Date:	9-25-19	City, State:	Spring Lake, NC	SHEET: 1 OF 3
Client:	**Upstate Digital Sign Sales, LLC**	Overall Height:	13'-2"	Sean M. McFarland, P.E.
Sign:	Overhills Middle School	Wind Speed	120 mph	McFarland Engineering

Sign Description 2711 Ray Rd

Columns: 1

ME Job: 45814

ULTIMATE LOADS

Height: Varies

42 KSI STEEL PIPE

Width: Varies

Table of Contents

Content:	Page
Design Loads	1
Support Design	1-3

Structural Variables and Code Loading Specifications

Cabinet Type:	Miscellaneous	Code:	2015 IBC / 2018 NC State
Structural Section:	Steel Pipe - 42000psi	Wind Speed:	120
Number of Zones:	3	Wind Exposure:	C

Wind Loads Per ASCE 7-10

Sign Sections:

Zone	Cabinet Wt. Per Sq. Ft.	Weight	Transition (Y or N)
1	20	10.8 #/FT	y
2	25	22.4 #/FT	
3	5	22.4 #/FT	y
4	0		
5	0		
6	0		
7	0		
8	0		

NORTH CAROLINA PROFESSIONAL SEAL 29710 ENGINEER SEAN M. McFARLAND

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State License: North Carolina - 29710

Geometry:

Zone	Top Elevation	Height	* Approx. Width	Pressure	Force	Approx. Weight
1	13.17 FT	5.00 FT	14.17 FT *	27.22 PSF	1.93 K	1,471 #
2	8.17 FT	3.17 FT	7.92 FT *	26.37 PSF	0.66 K	698 #
3	5.00 FT	5.00 FT	3.00 FT *	20.42 PSF	0.31 K	187 #

Total Wind Force =	2.90 K	2,355 #

Date:	9-25-19	City, State:	Spring Lake, NC	SHEET: 2 OF 3
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2711 Ray Rd

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Moments at Transitions:

Zone	Lateral Force	3 Mom. Arm	1 Mom. Arm				
1	1.93 K	10.67 FT	2.50 FT				
2	0.66 K	6.59 FT					
3	0.31 K	2.50 FT					
		25.69 K-FT	4.82 K-FT				
Section Properties:		11.12 IN^3	2.09 IN^3	.00 IN^3	.00 IN^3	.00 IN^3	.00 IN^3

Structural Sections to be used:

Zone	Option	Pipe Dim.	Wall t.	Weight	Sxx	d/t	Sxx Req'd
3	Pipe	8.63 IN	0.250 IN	22.4 #/FT	12.58 IN^3	34.50	11.12 IN^3
1	Pipe	4.50 IN	0.237 IN	10.8 #/FT	3.02 IN^3	18.99	2.09 IN^3

BASE PIPE MAY EXTEND TO TOP OF THE CABINET

Structure Required

# Req'd	Size	Wall Thickness
1	8.63 IN	0.250 IN
1	4.50 IN	0.237 IN

Date:	9-25-19	City, State:	Spring Lake, NC	SHEET: 3 OF 3
Client:	**Upstate Digital Sign Sales, LLC**	Overall Height:	13'-2"	Sean M. McFarland, P.E.
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2711 Ray Rd

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Pier Footing

Pier Footing Design:

Select the footing and soil type:

d = A / 2 * (1 + (1 + (4.36 * h) / A)^1/2))

where A = (2.34 * P) / (S1 * b)

Footing:	Round
Vert. Soil Bearing (psf):	1500
Lat. Soil Bearing (psf):	150

Mmax =	25,693 #-FT	
Pmax (Lateral) =	2,896 #	
LSBP =	150 PCF	
S1 =	730 PCF	X d
d =	3.000 FT	
A =	3.09 FT^2	
h =	8.873 FT	
d =	7.232 FT	
USE:	3.00 FT. RND. X	7.50 FT DEEP PIER

Soil Bearing Check:

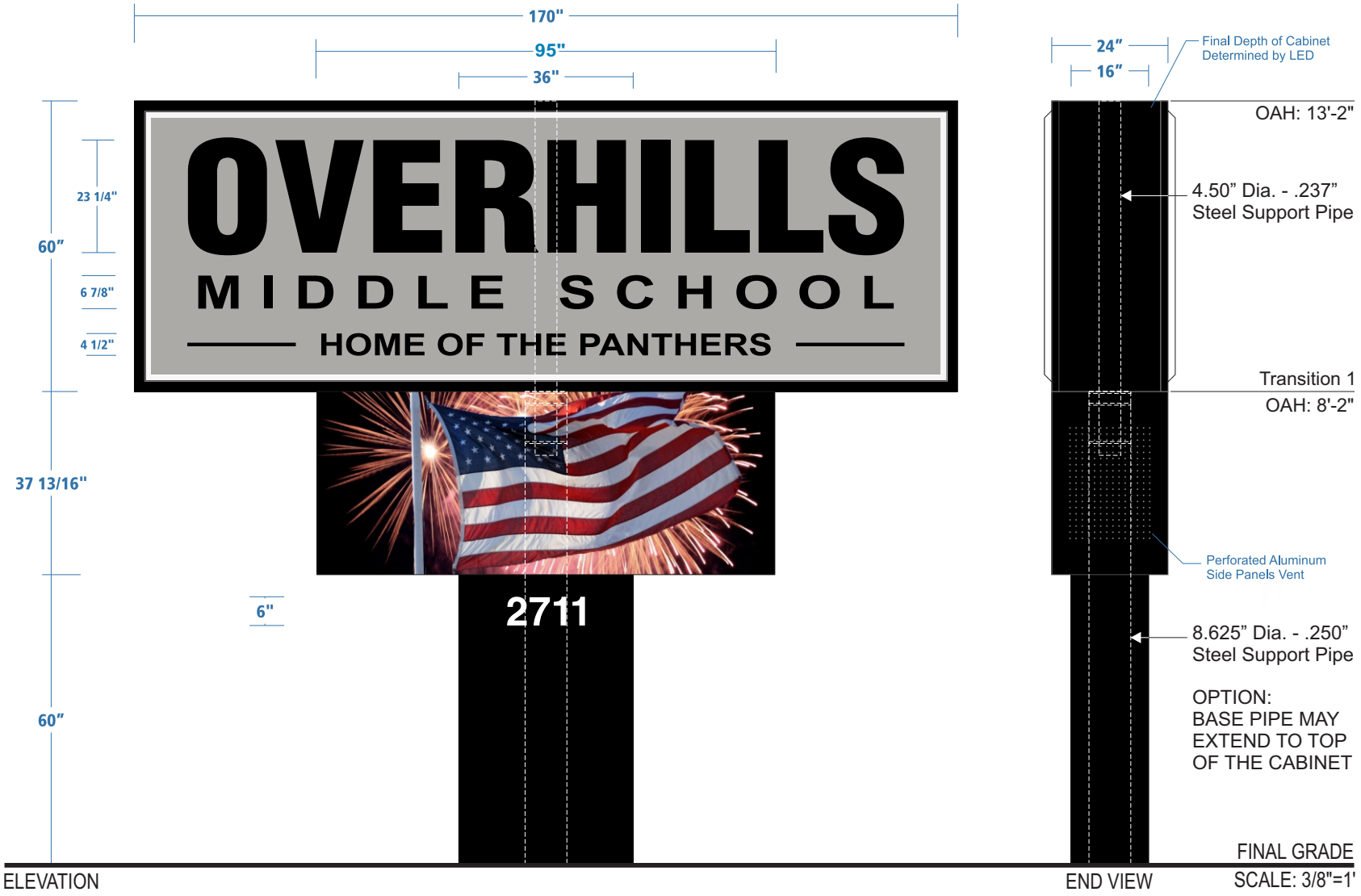
DLmax =	2,355 LBS	
Area of Footing =	7.07 FT^2	
Actural SBP =	333 PSF	
Allowable SBP =	1,950 PSF	(Includes code allowed 20% increase for every foot of footing below 12" into natural grade.)

333 PSF < 1,950 PSF THEREFORE OK

General Notes

1. Contractor shall verify all dimensions and conditions on job site
2. Structural steel pipe shall conform to ASTM A53 grade B type E or S, Fy=35 ksi min.
3. Structural steel tube shall conform to ASTM A500 grade B, Fy=46 ksi min.
4. Structural steel shapes and plates shall conform to ASTM A36.
5. Welding shall conform to AISC specs or local codes and performed by certified welder using arc process E70XX electrodes.
6. Isolate Aluminum from Steel
7. All bolt holes to be drilled or punched.
8. 4000 psi (min) 28-day Concrete Compressive Strength
9. All electrical work to conform to the requirements of UL48 and section 600 of NEC.
10. UL and Data labels required
11. Sign to be a minimum of 6-ft horizontal & 12-ft vertical from high voltage wires.
12. If there is no stub pipe to be used in the top cabinet, the supporting member immediately below the stub pipe shown can be extended to the top of the uppermost cabinet.
13. All Pipe sizes shown are minimum sizes. Pipe with a larger diameter and/or greater Sxx may be substituted
14. All structural lengths required are approximations only. Actual length may vary slightly depending on sign cabinet conditions.

ME #: 45814



Pole Sign: Exterior, Double-Sided, Aluminum Construction, Pan-Formed Plastic Face, Internal Illumination, Digital Reader Board

Scale: 3/8" = 1' - 0"

McFarland Engineering
464 N. Hiddenbrook Dr,
Advance, NC 27006

STRUCTURAL SIGN DESIGN & ENGINEERING SERVICES

Ph: (281) 813-7439
Fax: (888) 712-5364
Email: sean@signstructures.com
Web: www.signstructures.com

OVERHILLS MIDDLE SCHOOL

Address: 2711 RAY RD

City/State: SPRING LAKE, NC

Client: UPSTATE DIGITAL SIGN SALES, LLC

ENGINEERING OF VERTICAL SUPPORT AND FOUNDATION ONLY. NO CABINET ENGINEERING PROVIDED OR IMPLIED.

Initial Drawing: (45814) DS

NC Firm Registration: F-1136
North Carolina License Number: 29710
North Carolina Expiration Date: 12/31/2019

The electronic seal appearing on this document was authorized by Sean M. McFarland, PE on September 25, 2019.

Date: 9-25-2019

Sheet #: 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 29710 ENGINEER SEAN M. McFARLAND

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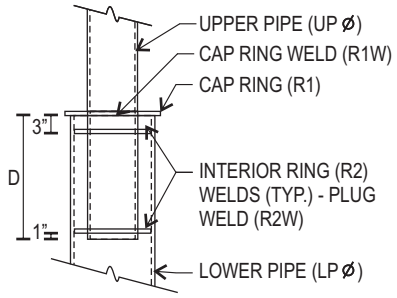
Sean McFarland
1BDD4704DCE5405...

ME #: 45814

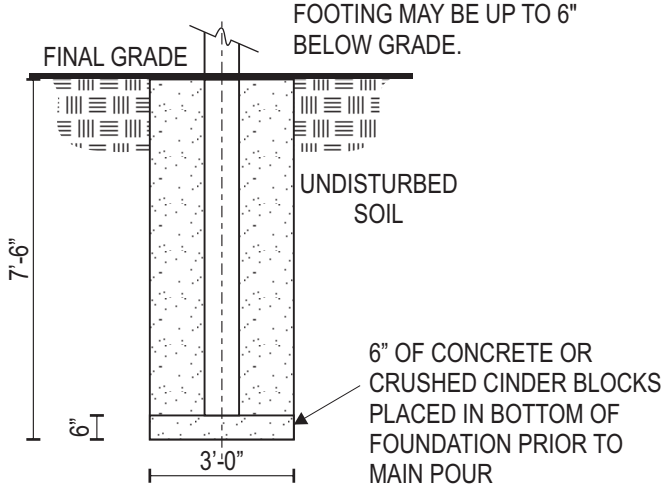


TRANSITION

(4) ½" Wide x 2" Long Plug Welds (<=24" Dia.)
(6) ½" Wide x 2" Long Plug Welds (24" to 48" Dia.)
(8) 5/8" Wide x 2-1/2" Long Plug Welds (>48 Dia.)

TRANSITION TABLE

#	UP Ø	LP Ø	D	R1	R2	R1W	R2W
1	4"	8"	1.25'	½"	3/8"	1/4"	1/4"



2500 PSI CONCRETE (MIN.)
TYPICAL OF ONE PIER
SCALE: 1/4" = 1'

McFarland Engineering
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OVERHILLS MIDDLE SCHOOL

Address: 2711 RAY RD

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