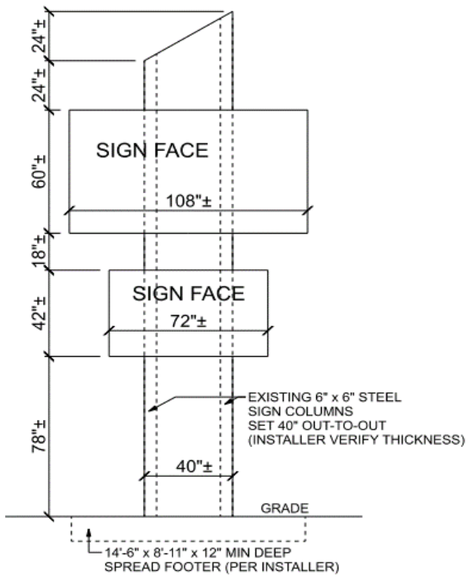
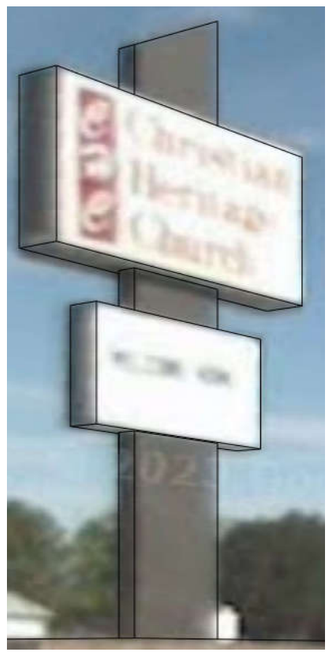
THIS ENGINEERING CALCULATES WIND LOAD ON COLUMN AND FOUNDATION WHEN AN EXISTING PERMITTED SIGN IS REPLACED BY A NEW SIGN. THE NEW SIGN WILL PUT EQUAL OR LESS STRESS ON COLUMN AND FOUNDATION AS EXISTING SIGN. SIGN INSTALLER MUST VERIFY EXISTING COLUMN AND FOUNDATION ARE IN GOOD STRUCTURAL CONDITION.



ORIGINAL SIGN LAYOUT
(BASED ON PHOTO AND PER INSTALLER)



EXISTING SIGN DRAWING FROM SIGN INSTALLER

NEW SIGN TO BE INSTALLED ON EXISTING SIGN COLUMNS AND FOUNDATION

6" L x 6" W x 0.188" wall, A500 46 ksi HSS Steel Column, S=7.42 M=17.1

Florida, FBC 7th Ed (2020), Sect 1609 wind

ref ASCE 7-16

140 **Wind Speed, Vult,** mph, from ASCE 7-16, Figure 26.5

IV **Risk Category;** II, Normal; III, Substantial Hazard; IV, Essential/Critical

C **Wind Exposure;** C, House size obstructions for > 600 ft; D, no obstructions > 5000 ft

Sign Support Columns

Sand, silty sand, clayey sand, silty gravel, clayey gravel ← **Presumptive soil type**

Grade offset (ft) | Grade offset (ft)

EXISTING SIGN WIND LOAD

WIND LOAD CALC: ASCE 7-16 Section 29.3.1, Solid Freestanding Signs

Terrain K_{zt}=1, no hill, ridge, or escarpment >15' high; Directionality K_d=0.85; Gust **G**=0.85 rigid structure;

K_z=2.01*(H/900)^(2/9.5)ExpC, (700&11.5)ExpD; $q_{h,ult}$=0.00256*K_z*K_{zt}*K_d*V^2_{ult}; load = 0.6W+D, D ≤ 15 psf

A	B	C	D	E	F	Sign Segment ID	OAH&D
19.5	**16.5**	**11.5**	**10.0**	**6.5**		Segment Top Above Grade, Top, ft	19.5
3.3	**9.0**	**3.3**	**6**	**3.3**		Segment Width, W, ft	5.2
3.0	**5.0**	**1.5**	**3.5**	**6.5**		Segment Height, H, ft	19.5
9.9	45	4.95	21	21.45		Segment Area, ft^2 (adjusted for grade height)	
0.90	0.87	0.85	0.85	0.85		Velocity Pressure Exposure Coeff; K_z	
38.3	36.9	36.2	36.2	36.2		Velocity Pressure, $q_{h,ult}$, psf (per segment)	
1.80	1.80	1.80	1.78	1.55		Force coefficient C_f (per segment)	1.70
58.5	56.5	55.4	54.6	47.7		Wind Pressure, P_{ult}, psf = $q_{h,ult}$*G*C_f	
35.1	33.9	33.2	32.8	28.6		Wind Pressure, P_{asd}, psf = P_{ult}*0.6	
0.348	1.526	0.165	0.688	0.614		Wind Force, F_{seg}, kips = P_{asd}*$Area_{seg}$	
6.259	21.363	1.769	5.678	1.995		Wind $Moment_{seg}$ kip*ft = F_{seg}*$centroid_{seg}$	
4.605	24.415	1.301	5.273	1.468		Column mom_{seg} = (F_{seg}/2+$F2_{seg}$*W_{seg}/spacing)*$centroid_{seg}$	
		2.8	ft OC			Column Spacing	
"grade" =	0 ft	**3.34**	kip			Total Shear at Grade, V = Sum (F_{seg})	
11.096		**37.06**	kip.ft			Total Moment at Grade, M = Sum (F_{seg} * centroid of segment)	
		3.21	kip			Column Shear, V_c = sum(F_{seg})/2+sum((F_{seg}*0.2)*width)/Spacing	
11.540	1.00	**37.1**	kip.ft			Column Moment at Grade M_c = sum(column $moment_{seg}$)	

A	B	C	D	E	F	Sign Segment ID	OAH&D
8.0						Segment Top Above Grade, Top, ft	8.0
12.0						Segment Width, W, ft	12.0
8.0						Segment Height, H, ft	8.0
96						Segment Area, ft^2 (adjusted for grade height)	
0.85						Velocity Pressure Exposure Coeff; K_z	
36.2						Velocity Pressure, $q_{h,ult}$, psf (per segment)	
1.45						Force coefficient C_f (per segment)	1.55
44.6						Wind Pressure, P_{ult}, psf = $q_{h,ult}$*G*C_f	
26.8						Wind Pressure, P_{asd}, psf = P_{ult}*0.6	
2.570						Wind Force, F_{seg}, kips = P_{asd}*$Area_{seg}$	
10.281						Wind $Moment_{seg}$ kip*ft = F_{seg}*$centroid_{seg}$	
13.953						Column mom_{seg} = (F_{seg}/2+$F2_{seg}$*W_{seg}/spacing)*$centroid_{seg}$	
		2.8	ft OC			Column Spacing	
"grade" =		**2.57**	kip			Total Shear at Grade, V = Sum (F_{seg})	
4.000		**10.28**	kip.ft			Total Moment at Grade, M = Sum (F_{seg} * centroid of segment)	
		3.49	kip			Column Shear, V_c = sum(F_{seg})/2+sum((F_{seg}*0.2)*width)/Spacing	
4.000	1.36	**14.0**	kip.ft			Column Moment at Grade M_c = sum(column $moment_{seg}$)	

- Sign manufacturer/installer's design, detailing, fabrication, and erection shall conform to the following specifications: Building Code, ASTM specifications, ACI-318 for reinforced concrete, American Welding Society Code for Welding in Building Construction, AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.
- Materials of construction: (Unless noted otherwise)
  - Structural steel (angles, shapes, plates, gussets): ASTM A-36, Fy = 36 ksi.
  - HSS round steel tubing: A-500, Grade B, Fy=42ksi; Rectangular: 46ksi.
  - Structural aluminum tubing: 6061-T6, or equivalent, Fy = 18 ksi at weld.
  - Structural pipe: A-53, Grade B, Type E or S, Fy = 35 ksi.
  - Anchor bolts: ASTM F1554 Grade 36 with heavy hex at bottom, not "L or J" bolts.
  - Connection bolts: A-325, snug tight.
  - Rebar: ASTM 615, #6 or larger - Grade 60, #5 or smaller - Grade 40, 3" cover.
  - Concrete: 2500 psi, 28 days.
  - Provide coatings to prevent any possibility of corrosion.
- Welding design and fabrication according to AWS D1.1.
  - AWS certification required for all structural welders.
  - E70XX electrodes for SMAW processes. F7X-EXXX electrodes for SAW processes.
- Embedded column acts as vertical reinforcement for drilled and cube foundations.
- Soil bearing capacity is Section 1806.2 Presumptive Load Bearing Value. Lateral bearing is doubled for sign poles per 1806.3.4. Soil choice types per Table 1806.2. **Soil type must be applicable for entire foundation. Flat level grade and unsaturated soil matching presumptive soil type must be verified by sign installer.**

Spread Foundation **(Long is perpendicular to face)**

8.9' long x 14.5' wide x 1' deep

#5, 12" OC each way, 2 mats, 3" from top and bottom

In 2500 psi or higher concrete, embed support columns, anchor bolts, and/or vertical rebar to 6" from bottom in drilled shaft and cube foundations, and to 3" from bottom in spread foundations.

Cube L=W=D

Drilled Shaft Foundation, Code Section 1807.3.2

laterally unconstrained at grade

Diameter, b, ft	(or length and width of cube)
Depth, D, ft	D= 0.5*A{1+[1+(4.36*Hcent/A)]^.5}
A term	A = 2.34*F/(S1*b)
S1 or S3	S1 = 2*Ssoil*D/3
150 psf/ft	Ssoil psf/ft for Sand, silty sand, clayey sand, silty gravel, clayey gravel

Spread Foundation Q psf for Sand, silty sand, clayey sand, silty gravel, clayey gravel = 2000

8.9	Length, L, ft
14.5	Width, W, ft
1.0	Depth, D, ft
2600	Soil Bearing at Bottom of Foundation, Qbot, psf, Qbot = 1.3*(Q+100pcf*(D-1))
19.4	Total Weight, Wt, kips, Wt = L * W * D * .15 kips/ft3
1.0	Toe Length, Toe, ft, Toe = Wt / (W * Qbot)
4.1	Bearing Eccentricity, e, ft, e = L / 2 - Toe / 3
53.0	Overturning Capacity Calc, OT, kip.ft, OT = Wt / e / 1.5safety

10.3

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This item has been digitally signed and sealed by Mark Disosway, PE, on the digital signature date. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies. UNO, valid for one sign at this location

C=US, O=Florida, dnQualifier=A01410C0000017E97DE07CA000746F0, CN=Mark d Disosway
2023-09-25 17:35:04

This seal for structural engineering (Foundation & Support Column ONLY)

SCOPE OF WORK: Comparison to show no additional stress on existing column and foundation with cabinet exchange. Based on stated (not verified) site factors and size & shape based on sign installer's drawing, attached. **By using this engineering** the owner, manufacturer, and installer accept responsibility to: Design, build, and install sign cabinet, face, attachment, electrical, etc according to building, appendix h, sign, fire, UL, zoning codes. Verify site conditions match stated wind speed, risk, exposure, topo, and soil factors or request engineering revision.

IC Construction, LLC

JOB #

PYLON SIGN
2 Columns, Centered & Embedded in Foundation

Christian Heritage Church
159 Hudson Cir, Lake City, FL 32025