

GF Consulting Engineers Inc.

13170 SW 128th Street #204

Miami, FL

305-971-4323

JOB TITLE LAMAS RESIDENCE GARAGE

JOB NO. 23-08

SHEET NO.

CALCULATED BY FH

DATE 9/6/20

CHECKED BY FH

DATE

www.struware.com

CODE SUMMARY**Code:** ASCE 7 - 16**Live Loads:**

Roof 0 to 200 sf: 30 psf
 200 to 600 sf: 30 psf
 over 600 sf: 30 psf

Typical Floor 40 psf
 Partitions 15 psf
 Attics without storage 10 psf
 Balconies (1.5 times live load) 60 psf
 0 0 psf

*From original
 calc's.*

Dead Loads:

Floor 29.8 psf
 Roof 20.0 psf

Roof Snow Loads:

Design Uniform Roof Snow load = 0.0 psf
 Flat Roof Snow Load Pf = 0.0 psf
 Balanced Snow Load Ps = 0.0 psf
 Ground Snow Load Pg = 0.0 psf
 Importance Factor I = 1.00
 Snow Exposure Factor Ce = 1.20
 Thermal Factor Ct = 1.00
 Sloped-roof Factor Cs = 1.00
 Drift Surcharge load Pd =
 Width of Snow Drift w =

Earthquake Design Data:

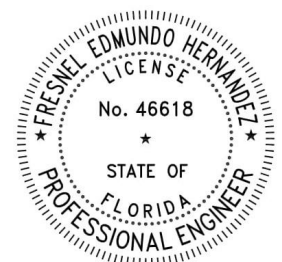
Risk Category = II
 Importance Factor I = 1.00
 Mapped spectral response acceleration Ss = 0.04
 S1 = 0.02
 Site Class = D
 Spectral Response Coef. Sds = 0.000
 Sd1 = 0.000
 = A
 Seismic Design Category = Dual Systems w/ intermediate Moment Frames Capable of Resisting >= 25% of S
 Basic Structural System = Ordinary reinforced masonry shear walls
 Seismic Resisting System
 Seismic Response Coef. Cs = 0.010
 Response Modification Factor R = 3
 Analysis Procedure = Equivalent Lateral-Force Analysis

Rain Design Data:

Rain intensity i = 4.70 in/hr
 Rain Load R = 27.5 psf

Wind Design Data:

Ultimate Design Wind Speed 175 mph
 Nominal Design Wind Speed 135.55 mph
 Risk Category II
 Mean Roof Ht (h) 15.0 ft
 Exposure Category C
 Enclosed Building
 Internal pressure Coef. +/-0.18
 Directionality (Kd) 0.85



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Component and Cladding Ultimate Wind Pressures

Roof Area	Surface Pressure (psf)							
	10 sf	20 sf	50 sf	100 sf	200 sf	350 sf	500 sf	1000 sf
Negative Zone 1	-106.4	-99.3	-90.1	-83.0	-76.0	-70.4	-66.8	-66.8
Negative Zone 1'	-61.1	-61.1	-61.1	-61.1	-52.6	-45.7	-41.3	-32.8
Negative Zone 2	-140.3	-131.3	-119.3	-110.3	-101.3	-94.0	-89.4	-89.4
Negative Zone 3	-191.2	-173.2	-149.3	-131.3	-113.2	-98.7	-89.4	-89.4
Positive All Zones	27.2	25.5	23.2	21.5	21.5	21.5	21.5	21.5
Overhang Zone 1&1'	-96.2	-94.5	-92.2	-90.5	-75.9	-64.1	-56.6	-56.6
Overhang Zone 2	-130.1	-118.1	-102.2	-90.2	-78.1	-68.4	-62.2	-62.2
Overhang Zone 3	-181.0	-160.0	-132.2	-111.1	-90.1	-73.1	-62.2	-62.2

Overhang soffit pressure equals adj wall pressure (which includes internal pressure of 10.2 psf)

Parapet Area	Solid Parapet Pressure (psf)					
	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
CASE A: Zone 2:	0.0	0.0	0.0	0.0	0.0	0.0
Zone 3:	0.0	0.0	0.0	0.0	0.0	0.0
CASE B: Interior zone:	0.0	0.0	0.0	0.0	0.0	0.0
Corner zone:	0.0	0.0	0.0	0.0	0.0	0.0

Wall Area	Surface Pressure (psf)			
	10 sf	100 sf	200 sf	500 sf
Negative Zone 4	-66.2	-57.2	-54.5	-50.9
Negative Zone 5	-81.5	-63.5	-58.1	-50.9
Positive Zone 4 & 5	61.1	52.1	49.4	45.8

$$Z4 = -34.3 \text{ psf}$$

$$Z5 = -38.1 \text{ psf}$$

$$+ = +31.3 \text{ psf}$$

Double garage door $18' \text{ wide} \times 9' \rightarrow TA = 162 \text{ sf}$
 $\frac{18^2}{3} = 108 \text{ sf} \leftarrow \text{use this}$

single door $9' \times 9' = 81 \text{ sf}$

* Double door is mostly in Zone 4
 Avg $\frac{34.3 + 38.1}{2} = -36.2 \text{ psf (Avg)}$

single door is in Zone 4 $+31.3 \text{ psf}$
 -34.3 psf

Calculated values very similar to FBC
 TABLES 1609.6(1) & 1609.6(2)



TABLE 1609.6(1)
NOMINAL (ASD) GARAGE DOOR AND ROLLING DOOR WIND LOADS FOR A BUILDING WITH A MEAN ROOF
HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (PSF)^{1, 2, 3, 4, 5}

ULTIMATE DESIGN WIND SPEED (V_{ult}) DETERMINED IN ACCORDANCE WITH SECTION 1609.3 (MPH - 3 SECOND GUST)																				
Width (ft)	Height (ft)	100 MPH	110 MPH	120 MPH	130 MPH	140 MPH	150 MPH	160 MPH	170 MPH	180 MPH	190 MPH									
Roof Angle 0 – 10 degrees																				
8	8	+	+	+	+	+	+	+	+	+	+	+	+							
		10.0	10.0	10.5	11.9	12.5	14.2	14.7	16.6	17.1	19.3	19.6	22.2	22.3	25.2	25.1	28.5	28.2	31.9	31.4
10	10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.0	10.2	11.4	12.1	13.6	14.2	16.0	16.5	18.5	18.9	21.2	21.5	24.2	24.3	27.3	27.3	30.6	30.4
14	14	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.0	10.8	11.5	12.8	15.0	15.7	17.4	18.0	20.0	20.5	22.8	23.1	25.7	25.9	28.8	28.9	28.9	28.9
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
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		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
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		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
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		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2
16	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.3	10.9	12.2	13.1	14.6	15.5	17.2	17.7	19.7	20.4	22.7	23.3	26.0	26.4	29.4	29.3	32.6	32.7
Roof Angle > 10 degrees																				
9	7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		10.0	10.9	11.4	12.9	13.7	15.5	16.1	18.2	18.5	20.9	21.3	24.1	24.3	27.5	27.6	31.2	30.6	34.6	34.2

+26.7 psf
-30.2

+24.5 psf
-27.3

Single

For SI: 1 foot = 304.8 mm, 1 mile per hour = 1.609 km/h, 1 psf = 47.88 N/m².

Nominal Design Wind Speed (V_{asd}) converted from Ultimate Design Wind Speed per Section 1609.3.1

1. For door sizes or wind speeds between those given above the load may be interpolated, otherwise use the load associated with the lower door size.
2. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table 1609.6(2). Minimum positive wind load shall be 10 psf and minimum negative wind load shall be 10 psf.
3. Plus and minus signs signify pressures acting toward and away from the building surfaces.
4. Negative pressures assume door has 2 feet of width in building's end zone.
5. Table values include the 0.6 load reduction factor.

TABLE 1609.6(2) ADJUSTMENT FACTOR FOR BUILDING HEIGHT AND EXPOSURE, (A)

MEAN ROOF HEIGHT (feet)	EXPOSURE			
	B	C	D	
15	1.00	1.21	1.47	
20	1.00	1.29	1.55	
25	1.00	1.35	1.61	
30	1.00	1.40	1.66	
35	1.05	1.45	1.70	
40	1.09	1.49	1.74	
45	1.12	1.53	1.78	
50	1.16	1.56	1.81	
55	1.19	1.59	1.84	
60	1.22	1.62	1.87	

$$P_s = +26.7 \times 1.21 = +32.3 \text{ psf}$$

$$S = -30.2 \times 1.21 = -36.5 \text{ psf}$$