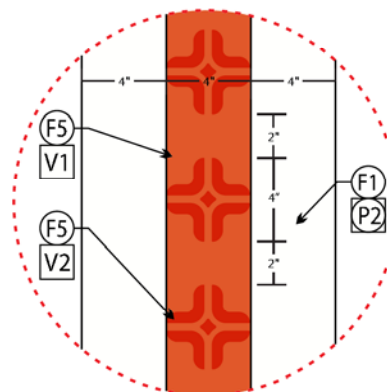
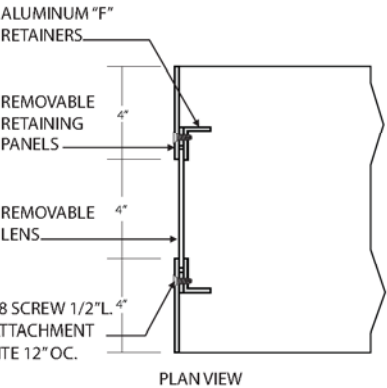
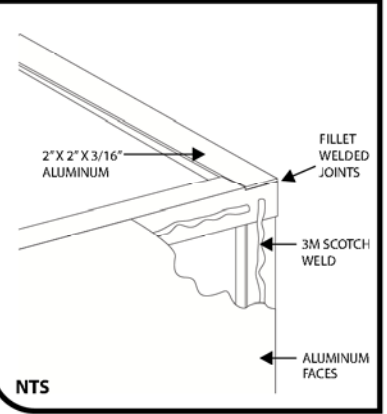


SIGN LOCATION - 32 & 33

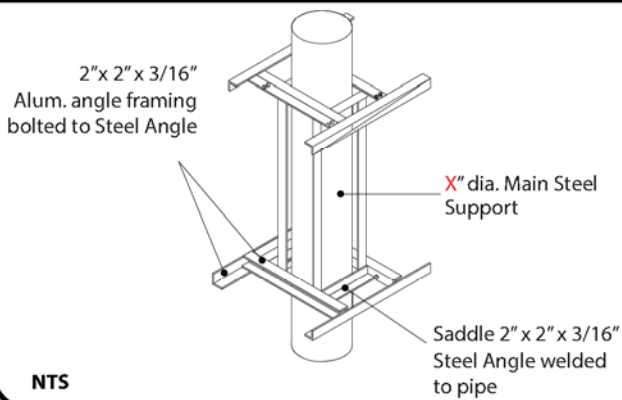


A Side Reveal / LENS Detail

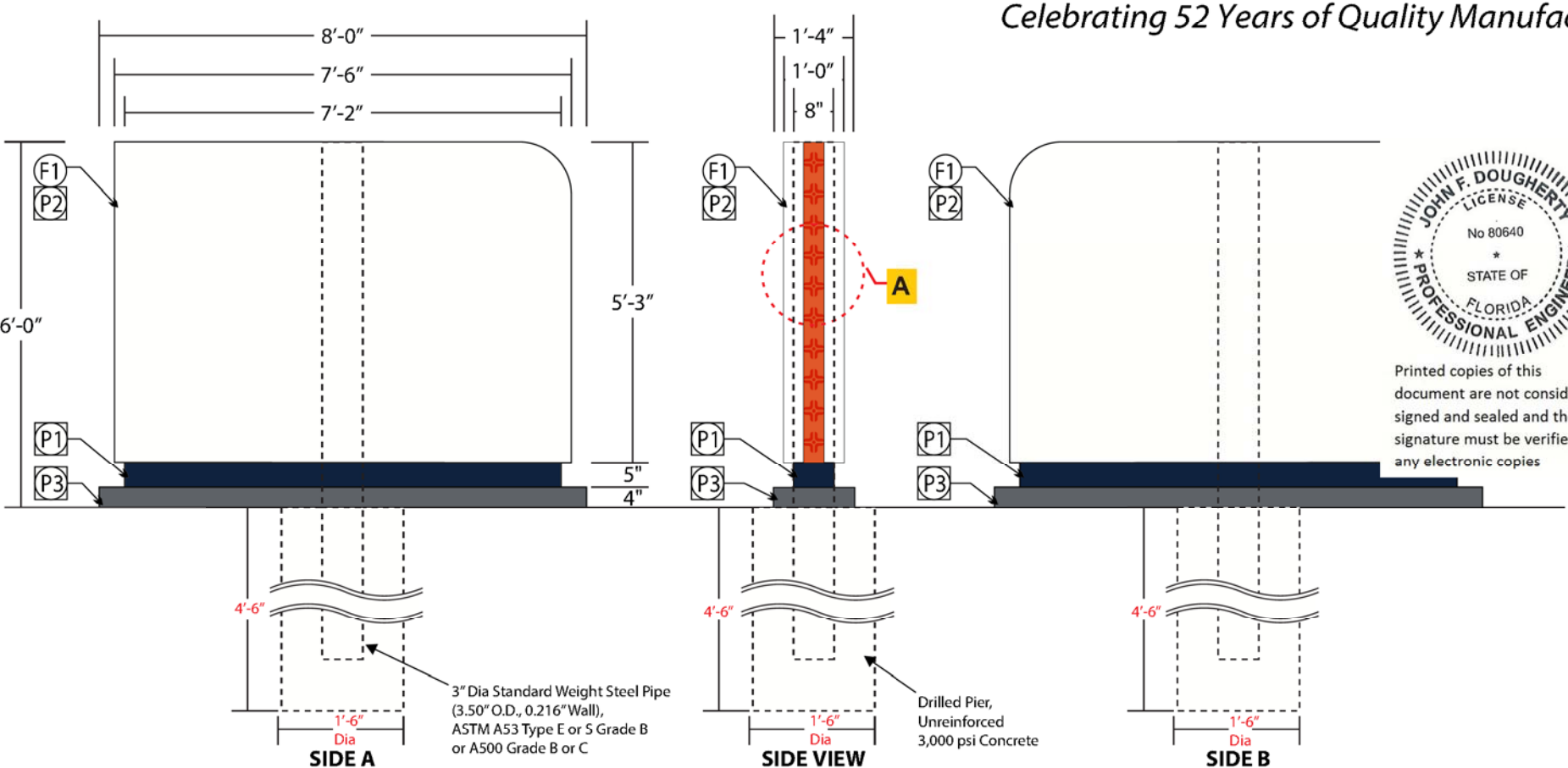
SIGN FRAME DETAIL



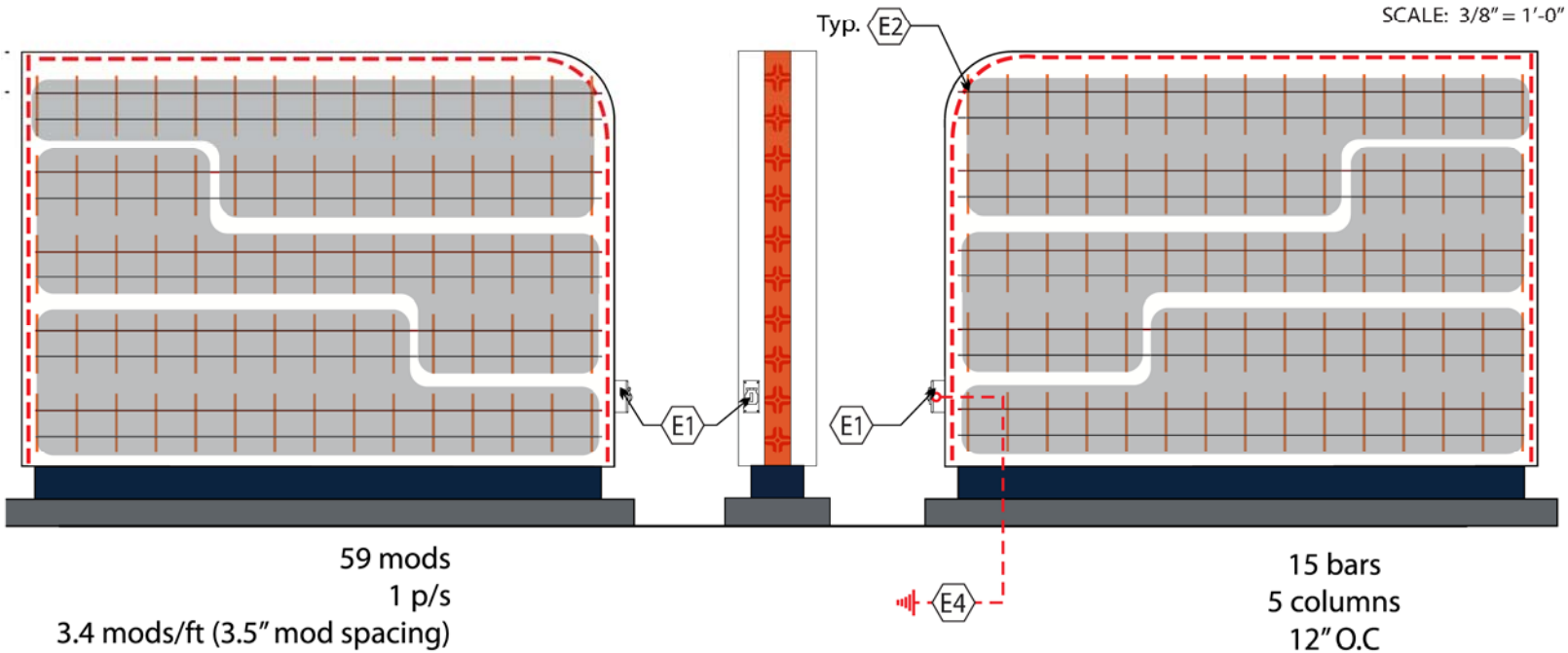
SADDLE DETAIL



NTS



New Illuminated Directionals



E3 LED Layout

BILL OF MATERIALS						
Ref #	Part Number	Description	Qty	Unit	w/unit	Unit/PS
1	OTSR-X2-BW65	PRIME24V REBEL Bright White 6500K	59	mods	0.6	136
2	ASU-100-24U	96W-24V Power Supply	1	pcs	N/A	N/A
3	L3G-LD10U15-24VBW65-230	L3G DS 100mm-150mm BW, 230mm	75	bars	3.36	26
4	ASU-100-24U	96W-24V Power Supply	3	pcs	N/A	N/A

E5

SCALE: 1/2" = 1'-0"

Celebrating 52 Years of Quality Manufacturing and Service

52



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TOTAL SQFT = 45.00 sq

PART # LCH-MN721-32

ESTIMATE # 187494

MATERIALS FOR FREE STANDING SIGN

EXT. FILLER: .090" ALUMINUM
FRAMING: 2" X 2" X 3/16" ALUM ANGLE
FACES: .125 ALUMINUM
RETAINER: 1" ALUMINUM "F" RETAINER (SEE DETAIL A)
LIGHTING: PRIME24V REBEL BRIGHT WHITE
BASE: .125" ALUMINUM
SUPPORTS: DIRECT BURIED 3" DIAMETER STEEL PIPE
GRAPHICS: VINYL GRAPHICS

COLORS FOR FREE STANDING SIGN

FILLER: MATTHEWS WHITE WONDER MP-32071 - W/ UV RESISTANT CLEAR SATIN
FACE BKGND: MATTHEWS WHITE WONDER MP-32071 - W/ UV RESISTANT CLEAR SATIN
BASE: TO MATCH PANTONE 424C SLATE GRAY - W/ UV RESISTANT CLEAR SATIN
REVEAL: TO MATCH PANTONE 289C NAVY BLUE - W/ UV RESISTANT CLEAR SATIN

FABRICATION NOTES

1) ROUTED ALUMINUM FACE BACKED W/ 1/77" ACRYLIC
2) CLEAR POLY.

VINYL COLOR

1) TRANSLUCENT: 3M 3630-124 BURNT ORANGE VINYL / SECOND SURFACE
2) OPAQUE: DIGITALLY PRINTED ON 3M SCOTCHCAL 7725-20 MATTE WHITE COMPLETE WITH 3M MATTE OVERLAMINATE TO MATCH ORANGE 10% TO 15% DARKER THAN 3M 3630-124 BURNT ORANGE VINYL / FIRST SURFACE

PAINT COLOR

1) MATHEWS PAINT COLOR TO MATCH PANTONE 289 C / UV RESISTANT CLEAR SATIN TOP COAT.
2) MATTHEWS WHITE WONDER MP-32071 / UV RESISTANT CLEAR SATIN TOP COAT.
3) MATHEWS PAINT COLOR TO MATCH PANTONE 424 C / UV RESISTANT CLEAR SATIN TOP COAT.

ELECTRICAL NOTES

1) WEATHERPROOF DISCONNECT SWITCH
2) LEDs
3) SIGN IS WIRED AS IS ON SCHEMATIC FOR POWER SUPPLY
4) 10 FT MIN. WHIP / ELEC. PRIMARY
5) LED POWER SUPPLY



ELECTRICAL SPECIFICATIONS

LED MODULES= 133	110 VOLT INPUT		AMP. INPUT
	SECONDARY		
BITRO TRANSFORMER	VOLTS	WATTS	1.0
	24	96	
TOTAL			4.0
(1) 20 AMP-120 VOLT CIRCUIT REQUIRED			



PER 2017 NATIONAL ELECTRIC CODE
ALL ELECTRICAL COMPONENTS WILL BE UL LISTED AND APPROVED AS PER 2017 NEC 600.3 AND MARKED AS PER NEC 600.4. THE INSTALLATION OF THE WIRING WILL BE DONE AS PER FBC 4505.4 AND DESIGNED TO UL 4E. ALL SIGNS WILL BE GROUNDED AND BONDED AS PER NEC 600.7 AND 250.122. A DISCONNECT WILL BE PROVIDED AS PER NEC 600.6. PRIMARY ELECTRICAL SOURCE WILL BE SUPPLIED BY CUSTOMER TO WITHIN 5 FEET OF SIGN LOCATION. THIS SIGN WILL BE BUILT AND INSTALLED IN COMPLIANCE WITH 2017 NEC ARTICLE 600, UL AND FBC. THIS SIGN IS A UL LISTED ASSEMBLY PER NEC 600.3

THE LOCATION OF THE DISCONNECT SWITCH AFTER INSTALLATION SHALL COMPLY WITH ARTICLE 600.6(A) (1) OF THE NATIONAL ELECTRICAL CODE.

Design Loads

PER FL BLDG CODE, 7TH ED (2020)	
BASIC WIND SPEED, V	136 MPH
RISK CATEGORY	IV
EXPOSURE CATEGORY	B
DESIGN WIND PRESSURE	28.0 PSF
FL CERTIFICATE OF AUTHORIZATION NO 31751	



THOMAS

SIGN & AWNING CO INC

4590 118TH Avenue North
Clearwater, Florida 33762

800-526-3325

www.thomassign.com

CLIENT

HCA Florida
Lake City Hospital
Design Number:
97209

Installation Address:
3239 NW York DR
Lake City, FL
32055

Project Identity Number:
96070

Sales Associate:	Project Team:
MT	BM
Designer:	Date:
JB	09.07.22

Project Updates:
09.12.22 JB - Revisions
09.19.22 JB - Revisions



THIS ARTICLE IS INTENDED TO BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 600 OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER APPLICABLE LOCAL CODES. THIS INCLUDES PROPER GROUNDING AND BONDING OF THE SIGN.



3MTM MCSTM Warranty

Approval:

☐ Approved
DATE:
☐ Approved as noted
DATE:
☐ Revise & Re-Submit
DATE:

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Page Sheet

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Local: 727-573-7757
Fax: 727-573-0328

THOMAS

Sign & Awning Company, Inc.

4590 118th Avenue North

Clearwater, Florida 33762

Florida Certificate of Authorization No. 31751

Structural Calculations

Client: HCA Florida Lake City Hospital

Project Identity No.: 96070

Design No.: 97209

Installation Location: 3239 NW York Dr, Lake City, FL

Description: 6' OAH Monument Signs; Sign Locations 32 & 33

Engineering Calculations

Table of Contents

Structural Engineering Calculations

Pages 1 - 7

Prepared by: John F. Dougherty, P.E.

Florida P.E. No. 80640

Code: Florida Building Code, 7th Edition (2020) - Building



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Structural Calculations

Client: HCA Florida Lake City Hospital

Project Identity No.: 96070

Design No.: 97209

Prepared by: John F. Dougherty

Florida P.E. License No. 80640

Installation Location: 3239 NW York Dr, Lake City, FL

Sign geometry:

Sign Height, s	6.00	feet
Sign Width, B	7.50	feet
Sign Face Area, As	45.00	square feet
Height from grade to top of sign, h = s =	6.00	feet

Say sign weighs	5	psf
Then total weight =	225	lbs

Thickness of sign, t	1	feet
Lateral wind area, $A_{lat} = t s =$	6.00	square feet

Florida Building Code 7th Edition (2020) Building (FBC 7th)

Table 1604.5; Risk Category	IV
Fig. 1609.3; Ultimate Wind Speed, Vult	133 mph, interpolated
Use Vult	136 mph
1609.4.2; Surface Roughness	B Suburban
1609.4.3; Exposure Category	B

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Installation Location: 3239 NW York Dr, Lake City, FL

For free-standing solid signs, apply ASCE 7 provisions.

ASCE 7-16 Chapter 29 Wind Loads on Building Appurtenances and Other Structures...

Figure 29.3-1	Clearance ratio, $s/h =$	1.00	
	Aspect ratio, $B/s =$	1.25 < 2; Case C doesn't apply	
	Cf for Case A or B	1.44	
	Cfc1 for Case C, 0 to s	0.00	
	Cfc2 for Case C, s to 2s	0.00	
	Cfc3 for Case C, 2s to 3s	0.00	
	Cfc4 for Case C, 3s to 4s	0.00	
	Table 26.10-1; $K_h =$	0.57	
	Table 26.6-1, Directionality Factor, K_d	0.85	for free standing signs
	Section 26.8.2, Topographic factor, K_{zt}	1.00	
	Velocity pressure, $q_z = q_h = 0.00256 K_z K_{zt} K_d V_{asd}^2 =$	22.9	psf
	Section 26.11 gust effect factor, G	0.85	
	Design wind pressure (Case A) = $q_z G C_f =$	28.0	psf
	Eq. 29.3-1, $F = q_h G C_f A_s$		
	Case A and Case B, $F_{AB} =$	1261	lb
	Case C, $F_1 = q_h G C_{fc1} s^2 =$	0 lb applied $s/2 =$	3.00 feet from end of sign
	Case C, $F_2 = q_h G C_{fc2} s^2 =$	0 lb applied $3s/2 =$	9.00 feet from end of sign
	Case C, $F_3 = q_h G C_{fc3} s^2 =$	0 lb applied $5s/2 =$	15.00 feet from end of sign
	Case C, $F_4 = q_h G C_{fc4} s^2 =$	0 lb applied $7s/2 =$	21.00 feet from end of sign
	Total force, $\Sigma F_c =$	0	lb
	Lateral load, $F_{lat} = \text{say } q_h G C_f A_{lat} =$	168.19	lb (assumes $C_f = 1.00$)

To be shown on construction documents:

ULTIMATE DESIGN WIND SPEED, Vult (3-SECOND GUST):	136 mph
RISK CATEGORY:	IV
EXPOSURE CATEGORY:	B
DESIGN WIND PRESSURE:	28.0 psf

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Installation Location: 3239 NW York Dr, Lake City, FL

For One Support Pole:

Case B ASCE 7, Fig. 29.3-1; F_{AB} applied 0.2B = 1.50 feet from center of sign
Torsion = $F_{AB} (0.2B)$ = 1,892 ft-lb
F applied 0.05h = 0.30 feet above center
Pole base moment, $M_{x_B} = F_{AB}(0.55)h$ = 4,163 ft-lb*
 $V_{x_B} = F_{AB}$ = 1261 lb
 $V_{y_B} = \text{Flat}$ = 168.2 lb
Pole base moment, $M_{y_B} = V_{y_B} (0.55h)$ = 555.0 ft-lb*

Case C Total load, $V_{x_C} = F_{AB}$ = 0 lb
Pole base moment, $M_{x_C} = V_{x_C} (0.55)h$ = 0 ft-lb*
Torsion, $T = F_1 (B/2-s/2) + F_2 (B/2-3s/2) + F_3 (B/2-5s/2) + F_4 (B/2-7s/2)$
 $T =$ 0 ft-lb
 $V_{y_B} = \text{Flat}$ = 168.2 lb
Pole base moment, $M_{y_B} = V_{y_B} (0.55h)$ = 555.0 ft-lb*

	Case B	Case C	Maximum	
$V_x =$	1,261	0	1,261	lb
$M_x =$	4,163	0	4,163	ft-lb at grade*
Torsion	1,892	0	1,892	ft-lb
$M_y =$	555.0	555.0	555	ft-lb at grade*
$V_y =$	168.2	168.2	168	lb
** Resultant $V = (V_x^2 + V_y^2)^{1/2} =$	1273	168	1,273	lb
** Resultant $M = (M_x^2 + M_y^2)^{1/2} =$	4199	555	4,199	ft-lb at grade*

* Moment is greater below grade; see drilled pier design

** Use resultant base shear and moment for drilled pier design

For load combination 1.0 DL + 0.6 Wind

$V_x =$ 757 lb
 $M_x =$ 2,498 ft-lb at grade*
Torsion 1,135 ft-lb
 $M_y =$ 333 ft-lb at grade*
 $V_y =$ 101 lb
** Resultant $V = (V_x^2 + V_y^2)^{1/2} =$ 764 lb
** Resultant $M = (M_x^2 + M_y^2)^{1/2} =$ 2,520 ft-lb at grade*

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Design No.: 97209

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Florida P.E. License No. 80640

Installation Location: 3239 NW York Dr, Lake City, FL

For short, free-head pier in cohesionless soil

Lateral load applied to pile at grade, $P_a = 764$ lb

Moment applied to pile at grade, $M_a = 2,520$ ft-lb

Torsion, $T = 1135$ ft-lb

Resolve P_a and M_a into a load applied at a height e above grade

$e = M/P = 3.3$ feet

Diameter of the pier, $b = 18$ inches = 1.5 feet

Note: Thomas Sign's standard truck-mounted augers are 18, 30 and 36 inches diameter X 14' max depth,
48" diameter x 6' max depth

and the hand-held power auger has 6", 8" and 12" diameter bits.

Embedded length below grade, $L = 4.5$ feet

Assume angle of friction, $\phi = 30$ degrees

Rankine coefficient of passive pressure, $K_p =$

$\tan^2(45+\phi/2) = 3.00$

Unit weight of soil, $\gamma = 110.0$ pcf

Using Brom's method:

The load that will cause soil failure,

$P_t = \gamma b L^3 K_p / 2 / (e+L) = 2891.5$ lb

$P_t \geq P_a$; OK

Distance from grade down to the point of
zero shear (max moment),

$f = \{2P_a / (3 \gamma b K_p)\}^{1/2} = 1.01$ feet

$M_{max} = P_a (e+f) - P_a f / 3 = 3,036$ ft-lb

Moment magnification = $M_{grade} / M_{max} = 1.205$

Check stresses in the sign pole embedded in concrete pier.

Perimeter area of pier, $A_p = 2\pi(b/2)(12L) = 3054$ sq in

Shear on soil-concrete interface = $12T / (b/2) / A_p = 0.50$ psi x 144 = 71 psf

average soil pressure = 110 pcf $(L/2) = 247.5$ psf

say friction coefficient, $f_r = 0.3$

friction force = 74.25 psf

Factor of Safety against turning = $74.3 / 71 = 1.04 > 1.00$; OK

The auger-drilled pier spreads support reactions from the main steel support onto the supporting soil, but does not directly carry structural shear or bending moments. Those forces remain in the main support, embedded in the pier. So the concrete does not need to be reinforced to carry the loads.

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Check: **ASTM A53 Type E or S, Grade B** $F_y =$ 35 ksi
Pipe3STD

W (lb/ft)	A	OD	ID	t_{nom}	t_{des}	D/t	I_x
7.58	2.07	3.5	3.07	0.216	0.201	17.4	2.85
Z_x	S_x	r_x	I_y	Z_y	S_y	r_y	J
2.19	1.63	1.17	2.85	2.19	1.63	1.17	5.69

From drilled pier design, Max Resultant Moment, $M =$ 3,036 ft-lb
Resultant Lateral load on pole, $R_b =$ 764 lb
Torsion, $T =$ 1,135 ft-lb
Free length of cantilever, $h =$ 6.00 feet
Center of load applied above grade, $H = 0.55 h =$ 3.30 feet
Weight of sign = 225 lb

AISC Table B4.1, sect 15 $D/t =$ 17.40
In compression; $\lambda_r = 0.11 E / F_y =$ 91.14 $> D/t$; non-slender element
In flexure; $\lambda_p = 0.07 E / F_y =$ 58.00
 $\lambda_r = 0.31 E / F_y =$ 256.86 compact section

AISC Chapter E; Compression

AISC Section E1 $\Omega_c =$ 1.67

AISC Section E2 Effective length factor, $K =$ 2.10 for cantilever
 $Kl/r = K(12H)/r_x =$ 71.08

AISC Section E3 $4.71 (E/F_y)^{1/2} =$ 136 $\geq Kl/r$

AISC Eq. E3-4; $F_e =$ 56.7 ksi
AISC Eq. E3-2; $F_{cr} =$ 27.0 ksi
AISC Eq. E3-1; $P_n = F_{cr} A_g =$ 56 kips
Allowable compression strength, $P_c = P_n / \Omega_c =$ 33 kips

Pole weight 7.58 lb/ft
 H 3.30 feet
Weight of pole = 25.0 lb
Weight of sign = 225 lb
Required compression, $P_r =$ 250.0 lb = 0.25 kips
0.25 $\leq$ 33; OK

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AISC Chapter F; Flexure

$$\Omega_b = 1.67$$

AISC Section F8

$$0.45 E/F_y = 372.9 \quad D/t < 0.45 E/F_y; \text{Sect F8 Applies}$$

Section F8.1; Yielding

$$\text{Eq. F8-1; } M_n = M_p = F_y Z = 77 \text{ kip-in}$$

Section F8.2; Local Buckling

For compact sections Section F8.2 does not apply

$$\text{For non compact sections; Eq. F8-2; } M_n = 114 \text{ kip-in}$$

$$\text{For slender walled sections; Eq. F8-3; } M_n = 897 \text{ kip-in}$$

$$M_n = 77 \text{ kip-in}$$

$$\text{Allowable moment, } M_c = M_n / \Omega_b = 46 \text{ kip-in}$$

$$\text{Required moment, } M_r = 3,036 \text{ ft-lb} = 36 \text{ inch-kip}$$

$$36 \leq 46; \text{OK}$$

AISC Chapter G; Shear

$$\Omega_v = 1.67$$

Section G6; L_v is undefined since transverse shear is constant

Section G6; Eq. G6-2a; $F_{cr} = \text{N/A}$

$$\text{Eq. G6-2b; } F_{cr} = 312 \text{ ksi}$$

$$V_n = F_{cr} \text{ Area} / 2 = 323 \text{ kips}$$

$$\text{Allowable transverse shear, } V_c = V_n / \Omega_v = 193 \text{ kips}$$

$$\text{Required transverse shear, } V_r = 764 \text{ lb} = 0.76 \text{ kips}$$

$$\text{inch-kip}$$

$$0.76 \leq 193; \text{OK}$$

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AISC Chapter H; Combined Forces

Section H3.1 $\Omega t = 1.67$
HSS torsional constant, $C = \pi(OD-t)^2 t / 2 = 3.44$

Fcr is largest of eq. H3-2a and eq. H3-2b but shall not exceed 0.6Fy

Eq. H3-2a; Fcr = 298 ksi

Eq. H3-2b; Fcr = 239.5 ksi

0.6 Fy = 21.0 ksi

Use Fcr = 21.0 ksi

eq H3-1; Tn = Fcr C = 72.2 in-kip

Allowable torsion, Tc = Tn / Ωt = 43.2 in-kip

Required torsion, Tr = 1,135.3 ft-lb = 13.62 inch-kip

13.62 <= 43; OK

AISC Section H3.2; eq. H3-6

$(Pr/Pc) + (Mr/Mc) + \{(Vr/Vc) + (Tr/Tc)\}^2 \leq 1.00$

0.90 <= 1.00; OK

Deflection

Deflection due to load Rb, $\Delta = Rb (12H)^3 / (3EIx) =$
 $2(12H)/120 =$

0.19 inches

0.66 inches*

OK

* Uses span = 2H in accordance with building code for cantilevers