=3.1+4.5 = 7.6k (6.4k Red)

$W = .04(29/2) = .58k'$

$M = 32.8k'$

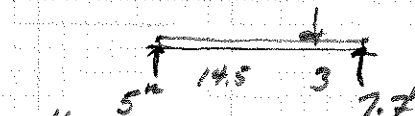


$f_b = 2.3 ksi$
 $\Delta = .7" = e/300$

P18 W=.04(29/2) = .57k'

$P = 4k$

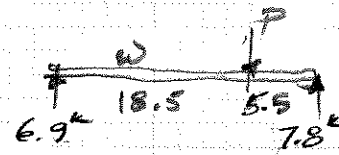
$M = 25.6k'$



$f_b = 1.79 ksi$
 $\Delta = .54" = e/306$

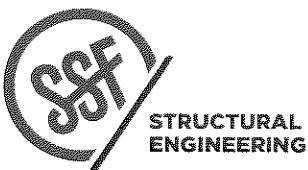
P19 W=.04(5) + .05(14/2) = .55k'

$P = 1.5k (LF)$
 $M = 40k'$



$f_b = 2.3 ksi$
 $\Delta = 1.3" = e/222$

W12x26
 $\Delta = .77" = e/372$



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12/28/22
DATE

DESIGN

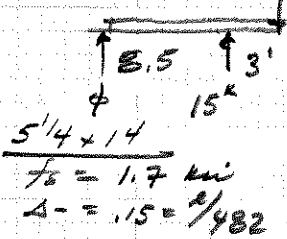
SHEET

(R10)

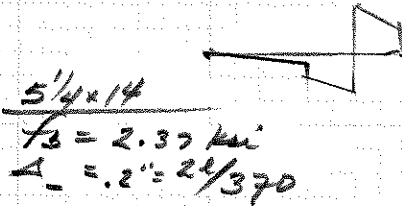
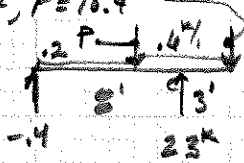
SEATTLE 2124 Third Ave, Suite 100, Seattle, WA 98121 | ☎ 206.443.6212
 TACOMA 934 Broadway, Suite 100, Tacoma, WA 98402 | ☎ 253.284.9470
 SWENSON SAY FAGET | sseengineers.com

OPP FLR Frame (Cont.)

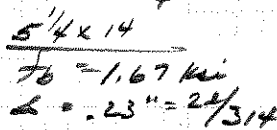
B20 Cant Bm Supporting B16 =
 $w = .7\%$ Avg
 $M = 25\text{ k}'$



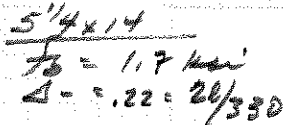
B21 Cant Bm for B17, $P = 10.4\text{ k}$
 $P = B14 + B15 = 2.9 + 4.7 = 7.6\text{ k}$
 $M = 33.9\text{ k}'$



B22 Cant Bm for B18, $P = 7.7\text{ k}$
 $w = .2\%$ Avg
 $M = 24\text{ k}'$

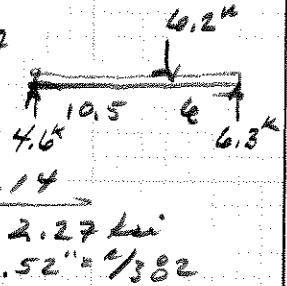


B23 Cant Bm for B19 $P = 7.8\text{ k}$
 $w_{min} = .2\%$
 $M = 24.3\text{ k}'$

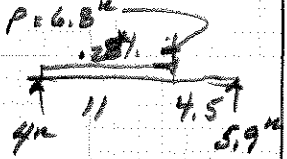


B24 Supporting B17

$w = .04(\frac{1}{2}) = .02\%$
 $M = 32.5\text{ k}'$

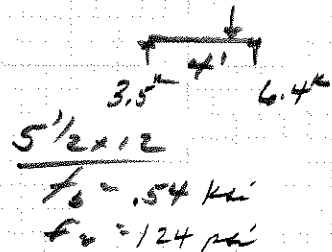


B25 Supporting B16, $P = 6.8\text{ k}$
 $M = 26.6\text{ k}'$



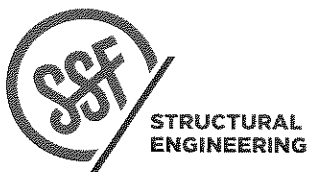
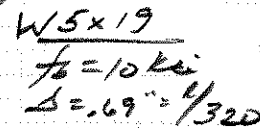
B26 (HDR)

$P = 5.9\text{ k}$
 $w = .8\%$
 $M = 5.9\text{ k}'$



B27 $L = 18.5$

$w = .04(5) = .2\%$
 $R = 1.8\text{ k}$
 $M = 8.6\text{ k}'$



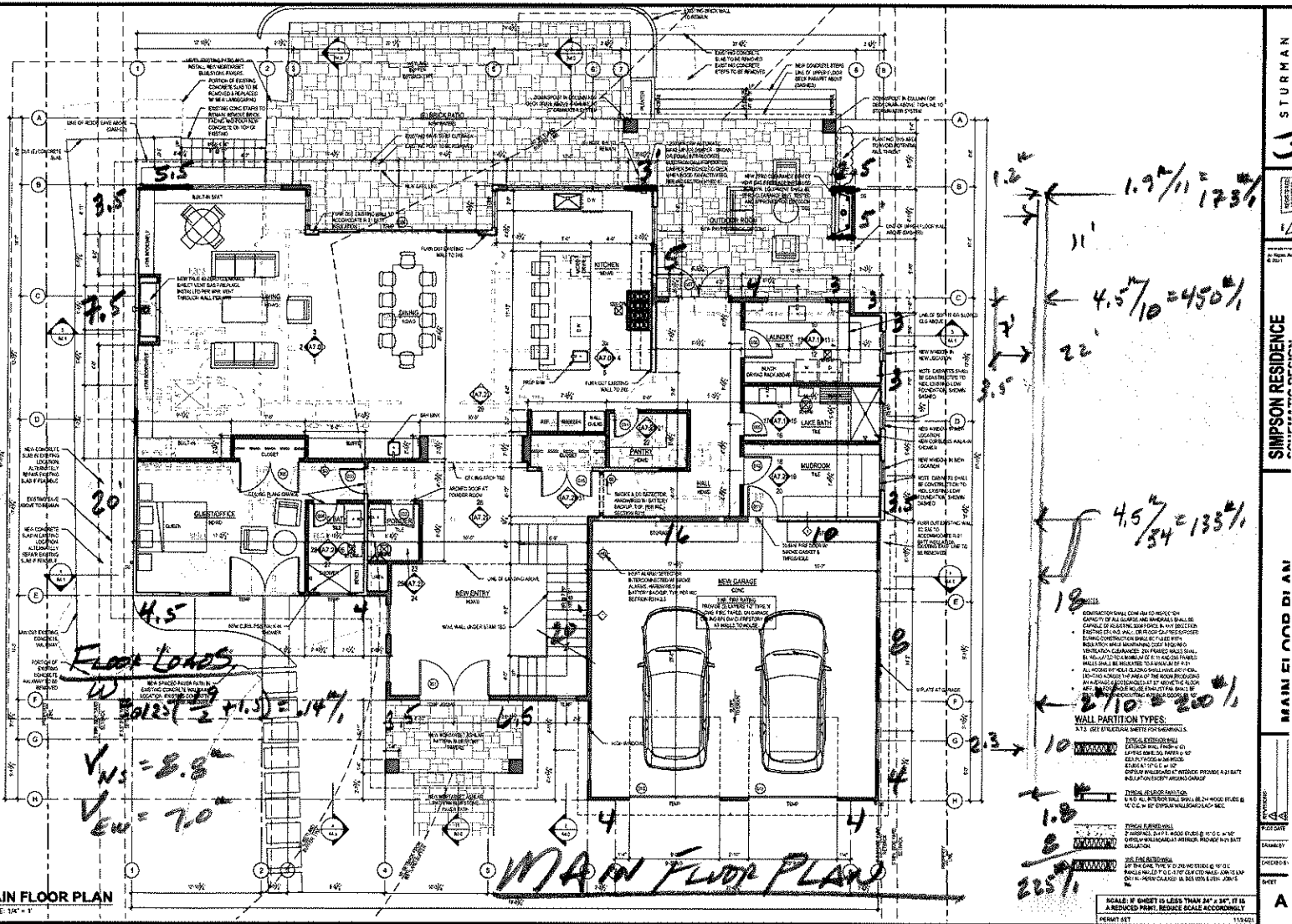
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12/28/22
 DATE

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CR11

Lateral Design Wind, Exp C
 Wind Governing Loading in Both
 * UPP FLIZ LOADING / MAIN FLOOR WALLS



STURMAN
 SIMPSON RESIDENCE
 MAIN FLOOR PLAN

Simpson Residence
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 Blue (R13)