



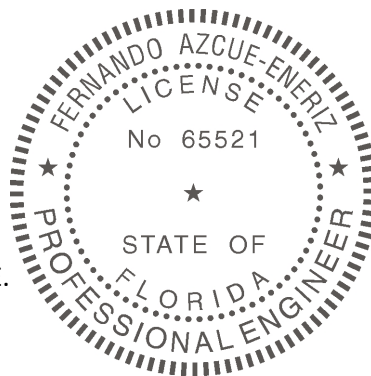
Fernando Azcue P.E.
License No 65521
S T R U C T U R A L

STRUCTURAL CALCULATIONS

PROJECT NAME:
GOMEZ DRIVEWAY AND BACKYARD REMODEL
11040 SW 69 AVE
PINECREST, FL 33156

TOTAL OF PAGES: 16

Fernando Azcue, P.E.
STRUCTURAL
LIC. No:65521
2/05/24



WIND CALCULATIONS

OPEN BLDG

$$P = q_h K_d G C_u$$

$$q_h = 0.00256 k_z k_{zt} k_c V^2$$

$$k_z = 0.85 \quad k_{zt} = 1.0 \quad k_c = 1.0 \quad V = 175 \text{ MPH}$$

$$q_h = 0.00256 \times 0.85 \times 1.0 \times 1.0 \times (175)^2 = 66.6 \text{ PSF}$$

$$K_d = 0.85$$

$$G = 0.85 \text{ (GUST FACTOR)}$$

	<u>C_u</u>	
LOAD CASE	C _{NW}	C _{NL}
A	-1.2	-1.0
B	-0.6	-1.6

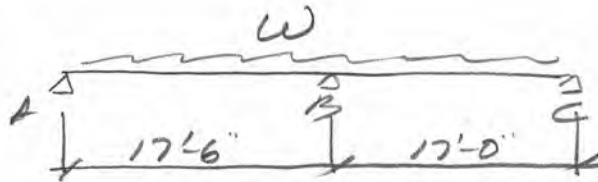


WIND PRESSURE (ULTIMATE) PSF

LOAD CASE	C _{NW}	C _{NL}
A	-58	-48
B	-29	-77



Beam RB-1



Roof Loads

$$Dead = 25 \text{ PSF}$$

$$Live = 20 \text{ PSF}$$

$$W_D: \text{Roof} = 25 \text{ PSF} \times 15.67 = 392$$

$$Bt = 150 \times 0.67 \times 1.5 = \frac{151}{543 \text{ PLF}}$$

$$W_L: 20 \text{ PSF} \times 15.67 = 313 \text{ PLF}$$

$$W = W_D + W_L = 856 \text{ PLF}$$

$$W_u = 1.2 W_D + 1.6 W_L = 1152 \text{ PLF}$$

Reactions (service)

$$R_A = 7.4 \text{ k}$$

$$R_B = 15.0 \text{ k}$$

$$R_C = 7.2 \text{ k}$$

$$M_u^- = 0.125 W_u l^2 = 0.125 \times 1.152 \times (17.5)^2 = 44.1 \text{ k-ft}$$

$$V_u \text{ at } d = 8.6 \text{ k}$$

BONDING

Section: 8" x 18"

$$M_u = 44.1 \text{ k-ft} \quad f_c' = 3000 \text{ psi}$$

$$b = 8"$$

$$d = 15.5$$



$$\frac{M_u}{f'_c b d^2} = 0.092 \longrightarrow w = 0.109$$

$$\rho = \frac{w f'_c}{f_y} = 0.00545$$

$$A = \rho b d = 0.68 \text{ in}^2$$

∴ Provide 2#6 TOP

$$A_{\text{prov.}} = 0.88 \text{ in}^2 > 0.68 \text{ in}^2, \text{ L OK}$$

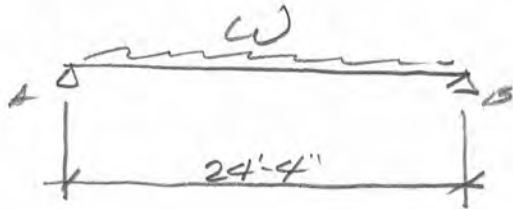
Shear

$$V_u = 8.6 \text{ k}$$

Provide #3 @ 8" O.C.



Beam RB-2



$$W_D: \text{Roof} = 25 \text{ PSF} \times 6.5 = 162$$

$$B1 = 10 \times 0.67 \times 1.5 = \frac{151}{313 \text{ PLF}}$$

$$W_L: 20 \times 6.5 = 130 \text{ PLF}$$

$$W = W_D + W_L = 443 \text{ PLF}$$

$$W_u = 1.2 W_D + 1.6 W_L = 584 \text{ PLF}$$

Reactions (services)

$$R_A = R_B = 5.4 \text{ k}$$

$$M_u = \frac{1}{8} W_u l^2 = \frac{1}{8} \times 0.584 \times (24.34)^2 = 43.2 \text{ k-ft}$$

$$V_u \text{ at } d = 7.5 \text{ k}$$

BONDING

$$\text{Section: } 8 \times 18 \quad M_u = 43.2 \text{ k-ft} \quad f'_c = 3000 \text{ psi}$$

$$b = 8"$$

$$d = 15.5"$$

$$\frac{M_u}{f'_c b d^2} = 0.090 \rightarrow W = 0.107$$



$$\rho = \frac{w f_c'}{f_y} = 0.0053$$

$$A = \rho b d = 0.66 \text{ in}^2$$

Provides 2#6 BOF.

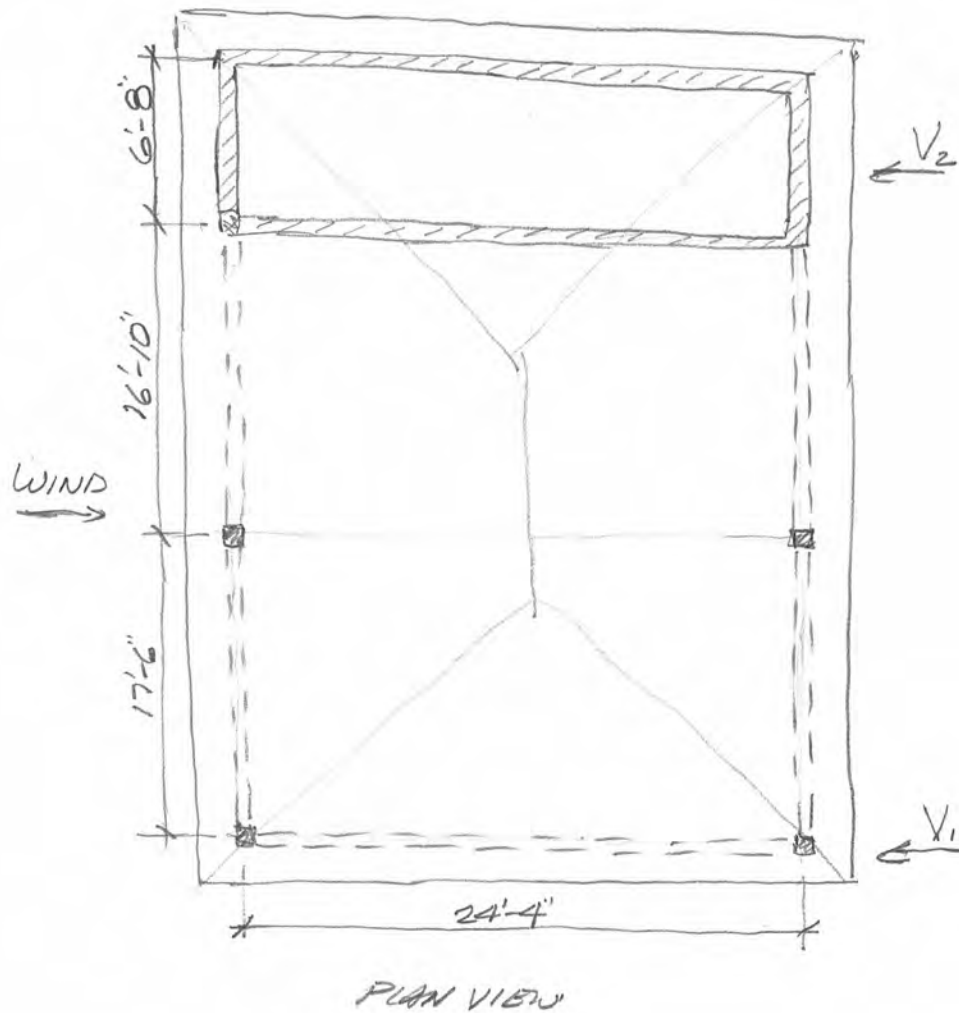
$$A_{\text{prov.}} = 0.88 \text{ in}^2 > 0.66 \text{ in}^2 \quad \checkmark \text{ OK}$$

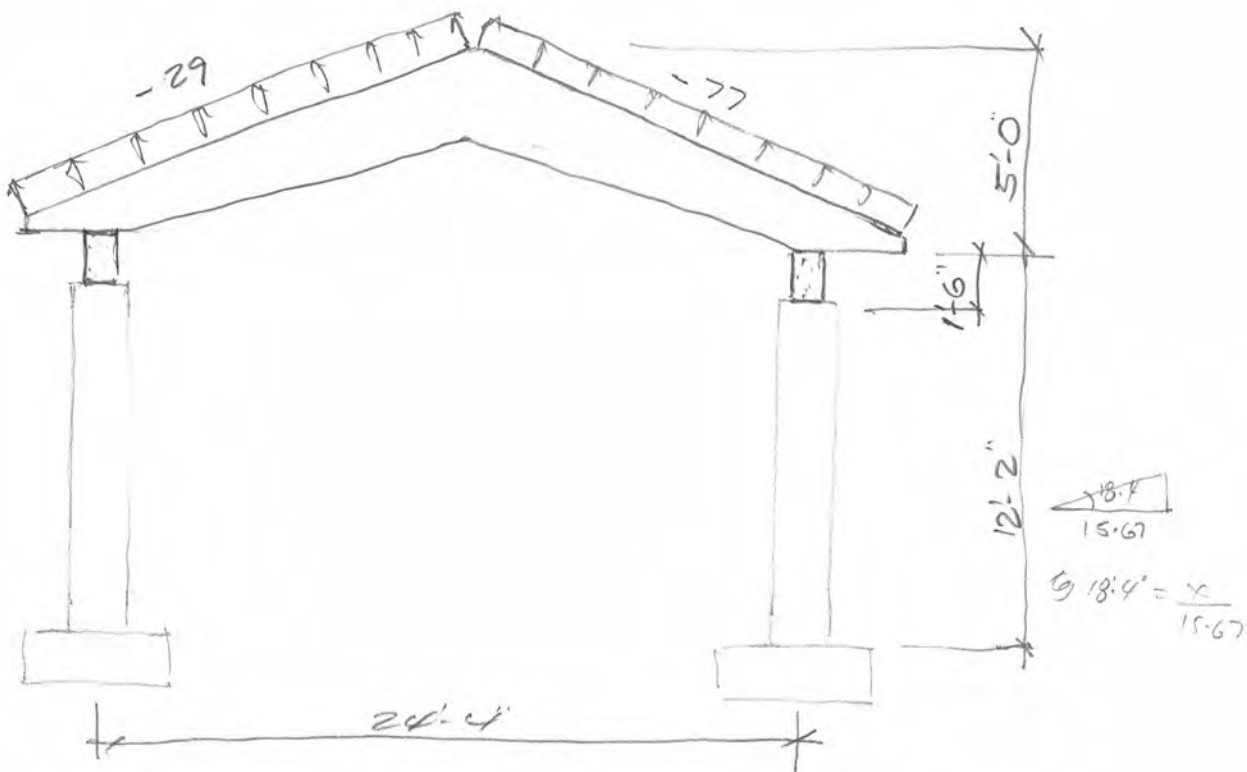
Stirrups

$$V_u = 7.5 \text{ k}$$

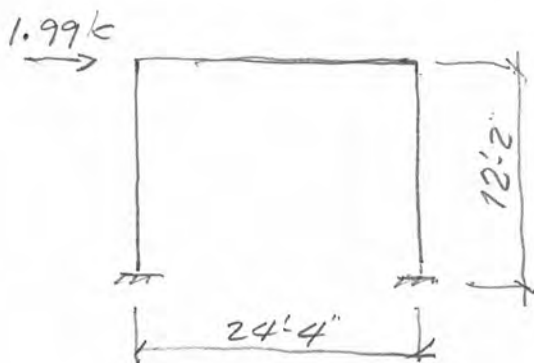
Provides #3 @ 8" o.c

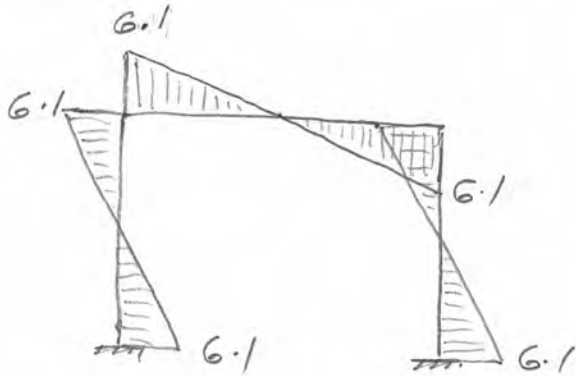
LATERAL ANALYSIS





$$V_1 = ((77-29) \sin 18.4^\circ) \times 6.5 \times 20.17 = 1986 \#$$





COLUMN CHECK

SIZE: 12" x 12"

$b = 12"$

$d = 9.5"$

$$M_u = 6.1 \text{ k-ft} \quad f'_c = 3000 \text{ psi}$$

$$A_{s, req} = 0.14 \text{ in}^2$$

$$A_{s, prov} = 0.88 \text{ in}^2 \quad \checkmark \text{ Ok}$$

2#6 BF

FTG F4.5
 COMB COMB: D+0.6W



$$P = 9.5 \text{ k}$$

$$M = 6.1 \text{ k-ft} \times 0.6 = 3.7 \text{ k-ft}$$

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Job #

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General Footing

ENERCALC, INC. 1983-2011, Build:6.11.6.23, Ver:6.11.6.23

Lic. # :

Licensee :

Description : F4.5

General Information

Calculations per, ASCE 7-05

Material Properties

f'_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	0.00140
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears :	:	Yes
Include Pedestal Weight as DL	:	No

Soil Design Values

Allowable Soil Bearing	=	2.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	0.0 ft
Allowable pressure increase per foot of dept=	=	0.0 ksf
when footing base is below	=	0.0 ft

Increases based on footing plan dimension

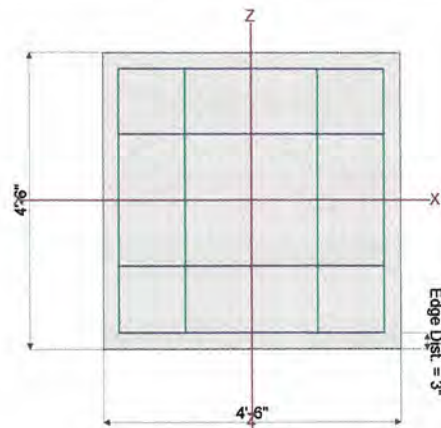
Allowable pressure increase per foot of dept =	=	0.0 ksf
when maximum length or width is greater+	=	0.0 ft

Dimensions

Width parallel to X-X Axis	=	4.50 ft
Length parallel to Z-Z Axis	=	4.50 ft
Footing Thicknes	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	0.0 in
pz : parallel to Z-Z Axis	=	0.0 in
Height	=	0.0 in
Rebar Centerline to Edge of Concrete..	=	3.0 in
at Bottom of footing	=	

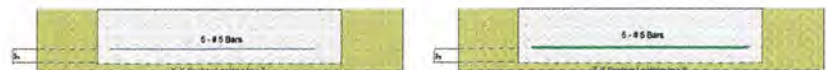


Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	5.0
Reinforcing Bar Size	=	# 5
Bars parallel to Z-Z Axis	=	
Number of Bars	=	5.0
Reinforcing Bar Size	=	# 5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	9.50	0.0	0.0	0.0	0.0	0.0 k
OB : Overburden	=	0.0	0.0	0.0	0.0	0.0	0.0 ksf
M-xx	=	0.0	0.0	0.0	0.0	0.0	0.0 k-ft
M-zz	=	0.0	0.0	0.0	0.0	6.10	0.0 k-ft
V-x	=	0.0	0.0	0.0	0.0	0.0	0.0 k
V-z	=	0.0	0.0	0.0	0.0	0.0	0.0 k

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Lic. # : Licensee :

Description : F4.5

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.5050	Soil Bearing	1.010 ksf	2.0 ksf	+D+W+H
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	2.752	Overturing - Z-Z	6.10 k-ft	16.789 k-ft	0.6D+W
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1869	Z Flexure (+X)	2.509 k-ft	13.427 k-ft	+1.20D+0.50L+0.50S+1.60W
PASS	0.1238	Z Flexure (-X)	1.662 k-ft	13.427 k-ft	+1.40D
PASS	0.1238	X Flexure (+Z)	1.662 k-ft	13.427 k-ft	+1.40D
PASS	0.1238	X Flexure (-Z)	1.662 k-ft	13.427 k-ft	+1.40D
PASS	0.1110	1-way Shear (+X)	9.122 psi	82.158 psi	+1.40D
PASS	0.1110	1-way Shear (-X)	9.122 psi	82.158 psi	+1.40D
PASS	0.1110	1-way Shear (+Z)	9.122 psi	82.158 psi	+1.40D
PASS	0.1110	1-way Shear (-Z)	9.122 psi	82.158 psi	+1.40D
PASS	0.2423	2-way Punching	39.816 psi	164.32 psi	+1.40D

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	+Z	Actual Soil Bearing Stress +Z	-X	-X	Actual / Allowable Ratio
X-X, +D	2.0	n/a	0.0	0.6141	0.6141	n/a	n/a	0.307
X-X, +D+W+H	2.0	n/a	0.0	0.6141	0.6141	n/a	n/a	0.307
X-X, +D+0.750Lr+0.750L+0.750W+H	2.0	n/a	0.0	0.6141	0.6141	n/a	n/a	0.307
X-X, +D+0.750L+0.750S+0.750W+H	2.0	n/a	0.0	0.6141	0.6141	n/a	n/a	0.307
X-X, +0.60D+W+H	2.0	n/a	0.0	0.3685	0.3685	n/a	n/a	0.184
Z-Z, +D	2.0	0.0	n/a	n/a	n/a	0.6141	0.6141	0.307
Z-Z, +D+W+H	2.0	5.886	n/a	n/a	n/a	0.2178	1.010	0.505
Z-Z, +D+0.750Lr+0.750L+0.750W+H	2.0	4.415	n/a	n/a	n/a	0.3169	0.9114	0.456
Z-Z, +D+0.750L+0.750S+0.750W+H	2.0	4.415	n/a	n/a	n/a	0.3169	0.9114	0.456
Z-Z, +0.60D+W+H	2.0	9.810	n/a	n/a	n/a	0.0	0.7663	0.383

Overturing Stability

Rotation Axis & Load Combination...	Overturing Moment	Resisting Moment	Stability Ratio	Status
X-X, D	None	0.0 k-ft	Infinity	OK
X-X, 0.6D+W	None	0.0 k-ft	Infinity	OK
Z-Z, D	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+W	6.10 k-ft	16.789 k-ft	2.752	OK

All units k

Force Application Axis

Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				
Footing Flexure				

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.662	+Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.40D	1.662	-Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+1.60Lr+0.80W	1.425	+Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+1.60Lr+0.80W	1.425	-Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+1.60S+0.80W	1.425	+Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+1.60S+0.80W	1.425	-Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	1.425	+Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	1.425	-Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+0.50L+0.50S+1.60W	1.425	+Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +1.20D+0.50L+0.50S+1.60W	1.425	-Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +0.90D+1.60W+1.60H	1.069	+Z	Bottom	0.26	Bending	0.34	13.427	OK
X-X, +0.90D+1.60W+1.60H	1.069	-Z	Bottom	0.26	Bending	0.34	13.427	OK
Z-Z, +1.40D	1.662	-X	Bottom	0.26	Bending	0.34	13.427	OK

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Description : F4.5

Z-Z, +1.40D	1.662	+X	Bottom	0.26	Bending	0.34	13.427	OK
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Description : F4.5

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+1.60Lr+0.80W	0.8826	-X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+1.60Lr+0.80W	1.967	+X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+1.60S+0.80W	0.8826	-X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+1.60S+0.80W	1.967	+X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+0.50Lr+0.50L+1.60W	0.3405	-X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+0.50Lr+0.50L+1.60W	2.509	+X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.3405	-X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	2.509	+X	Bottom	0.26	Bendina	0.34	13.427	OK
Z-Z, +0.90D+1.60W+1.60H	0.00595	-X	Top	0.26	Bendina	0.34	13.427	OK
Z-Z, +0.90D+1.60W+1.60H	2.163	+X	Bottom	0.26	Bendina	0.34	13.427	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	9.122 psi	9.122 psi	9.122 psi	9.122 psi	9.122 psi	82.158 psi	0.111	OK
+1.20D+1.60Lr+0.80W	7.819 psi	7.819 psi	7.819 psi	7.819 psi	7.819 psi	82.158 psi	0.09517	OK
+1.20D+1.60S+0.80W	7.819 psi	7.819 psi	7.819 psi	7.819 psi	7.819 psi	82.158 psi	0.09517	OK
+1.20D+0.50Lr+0.50L+1.60W	7.819 psi	7.819 psi	7.819 psi	7.819 psi	7.819 psi	82.158 psi	0.09517	OK
+1.20D+0.50L+0.50S+1.60W	7.819 psi	7.819 psi	7.819 psi	7.819 psi	7.819 psi	82.158 psi	0.09517	OK
+0.90D+1.60W+1.60H	5.864 psi	5.864 psi	5.864 psi	5.864 psi	5.864 psi	82.158 psi	0.07138	OK

All units k

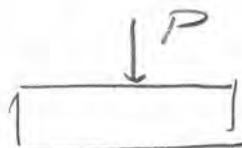
Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	39.816 psi	164.32 psi	0.2423	OK
+1.20D+1.60Lr+0.80W	34.128 psi	164.32 psi	0.2077	OK
+1.20D+1.60S+0.80W	34.128 psi	164.32 psi	0.2077	OK
+1.20D+0.50Lr+0.50L+1.60W	34.128 psi	164.32 psi	0.2077	OK
+1.20D+0.50L+0.50S+1.60W	34.128 psi	164.32 psi	0.2077	OK
+0.90D+1.60W+1.60H	25.604 psi	164.32 psi	0.1558	OK



FOUNDATION

FT6 F4.5

Gravity.



$$P = 15.0 + 1.8 = 16.8 \text{ k}$$

$\nwarrow$ REACTION FROM AB-1 $\nwarrow$ COL. WEIGHT

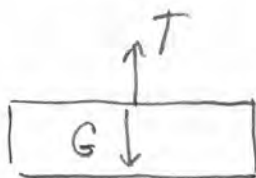
BENDING

SOIL BEARING CAPACITY = 2000 PSF

$$f = \frac{16.8 \times 1.1}{4.5 \times 4.5} = 1.16 \text{ KSF} < 2.0 \text{ KSF} \quad \checkmark \text{ OK}$$

USE FT6 F4.5
4'-6" - 4'-6" x 12"

UPLIFT



$$\begin{aligned} \text{WIND PRESSURE} &= 58 \times 0.6 \\ &= 35 \text{ PSF} \end{aligned}$$

$$T = (35 - 10) \times 15.67 \times 17 = 6660 \text{ \#}$$



$$\begin{aligned}
 G: \text{Beam} &= 150 \times 0.67 \times 1.5 \times 17 = 2562 \\
 \text{COL} &= 150 \times 1 \times 1 \times 12 = 1800 \\
 \text{SLG} &= 150 \times 0.38 \times 4.5 \times 4.5 = 1032 \\
 \text{SOIC} &= 110 \times 1 \times 4.5 \times 4.5 = 2228 \\
 \text{FRG} &= 150 \times 1.0 \times 4.5 \times 4.5 = 4070 \\
 &\quad \underline{11,692} \times 0.6 = 7015 \#
 \end{aligned}$$

$$\begin{aligned}
 \text{GRAVITY LOAD (G)} &> \text{UPRIFT LOAD (T)} \\
 0.6D &\quad 0.6W \\
 7015 \# &> 6660 \# \quad \text{OK}
 \end{aligned}$$

✓ USE FRG F4.5

4'-6" x 4'-6" x 12"