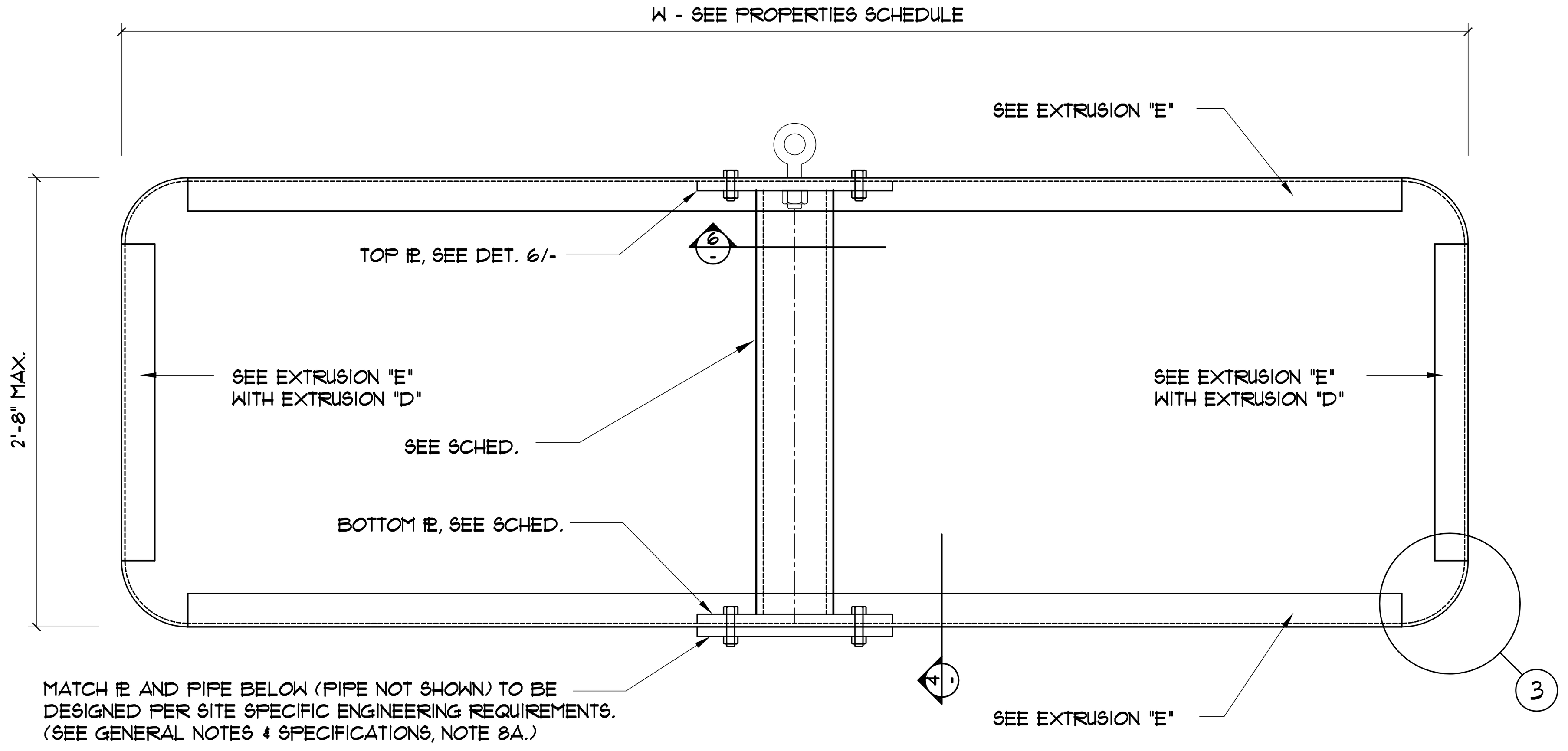
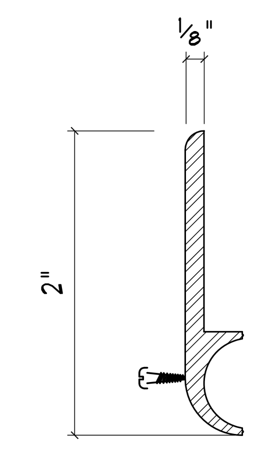


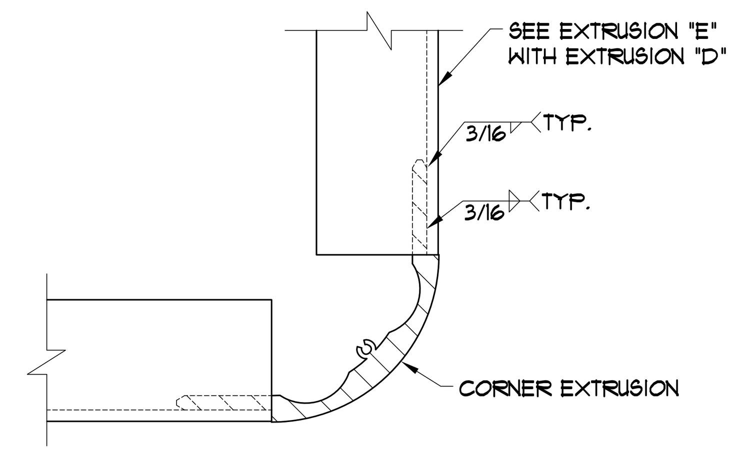
PROPERTIES SCHEDULE

WIDTH -W-	PIPE SIZE	BOTTOM PLATE	BOLTS
4'	2½" STANDARD	½" x 4½" x 1-0"	⅝"
6'	2½" STANDARD	½" x 4½" x 1-0"	⅝"
8'	3" STANDARD	½" x 4½" x 1-0"	⅝"
12'	T.B.D.	T.B.D.	T.B.D.

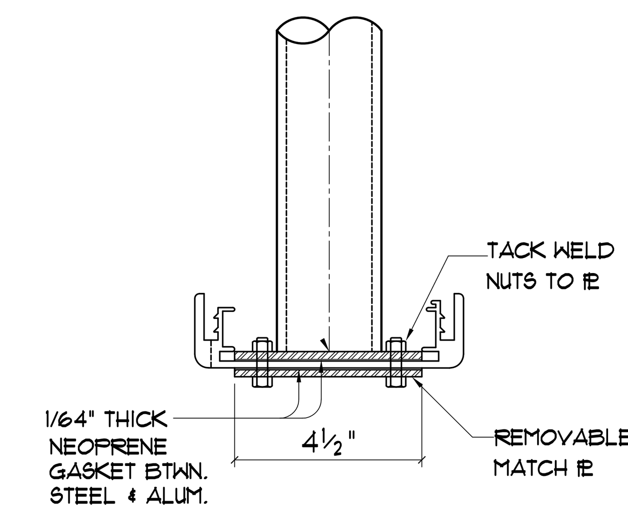
SIGN ELEVATION N.T.S. 1



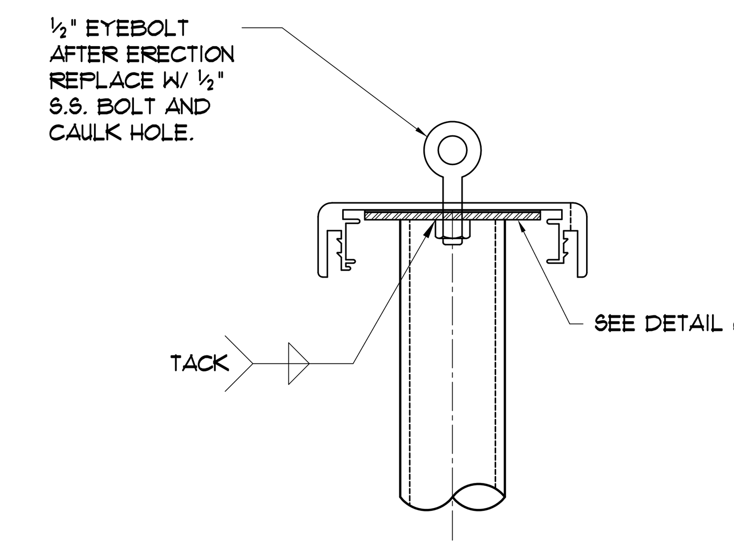
EXTRUSION "D" (NON-STRUCTURAL) N.T.S. 2



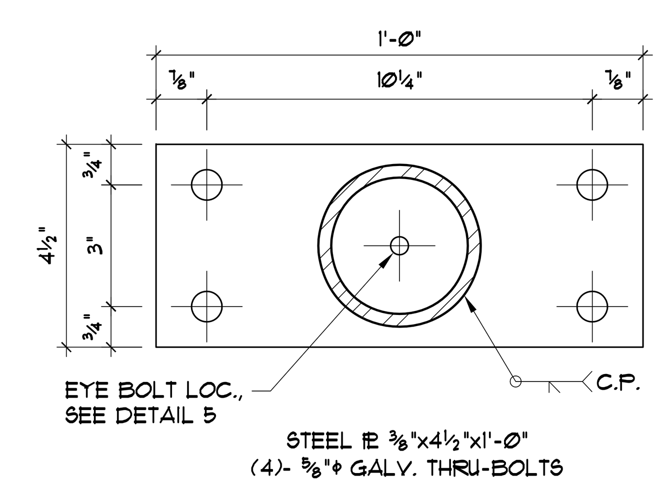
CORNER DETAIL N.T.S. 3



PIPE CONN. AT SIGN BOTTOM N.T.S. 4



PIPE CONN. AT SIGN TOP N.T.S. 5



TOP PLATE DETAIL N.T.S. 6

GENERAL NOTES & SPECIFICATIONS

1. GOVERNING CODES:

FLORIDA BUILDING CODE 2004	150 MPH
FLORIDA BUILDING CODE 2007	150 MPH
INTERNATIONAL BUILDING CODE 2003	150 MPH
INTERNATIONAL BUILDING CODE, 2006	150 MPH
INTERNATIONAL BUILDING CODE 2009	150 MPH
CALIFORNIA BUILDING CODE, 2010	150 MPH
CALIFORNIA BUILDING CODE 2007	150 MPH

2. DESIGN LOADS:

DEAD LOAD	6 LBS. PER SQ. FT.
WIND LOAD	72.4 LBS. PER SQ. FT.

3. RESTRICTIONS:

A. THE DESIGN LOADS ABOVE ARE BASED ON A HEIGHT ABOVE GROUND OF 25 FEET MAXIMUM.

B. THE METHOD OF ATTACHMENT TO SUPPORTS (POLES, WALLS, ETC.) IS NOT A PART OF THIS WORK AND MUST BE DESIGNED AND DETAILED BY OTHERS.

4. LIMITATIONS:

THE DESIGN AND CONSTRUCTION OF THE SIGN SHOWN HEREON CONFORMS TO THE ABOVE GOVERNING CODES WHEN INSTALLED AS SPECIFIED ON THIS DRAWING. NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. ANY ALTERATIONS OF THIS DRAWING WILL VOID THE SHEET. THIS SHEET IS VALID ONLY IF IT INCLUDES A WET SIGNATURE BY THE ENGINEER OF RECORD.

DO NOT REPRODUCE THESE DRAWINGS AND SPECIFICATIONS WITHOUT THE EXPRESSED WRITTEN PERMISSION OF STRUCTURAL TECHNOLOGY CONSULTANTS, INC. (STC). THE DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF THE SERVICE AND SHALL REMAIN THE PROPERTY OF STC WHETHER THE PROJECT FOR WHICH THEY ARE MADE IS EXECUTED OR NOT. THESE DRAWINGS AND SPECIFICATIONS SHALL NOT BE USED BY ANYONE ON ANY OTHER PROJECT(S) OR FOR ADDITIONS TO THIS PROJECT BY OTHERS, EXCEPT BY THE EXPRESSED WRITTEN PERMISSION OF STC.

5. MATERIALS:

A. ALUMINUM - ALLOY 6063-T5
BOLTS ASTM F593
SIGN PANELS - TO BE UNDERWRITERS LABORATORY APPROVED. USE ONLY APPROVED PLASTICS.

PLATE STEEL - A36
PIPE - ASTM A53, GRADE B
TUBE & ROUND HSS - ASTM A500, GRADE B

B. PROVIDE FOR ISOLATION OF DISSIMILAR MATERIALS.

6. WORKMANSHIP:

ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE REQUIREMENTS OF THE GOVERNING CODE (LATEST EDITION) AND THE LOCAL BUILDING OFFICIAL. WELDING SHALL CONFORM TO ALL APLICABLE CODES. CERTIFIED WELDERS ARE REQUIRED.

7. WELD SPECIFICATIONS:

STEEL WELDING
ALL WELDING SHOULD BE PERFORMED BY CERTIFIED WELDERS. WELDS USING E70 ELECTRODES OR WIRES AND AWS APPROVED SYSTEMS AND PROCEDURES ARE ACCEPTABLE. PROVIDE PERIODIC SPECIAL INSPECTION FOR FIELD WELDING IN ACCORDANCE WITH IBC SECTION 1704.3 (UBC SECTION 1701.5).

ALUMINUM WELDING
ALL WELDING SHALL BE DONE IN ACCORDANCE WITH LATEST EDITION OF THE AMERICAN WELDING SOCIETY D1.2 STRUCTURAL WELDING CODE ALUMINUM.

8. NOTES:

A. THE MATCH PLATE AND PIPE BELOW TO BE DESIGNED PER LOCAL ENGINEERING REQUIREMENTS. CONTACT STC FOR SITE SPECIFIC CALCULATIONS.

32" x 4' SIGN

EXTRUSION FRAME IS OK BY COMPARISON WITH 32" x 12' SIGN. USE POLE, BOTTOM PLATE AND BOLTS SPECIFIED FOR LARGER 32" x 6' SIGN. OK BY COMPARISON.

32" x 6' SIGN

EXTRUSION FRAME IS OK BY COMPARISON WITH 32" x 12' SIGN

POLE:
FORCE = 72.40 PSF x 2.67 FT x 6 FT = 1160 LB
M = 1160 LB x (2.67/2) = 1549 LB FT
S = 1549 LB FT x 12 / (0.6 x 35000 PSI) = 0.89 IN³

2½" STD. PIPE, t=0.203" (S = 1.01 IN³)

BOTTOM PLATE:

USE BOTTOM PLATE AND BOLTS SPECIFIED FOR LARGER 32" x 8' SIGN. OK BY COMPARISON.

32" x 8' SIGN

EXTRUSION FRAME IS OK BY COMPARISON WITH 32" x 12' SIGN

POLE:
FORCE = 72.40 PSF x 2.67 FT x 8 FT = 1546 LB
M = 1546 LB x (2.67/2) = 2064 LB FT
S = 2064 LB FT x 12 / (0.6 x 35000) = 1.18 IN³

3" STD. PIPE, t=0.216" (S = 1.63 IN³)

BOTTOM PLATE:

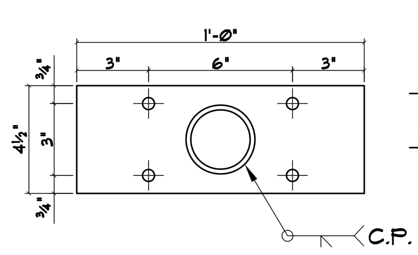
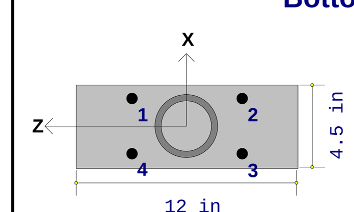


PLATE ½" x 4½" x 1'-0" W/ (4)- ⅝"φ BOLTS

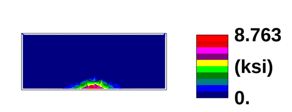
Bottom Plate for 2'-8" x 8'-0" Sign



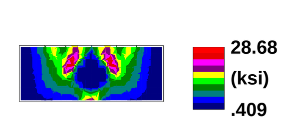
Plain Base Plate Connection

Base Plate Thickness	: .5 in
Base Plate Fy	: 36. ksi
Bearing Surface Fp	: 24.48 ksi
Anchor Bolt Diameter	: .625 in
Anchor Bolt Material	: A307
Anchor Bolt Fu	: 36. ksi
Column Shape	: PIPE_3.0
Design Code	: AISC ASD 13th
Pullout Code	: ACI 2005

Bearing Pressure
Maximum Bearing 8.763 ksi
Max/Allowable Ratio .358 IBC 16-12 (a) (ABIF = 1.000)



Base Plate Stress
Maximum Stress 28.68 ksi
Max/Allowable Ratio .885 IBC 16-12 (a) (ASIF = 1.000)



Anchor Bolts

Bolt	X (in)	Z (in)	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity	Combination
1	1.5	3.	3.548	.386	0.	27.	11.563	14.4	1.26	.857 (T)	IBC 16-12 (a) (4)
2	1.5	-3.	3.548	.386	0.	27.	11.564	14.4	1.26	.857 (T)	IBC 16-12 (a) (4)
3	-1.5	-3.	3.548	-.386	0.	27.	11.563	14.4	1.26	.857 (T)	IBC 16-12 (a) (3)
4	-1.5	3.	3.547	-.386	0.	27.	11.563	14.4	1.26	.857 (T)	IBC 16-12 (a) (3)

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Reverse
DL						No
WL		1.546			2.064	Yes

32" x 12' SIGN

HORIZONTAL EXTRUSION CHECK:
$L_{CANTILEVER}$ = 6.0 FT
$A_{TRIB.}$ = (6.0 FT)(2.67/2) = 8.01 FT²
WL = 8.01 FT² (72.40 PSF) = 580 LB
DL = 8.01 FT² (6.0 PSF) = 48 LB
M_{WL} = 580 LB (3 FT) = 1740 LB FT = M_Y
M_{DL} = 48 LB (3 FT) = 144 LB FT = M_X

Fb_X = 144 LB FT (12 IN/FT) / 1.27 IN³ = 1361 PSI
Fb_Y = 1740 LB FT (12 IN/FT) / 4.486 IN³ = 4654 PSI

UNITY CHECK:
1361 PSI / 12500 PSI + 4654 PSI / 8940 PSI = 0.63 < 1.0 OK

POLE: T.B.D.
PLATE: T.B.D.
WELD: T.B.D.

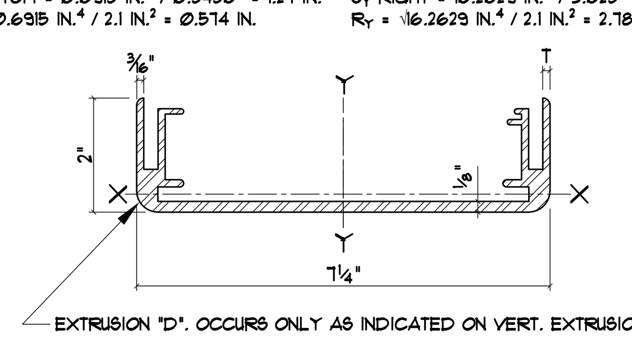
EXTRUSION "E"

PERIMETER EXTRUSION: SECTION PROPERTIES

A = 2.1 IN.²

X-X AXIS
I_X = 0.6915 IN.⁴
S_X TOP = 0.6915 IN.⁴ / 1.4544" = 0.475 IN.³
S_X BOTTOM = 0.6915 IN.⁴ / 0.5456" = 1.27 IN.³
R_X = √0.6915 IN.⁴ / 2.1 IN.² = 0.574 IN.

Y-Y AXIS
I_Y = 16.2629 IN.⁴
S_Y LEFT = 16.2629 IN.⁴ / 3.625" = 4.486 IN.³
S_Y RIGHT = 16.2629 IN.⁴ / 3.625" = 4.486 IN.³
R_Y = √16.2629 IN.⁴ / 2.1 IN.² = 2.78 IN.



ALLOWABLE STRESSES FOR 6063-T5 ALUM. PER ALUMINUM DESIGN MANUAL TABLE 2-22

BENDING TENSION
X-X AXIS: F_b = 12.5 KSI
Y-Y AXIS: F_b = 9.5 KSI

BENDING COMPRESSION
X-X AXIS: FLANGES
b/t = 2.0"/ 0.188" = 10.6 < S_1 = 12.8
F_b = 12.5 KSI

Y-Y AXIS: FLANGES, S_1 = 8.5, S_2 = 16
b/t = 2.0" / 0.188" = 10.6
F_b = 11.8 - 0.27 b/t = 11.8 - 0.27 (10.6)
F_b = 8.94 KSI

Y-Y AXIS: WEB
Lb / r_Y = 48" / 2.78" = 17.27 < S_1 = 28
F_b = 9.5 KSI

TOP PLATE

M_{WL} = 1740 LB FT (FROM CANTILEVER)
S_{PL} = (0.375")(4.5")² / 6 = 1.27 IN³
f_b = 1740 LB FT (12 IN/FT) / 1.27 IN.³ = 16441 PSI
F_b = 0.6 (36000 PSI) = 21600 PSI OK

PLATE ⅜" x 4½" x 1'-0"

BOLTS SHEAR:
V_{BOLT} = 1740 LB FT (12 IN/FT) / 3" (4 BOLTS) = 1740 LB < 3682 LB OK

5/8"φ GALV. THRU-BOLTS

ASCE 7-05 (WIND LOADS)

6.5.14 F = q_h*G*C_f*As
6.5.10 q_h = 0.00256*K_h*K_{zt}*K_d*V^2*I
K_{zt} = 1.0 (UNLESS UNUSUAL LANDSCAPE)
K_h = TABLE 6-3
K_d = 0.85 FOR SIGNS
V = 150 MPH
6.5.8 G = 0.925 ((1+1.7*g_q*I_z*Q) / (1+1.7*g_v*I_z)) or 0.85
I_z = c*(33/z)^(1/6)
z = max(0.6*h, z_{MIN})
z_{MIN} = 15
g_v = 3.4
g_q = 3.4

Q = SQRT(1.0 / (1+0.63*(B+h) / L_z)^0.63)
L_z = l*(z/33)^e

I = 1.0 FOR STRUCTURAL CATEGORY II
EXPOSURE C
l = 500 (CONSTANT FOR L_Z TABLE 6.2)
e = 0.2
c = 0.2

LOAD COMBINATION FACTOR = 1.0

SIGN ELEM. #	h	K_h	q_h	G	s/h	B/s	C_f	PRESSURE
3	22.33	0.94	46.02	0.85	0.11	4.49	1.85	72.37
4	25.0	0.94	46.02	0.85	0.11	4.49	1.85	72.37

REVISIONS	BY	DATE
	VH	12/03/10
	VH	11/05/07
3/16" EXTRUSION		

STRUCTURAL TECHNOLOGY CONSULTANTS INCORPORATED
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SIGNTRONIX
1445 W. SEPULVEDA BLVD, TORRANCE CA. 90509
(310) 534-7500

32" CENTER POLE MOUNT

SIGN ELEVATION,EXTRUSIONS AND MISCELLANEOUS DETAILS

SIGN NAME

ADDRESS
CITY, STATE

DATE:	12/03/10
JOB No.	489-XX
DESIGNED:	DJG
DRAWN BY:	VH
APPROVED BY:	DJG

489-CPM

SHEET 1 OF 18