sliderule
engineering works, llc

Yeung-Wang Residence Fire Repair and Addition

6127 92nd Avenue Southwest
Mercer Island, Washington 98040

Project Engineer: Andrew L. Herrick, P.E.
Sliderule Engineering Works, LLC
227 'E' Street Southeast
Auburn, Washington 98002
(206) 380-0732

Design Criteria: 2018 International Building Code

Roof Dead Load: 15 psf
Live Load: 25 psf (snow)

Floor Dead Load: 15 psf
Live Load: 40 psf

Wind Speed: 97 mph, Exposure B
50 year MRI 85 mph
Kzt =1.38, I=1.00

Seismic Criteria: D-2, I =1.0, Ss = 1.451, S1=0.556
R = 6 (wood framed and sheathed walls)
Base Shear = 0.16 Bldg Wt

Allowable Soil Pressure: 1500 psf (assumed)

Concrete and Reinforcing Bar: 28 day strength for walls, slabs, and footings = 2500 psi (5-1/2 sack mix) for engineering purposes, 3000 psi for weathering purposes, 40 ksi reinforcing bar for #4 and smaller, 60 ksi for #5 and larger.

Use: Simpson Strong-Tie Connectors per plans and details. Install per manufacturer's specification unless noted otherwise.
All metal connectors exposed to weather shall be galvanized.
All nails and/or bolts exposed to weather shall be galvanized.
A-307 bolts and lag bolts at connections and embedded anchor bolts, unless noted otherwise.
2x Lumber HF#2 KD Fb=1200 psi (min), E=1,400,000 psi (min).
4x Lumber DF#2 KD Fb=1200 psi (min), E=1,600,000 psi (min).
1.55E LSL members, Fb = 2325 psi, Fv = 310 psi, E = 1,550,000 psi

ANDREW LANE HERRICK
33053

4/7/21

Yueng-Wang Residence
Fire Repair/Remodel/Addn

Roof LL = 25psf (snow)
DL = 15psf
Floor LL = 40psf
DL = 15psf

2018 IBC/IRC

<u>Seismic</u> ASCE 7-16

$S_S = 1.451$
$S_1 = 0.556$
V = 0.16 (see spreadsheet)

single story plate ht = 9'
Roof Area (total) ≅ 3500 ϕ

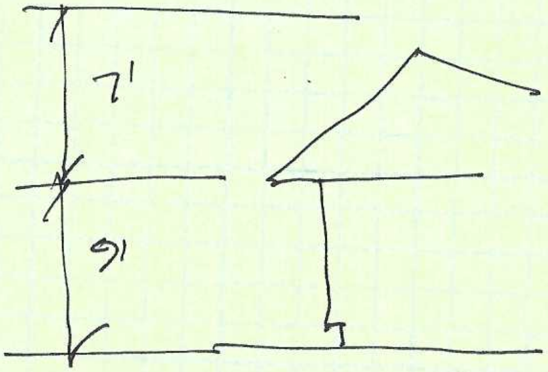
bldg wt = (15psf + 2.5psf) 3500
roof walls
= 61250#

Base shear = 9800#

<u>Wind</u> ASCE 7-16

Risk Category II = 97 mph
MRI 100 year = <u>93mph</u>
I = 1.0
K_{zt} = 1.38 ht = 25'
see spreadsheet for calcs

A = 21.9 psf wall } end zone
B = 5.8 psf roof } end zone
C = 14.6 psf wall
D = 3.2 psf roof



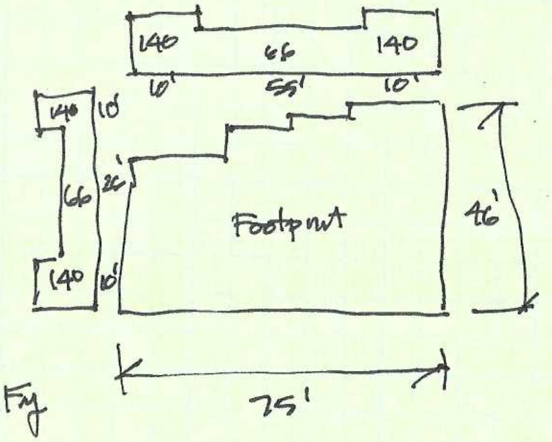
End zone = 10' (spreadsheet) (2)(5')
a = 5'

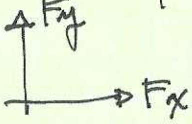
<u>end zone force</u>

= 7'(5.8psf) + 4.5(21.9)
≅ 140#/'

<u>interior force</u>

= 7'(3.2) + 4.5(14.6)
≅ 66#/'





<u>WIND</u> <u>EQ</u>

F_x = 4516# < 9800#
F_y = 6430# < 9800#

SEISMIC <u>governs</u>

F_y = 9800# uniform = 131#/'
F_x = 9800# uniform = 213#/'

Yueng Wang Res
Y-Axis

Shear Walls

DL wall = 10 psf
DL roof = 15 psf
reduce overturning DL = 0.67

First Floor - walls carrying roof DL + LL

unifrom lateral load = 131 #/ft

wall ID	trib (ft)	Σℓv (ft)	ℓv (ft)	ℓot (ft)	wall ht (ft)	trib DL (ft)	(1) side or (2) side SW	wall V (#)	unit v (#/ft)	wall type	Mot (ft-#)	Mr (ft-#)	uplift (#)	hold down
grid 1	12	22	22	22	9	8	2	1572	71.455	P1-6B	14148	34049	-904.6	none
grid 2	22	26	26	26	9	8	2	2882	110.85	P1-6B	25938	47557	-831.5	none
grid 3	26	25	25	25	9	8	2	3406	136.24	P1-6B	30654	43969	-532.6	none
grid 4	15	30	10	10	9	15	2	655	65.5	P1-6B	5895	10553	-465.8	none
								8515						

X-Axis

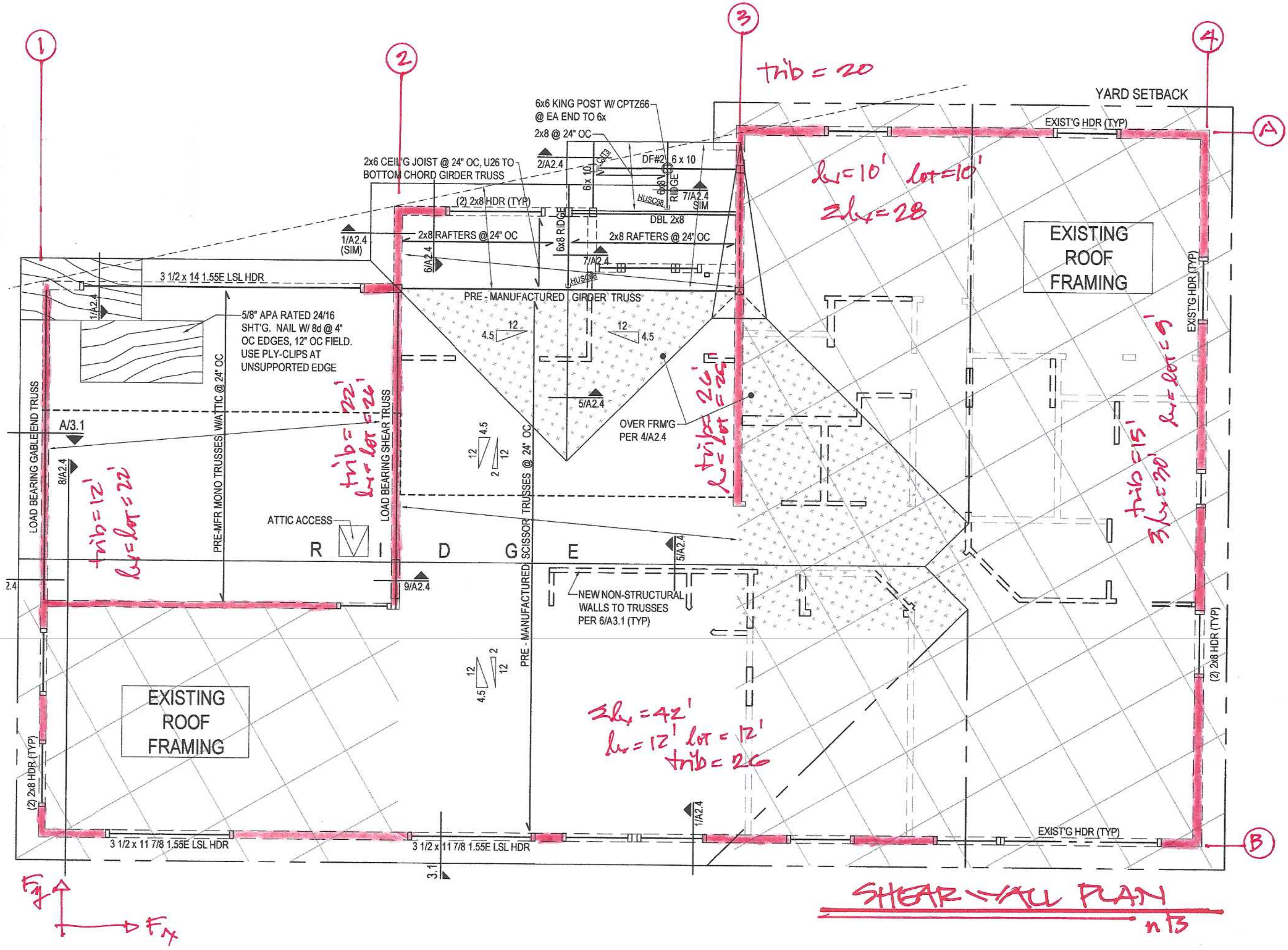
Shear Walls

DL wall = 10 psf
DL roof = 15 psf
reduce overturning DL = 0.67

First Floor - walls carrying roof DL + LL

unifrom lateral load = 213 #/ft

wall ID	trib (ft)	Σℓv (ft)	ℓv (ft)	ℓot (ft)	wall ht (ft)	trib DL (ft)	(1) side or (2) side SW	wall V (#)	unit v (#/ft)	wall type	Mot (ft-#)	Mr (ft-#)	uplift (#)	hold down
grid A	20	28	10	10	9	12	2	1521.4	152.14	P1-6B	13692.9	9045	464.79	insig
grid B	26	42	12	12	9	12	2	1582.3	131.86	P1-6B	14240.6	13025	101.31	insig
								3103.7						



SHEAR WALL PLAN

NTS

Hazards by Location

Search Information

Address: 6127 92nd Ave SE, Mercer Island, WA 98040, USA

Coordinates: 47.54779389999999, -122.2165254

Elevation: 319 ft

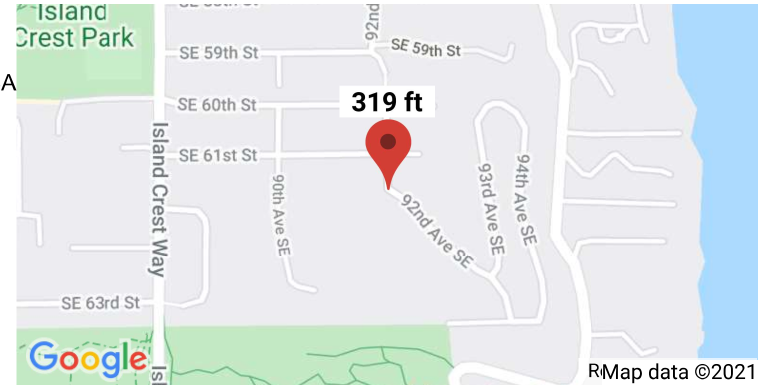
Timestamp: 2021-03-10T21:07:25.489Z

Hazard Type: Seismic

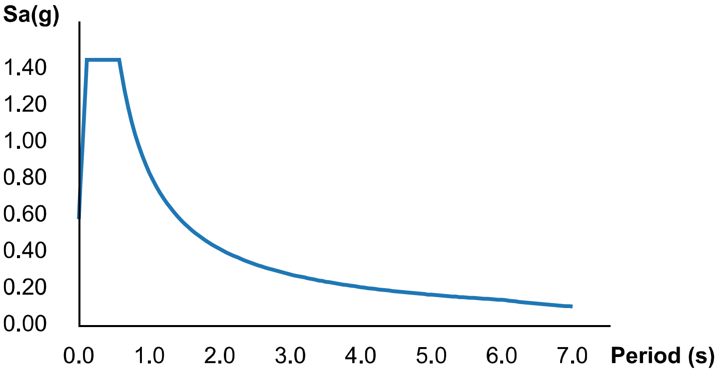
Reference Document: ASCE7-10

Risk Category: II

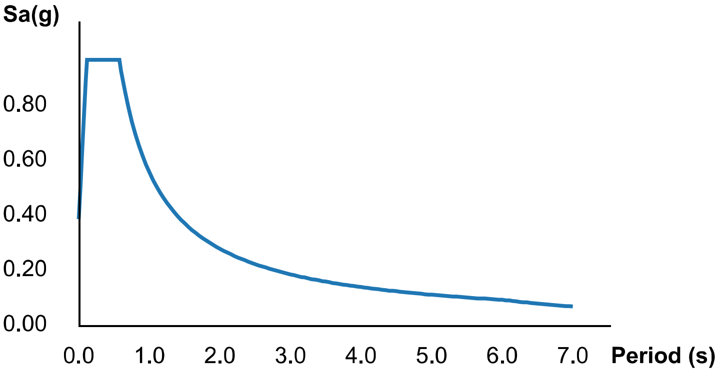
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.451	MCE_R ground motion (period=0.2s)
S_1	0.556	MCE_R ground motion (period=1.0s)
S_{MS}	1.451	Site-modified spectral acceleration value
S_{M1}	0.834	Site-modified spectral acceleration value
S_{DS}	0.967	Numeric seismic design value at 0.2s SA
S_{D1}	0.556	Numeric seismic design value at 1.0s SA

▾Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s

CR_S	0.949	Coefficient of risk (0.2s)
CR_1	0.928	Coefficient of risk (1.0s)
PGA	0.603	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.603	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.451	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.53	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.595	Factored deterministic acceleration value (0.2s)
S1RT	0.556	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.599	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.307	Factored deterministic acceleration value (1.0s)
PGAd	1.37	Factored deterministic acceleration value (PGA)

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

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

2018 International Building Code (Section 1613.5)

Section 12.8 of ASCE 7-16

Site Class = D

S_s = 1.45 figure 1613.5 (1)

S_1 = 0.56 figure 1613.5 (2)

R = 6.0 ASCE 7-10 table 12.2-1

I = 1.00 ASCE 7-10 table 11.5-1

h_n = 9.00 building height (ft)

C_t = 0.02 ASCE 7-10 table 12.8-2

F_a = 1.0 table 1615.1.2(1)

F_v = 1.5 table 1615.1.2(2)

S_{MS} = 1.451 equation 16-37

S_{M1} = 0.83 equation 16-38

S_{DS} = 0.97 equation 16-39

S_{D1} = 0.56 equation 16-40

C_u = 1.4 ASCE 7-10 table 12.8-1

T = 0.15 ASCE 7-10 12.8.2

Calculated Seismic Response Coefficient (ASCE 7-10) C_s = 0.16 equation 12.8-2 governs

$C_{s\ max}$ = 0.64 equation 12.8-3

$C_{s\ min}$ = 0.04 equation 12.8-4

Approximate Fundamental Period (ASCE 7-10 9.5.5.3.2) T_a = 0.10 equation 12.8-7

x = 0.75 ASCE 7-10 table 12.8-2

Seismic Base Shear (ASCE 7-10 9.5.5.2) $V = C_s W$ equation 12.8-1

V = 0.16 W

ATC Hazards by Location

Search Information

Address:	6127 92nd Ave SE, Mercer Island, WA 98040, USA
Coordinates:	47.54779389999999, -122.2165254
Elevation:	319 ft
Timestamp:	2021-03-10T21:05:26.947Z
Hazard Type:	Wind

ASCE 7-16

MRI 10-Year	67 mph
MRI 25-Year	73 mph
MRI 50-Year	78 mph
MRI 100-Year	83 mph
Risk Category I	92 mph
Risk Category II	97 mph
Risk Category III	104 mph
Risk Category IV	108 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

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

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the

2018 International Building Code (Section 1609)
ASCE 7-16 (Chapters 26-31)

Simplified Wind Load Method (2609.6)

Shall not apply to buildings sited on the upper half of an isolated hill or escarpment with the following conditions:

Hill or escarpment is equal or greater than 60' in Exposure B, 30' in Exposure C
Maximum average slope of the hill exceeds 10%
Hill or escarpment is unobstructed upwind by other topographhic features for a distance 50x the height of the hill or 1 mile, whichever is less.

Shall apply to buildings with the following conditions:

Simple diaphragm: Wind loads are transmitted through horizontal floor and roof diaphragms to vertical lateral-force-resisting systems.
Building has a fundamental natural frequency less than 1 hertz
Response charateristics do not include: Across wind loading, vortex shedding, instability caused by gallopoing or flutter.
Site characteristics do not create wind channeling or buffeting caused by upwind obstructions
No expansion joints or seperations
Regular shape with approximate symmentrical cross section and roof slopes not exceeding 45 degrees.

Enclosed Building (see 2609.2 eqns 26-31 and 26-32)

Basic Wind Speed (ASCE 6.5.4, figure 6-1)	**85**
Importance Factor (ASCE 7-05 table 6-1) I_w	**1.00**
Exposure (ASCE 6.5.6.3)	**B**
Roof Slope (x / 12)	**4.5**
Topographic Effects K_{zt} (ASCE 7-05 6.5.7)	**1.38**

$p_s = \lambda K_{zt} I_w p_{s30}$ (eqn 16-34)

Height and Exposure Adjustment coefficient = λ

Simplified Design Wind Pressure (load case 1)

	horizontal				vertical				overhangs	
level	A	B	C	D	E	F	G	H	E_{oh}	G_{oh}
p_{s15} =	21.9	-5.8	14.6	-3.2	-13.8	-9.6	-9.6	-7.3	-19.3	-15.1
p_{s20} =	21.9	-5.8	14.6	-3.2	-13.8	-9.6	-9.6	-7.3	-19.3	-15.1
p_{s25} =	21.9	-5.8	14.6	-3.2	-13.8	-9.6	-9.6	-7.3	-19.3	-15.1
p_{s30} =	21.9	-5.8	14.6	-3.2	-13.8	-9.6	-9.6	-7.3	-19.3	-15.1
p_{s35} =	23.0	-6.1	15.4	-3.3	-14.5	-10.1	-10.1	-7.7	-20.3	-15.9
p_{s40} =	23.9	-6.3	15.9	-3.5	-15.0	-10.5	-10.5	-8.0	-21.0	-16.5
p_{s45} =	24.6	-6.5	16.4	-3.6	-15.5	-10.8	-10.8	-8.2	-21.6	-16.9
p_{s50} =	25.5	-6.7	17.0	-3.7	-16.0	-11.1	-11.1	-8.5	-22.4	-17.5
p_{s55} =	26.1	-6.9	17.4	-3.8	-16.4	-11.4	-11.4	-8.7	-23.0	-18.0
p_{s60} =	26.8	-7.1	17.8	-3.9	-16.8	-11.7	-11.7	-8.9	-23.5	-18.4

1609.6.2.1.1 Minimum loading in zones A, B, C, D shall not be less than 10psf.

Minimum loading in zones E, F, G, H shall not be greater than or equal to ZERO psf.

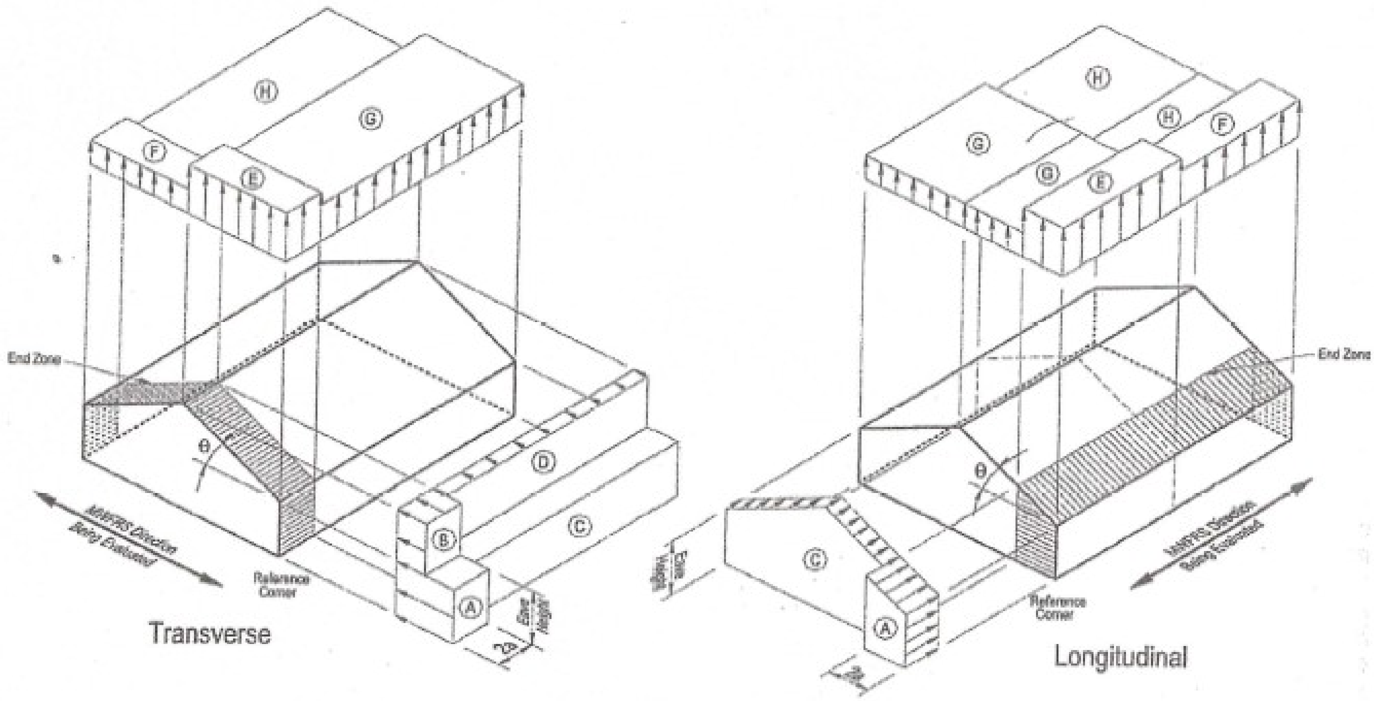


FIGURE 1609.6.2.1
MAIN WINDFORCE LOADING DIAGRAM

For SI: 1 foot = 304.8 mm, 1 degree = 0.0174 rad.

Notes:

1. Pressures are applied to the horizontal and vertical projections for Exposure B, at $h = 30$ feet, for $I_w = 1.0$. Adjust to other exposures and heights with adjustmen factor λ.
2. The load patterns shown shall be applied to each corner of the building in turn as the reference corner.
3. For the design of the longitudinal MWFRS, use $\theta = 0°$, and locate the Zone E/F, G/H boundary at the mid-length of the building.
4. Load Cases 1 and 2 must be checked for $25° < \theta \leq 45°$. Load Case 2 at 25° is provided only for interpolation between 25° to 30°.
5. Plus and minus signs signify pressures acting toward and away from the projected surfaces, respectively.
6. For roof slopes other than those shown, linear interpolation is permitted.
7. The total horizontal load shall not be less than that determined by assuming $p_S = 0$ in Zones B and D.
8. The zone pressures represent the following:
   Horizontal pressure zones — Sum of the windward and leeward net (sum of internal and external) pressures on vertical projection of:
   - A – End zone of wall
   - C – Interior zone of wall
   - B – End zone of roof
   - D – Interior zone of roof

   Vertical pressure zones — Net (sum of internal and external) pressures on horizontal projection of:
   - E – End zone of windward roof
   - G – Interior zone of windward roof
   - F – End zone of leeward roof
   - H – Interior zone of leeward roof
9. Where Zone E or G falls on a roof overhang on the windward side of the building, use E_{OH} and G_{OH} for the pressure on the horizontal projection of the overhang. Overhangs on the leeward and side edges shall have the basic zone pressure applied.
10. Notation:
    a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4 percent of least horizontal dimension or 3 feet.
    h: Mean roof height, in feet (meters), except that eave height shall be used for roof angles <10°.
    θ: Angle of plane of roof from horizontal, in degrees.

Least Horizontal Dimension = 46 ft

Average Roof Height = 17 ft

10% least horizontal dimension = 4.6 ft

40% height = 6.8 ft

Required Edge Distance = 4.6 ft

Existing walls capacity
original Home Built in 1962
Existing walls plywood sheathed
w/ ½" φ AB @ 6' oc
min shearwall capacities:

Plywood 8d @ 6" oc =
2800 x 0.82 ≅ 230#/'
max demand ≅ 153#/'
okay

½" φ AB @ 6' oc w/ HF plates

$Z_{\parallel}$ = 570#/bolt
C_D = 1.6

shear component per FT

$$= \frac{570\#/\text{bolt}}{6'/\text{bolt}}(1.6)$$

= 152#/' ≅ 153#/'
say okay

Add 3x3x¼ plate washers @ EXIST'G Anchor bolts

use HD5B Holdowns @ Garage pier walls

Framing Calculations @ Remodel Addition

Kitchen/Dining SGD HDR

trib = 17.5' → w = 700#/'
L = 8'
V = 2800#
M = 5600 ft·#
f_v = 101 psi okay
f_b = 817 psi okay
Δ_{TL} = 0.08" L/1125 okay

3½x11⅞ 1.55E
A = 41.5 in²
S_x = 82.2 in³
I_x = 488 in⁴

Kitchen HDR

L = 4
V = 1400#
M = 1400 ft-#
f_v = 96.8 psi
C_D = 1.15 f_v' = 84 psi okay
f_b = 639 psi okay
Δ_{TL} = 0.03" L/1360 okay

(2) 2x8
A = 21.7 in²
S_x = 26.3 in³
I_x = 95.2 in⁴

Garage Door HDR

L = 18' trib = 10' w = 500#/'
V = 4500#
M = 20250 ft·#
f_v = 138 psi okay
f_b = 2125 psi
f_b' = 1840 psi okay

Δ_{TL} = 0.95" L/227

3½x14 1.55E
A = 49 in²
S_x = 114.3 in³
I_x = 800 in⁴

use 3½x16 1.55E @ garage HDR

Floor Framing

2x10@16" oc, L=9'

V = 333# w = 74#/'

M = 749 ft·# DL = 15psf

LL = 40psf

fv = 36 psi okay

2x10 HF#2

A = 13.8in²

Sx = 21.4in³

Ix = 98.9in⁴

fb = 420psi okay

ΔTL = 0.09"

L/1173 okay

Floor Bm

L = 7.25' trib = 9'

V = 1794# w = 495#/'

M = 3252 ft·#

DF#2 4x10

A = 33in²

Sx = 52.6in³

Ix = 250in⁴

fv = 82psi okay

fb = 742psi okay

ΔTL = 0.09" L/989 okay

Ftg

P = 2(1794) ≅ 3600#

$$\sqrt{\frac{3600\#}{1500\,psf}} = 1.55'$$

use 2'x2' x 8" thick ftg w/ (3) #4 EW

Modify exist'g truss

L = 14.5' @ 2' oc

V = 580# w = 80#/'

M = 2103 ft·#

2x12

A = 16.8in²

Sx = 31.6in³

Ix = 177in⁴

fv = 34.5psi okay

fb = 799psi okay

ΔTL = 0.32" L/542 okay

@ brg wall

(2) 2x6 equiv

A = 16.5in² okay

Attach to Existing truss web and top chord w/ #10x3" screws @ 6"oc

DESIGN PROPERTIES

Design Stresses(1) (100% Load Duration)

Grade	Orientation	G Shear Modulus of Elasticity (psi)	E Modulus of Elasticity(2) (psi)	E_{min} Adjusted Modulus of Elasticity(3) (psi)	F_b Flexural Stress(4) (psi)	F_t Tension Stress(5) (psi)	$F_{c\perp}$ Compression Perpendicular to Grain(6) (psi)	$F_{c\parallel}$ Compression Parallel to Grain (psi)	F_v Horizontal Shear Parallel to Grain (psi)	SG Equivalent Specific Gravity(7)
TimberStrand® LSL										
1.3E	Beam/Column	81,250	1.3 x 10^6	660,750	1,700	1,300	710	1,835	425	0.50(8)
	Plank	81,250	1.3 x 10^6	660,750	1,900(9)	1,300	670	1,835	150	0.50(8)
1.55E	Beam	96,875	1.55 x 10^6	787,815	2,325	1,290(10)	900	2,170	310(10)	0.50(8)
Microllam® LVL										
2.0E	Beam	125,000	2.0 x 10^6	1,016,535	2,600	1,895	750	2,510	285	0.50
Parallam® PSL										
1.8E	Column	112,500	1.8 x 10^6	914,880	2,400(11)	1,995	545(11)	2,500	190(11)	0.50
2.2E	Beam	137,500	2.2 x 10^6	1,118,190	2,900	2,300	625	2,900(12)	290	0.50

(1) Unless otherwise noted, adjustment to the design stresses for duration of load are permitted in accordance with the applicable code.

(2) To properly calculate deflections for the full range of typical SCL span and loading applications, bending and shear deflection must be considered. Use the following equation for simple span, uniformly loaded beams:

$$\Delta = \frac{270\ wL^4}{Ebd^3} + \frac{28.8\ wL^2}{Ebd}$$

Where: Δ = deflection (in.) w = uniform load (plf)
L = span (feet) b = beam thickness (in.)
d = beam depth (in.) E = modulus of elasticity (psi)

For other span and loading conditions, use engineering mechanics to account for both bending and shear deflection or use Forte®WEB software.

(3) Reference modulus of elasticity for beam and column stability calculations, per NDS®.

(4) For 12" depth. For other depths, multiply f_b by the appropriate factor as follows:
–TimberStrand® LSL $\left[\frac{12}{d}\right]^{0.092}$ –Microllam® LVL $\left[\frac{12}{d}\right]^{0.136}$ –Parallam® PSL $\left[\frac{12}{d}\right]^{0.111}$

(5) Referenced tension design values are based on a standard 4 foot length. For lengths longer than 4 foot, multiply F_t by the following adjustment (where L is length in feet):
–TimberStrand® LSL $(4/L)^{0.083}$ –Parallam® PSL $(4/L)^{0.056}$ –Microllam® LVL $(4/L)^{0.085}$.

(6) $F_{c\perp}$ may not be increased for duration of load.

(7) For lateral connection design only.

(8) Specific gravity of 0.58 may be used for bolts installed perpendicular to face and loaded perpendicular to grain.

(9) Values are for thickness up to 3½".

(10) Value accounts for large hole capabilities. See **Allowable Holes** on page 26.

(11) Value shown is for plank orientation.

(12) For column applications, use $F_{c\parallel}$ of 500 psi. Alternatively, refer to ESR-1387, Table 1, footnote 13.

General Assumptions for Trus Joist® Beams

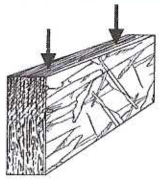
- Lateral support is required at bearing and along the span at 24" on-center, maximum.
- Bearing lengths are based on each product's bearing stress for applicable grade and orientation.
- All members 7¼" and less in depth are restricted to a maximum deflection of 5⁄16".
- Beams that are 1¾" x 16" and deeper require multiple plies. Some exceptions allowed when using Weyerhaeuser software.
- No camber.
- Beams and columns must remain straight to within $5L^2/4608$ (in.) of true alignment. L is the unrestrained length of the member in feet.

For applications not covered in this brochure, contact your Weyerhaeuser representative.

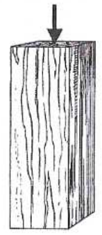
See pages 28 and 29 for multiple-member beam connections.

TimberStrand® LSL, Microllam® LVL, and untreated Parallam® PSL are intended for dry-use applications

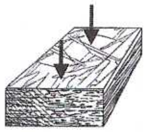
Beam Orientation



Column Orientation



Plank Orientation



DESIGN PROPERTIES

Allowable Design Properties(1) (100% Load Duration)

Grade	Width	Design Property	Depth										
			4⅜"	5½"	5½" Plank Orientation	7¼"	9¼"	9½"	11¼"	11⅞"	14"	16"	18"
TimberStrand® LSL													
1.3E	3½"	Moment (ft-lbs)	1,735	2,685	1,780	4,550							
		Shear (lbs)	4,340	5,455	1,925	7,190							
		Moment of Inertia (in.^{4})	24	49	20	111							
		Weight (plf)	4.5	5.6	5.6	7.4							
1.55E	1¾"	Moment (ft-lbs)						5,210		7,975	10,920	14,090	
		Shear (lbs)						3,435		4,295	5,065	5,785	
		Moment of Inertia (in.^{4})						125		244	400	597	
		Weight (plf)						5.2		6.5	7.7	8.8	
	3½"	Moment (ft-lbs)						10,420		15,955	21,840	28,180	
		Shear (lbs)						6,870		8,590	10,125	11,575	
		Moment of Inertia (in.^{4})						250		488	800	1,195	
		Weight (plf)						10.4		13	15.3	17.5	
Microllam® LVL													
2.0E	1¾"	Moment (ft-lbs)		2,125		3,555		5,885		8,925	12,130	15,555	19,375
		Shear (lbs)		1,830		2,410		3,160		3,950	4,655	5,320	5,985
		Moment of Inertia (in.^{4})		24		56		125		244	400	597	851
		Weight (plf)		2.8		3.7		4.8		6.1	7.1	8.2	9.2
Parallam® PSL													
2.2E	3½"	Moment (ft-lbs)					12,415	13,055	17,970	19,900	27,160	34,955	43,665
		Shear (lbs)					6,260	6,430	7,615	8,035	9,475	10,825	12,180
		Moment of Inertia (in.^{4})					231	250	415	488	800	1,195	1,701
		Weight (plf)					10.1	10.4	12.3	13.0	15.3	17.5	19.7
	5¼"	Moment (ft-lbs)					18,625	19,585	26,955	29,855	40,740	52,430	65,495
		Shear (lbs)					9,390	9,645	11,420	12,055	14,210	16,240	18,270
		Moment of Inertia (in.^{4})					346	375	623	733	1,201	1,792	2,552
		Weight (plf)					15.2	15.6	18.5	19.5	23.0	26.3	29.5
	7"	Moment (ft-lbs)					24,830	26,115	35,940	39,805	54,325	69,905	87,325
		Shear (lbs)					12,520	12,855	15,225	16,070	18,945	21,655	24,360
		Moment of Inertia (in.^{4})					462	500	831	977	1,601	2,389	3,402
		Weight (plf)					20.2	20.8	24.6	26.0	30.6	35.0	39.4

(1) For product in beam orientation, unless otherwise noted.

PRODUCT STORAGE

Protect product from sun and water

CAUTION:
Wrap is slippery when wet or icy

Use support blocks (6x6 or larger) at 10' on-center to keep bundles out of mud and water

Align stickers (2x3 or larger) directly over support blocks