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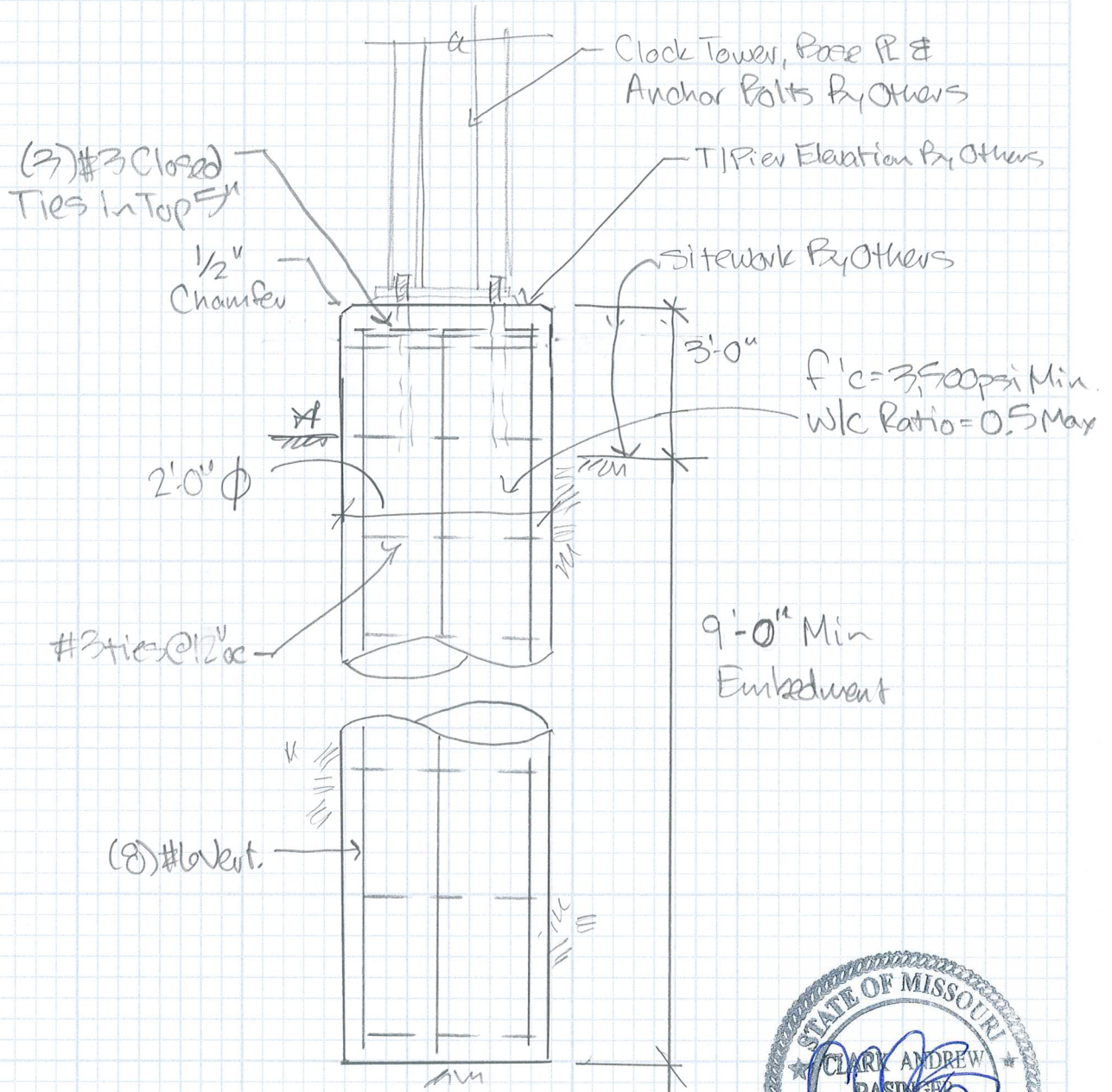
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Project Clock Tower

Date 6/2/23

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Project:	CLOCK TOWER
Location:	LEE'S SUMMIT, MO
By:	CAB
Date:	6/2/2023

Pole Foundation - Clock Tower

PROJECT:	CLOCK TOWER
FACILITY LOCATION:	LEE'S SUMMIT, MO
DESIGN CODE:	2016 IBC

HIGH SIGN (Forces on sign and pole calculated per ASCE 7, Chapter 29)

Top of sign el. (h) =	19.67	ft	
Sign Height (s) =	7.67	ft	
Sign Width (B) =	3.58	ft	
Wind Speed, V =	110.00	mph	Figure 26.5-1
Wind Directionality Factor, K_d =	0.85		Table 26.6-1
Exposure Category =	C		Section 26.7
Topographic Factor, K_{zt} =	1.00		Figure 26.8-1
Gust-effect Factor, G =	0.85		Section 26.9
Velocity Pressure Coefficient, K_h =	0.899		Exposure C. Table 29.3-1
Velocity Pressure, q_h =	23.66	psf	Equation 29.3-1
B/s =	0.467		
s/h =	0.390		
Force Coefficient, C_f =	1.85		Only CASE A&B considered
Wind Force, F =	1.02	kip	Equation 29.4-1
High Sign Moment =	16.18	k-ft	

LOW SIGN (Forces on sign and pole calculated per ASCE 7, Chapter 29)

Top of sign el. (h) =	0.00	ft	
Sign Height (s) =	0.00	ft	
Sign Width (B) =	0.00	ft	
Wind Speed, V =	110	mph	Figure 26.5-1
Wind Directionality Factor, K_d =	0.85		Table 26.6-1
Exposure Category =	C		Section 26.7
Topographic Factor, K_{zt} =	1.00		Figure 26.8-1
Gust-effect Factor, G =	0.85		Section 26.9
Velocity Pressure Coefficient, K_h =	0.000		Exposure C. Table 29.3-1
Velocity Pressure, q_h =	0.00	psf	Equation 29.3-1
B/s =	0.000		
s/h =	0.000		
Force Coefficient, C_f =	1.95		Only CASE A&B considered
Wind Force, F =	0.00	kip	Equation 29.4-1
Low Sign Moment =	0.00	k-ft	

POLE (Forces on sign and pole calculated per ASCE 7, Chapter 29)

Top of pole el. (h) =	12.25	ft	
Pole Height (s) =	12.25	ft	
Pole Diameter (B) =	1.42	ft	
Wind Speed, V =	110	mph	Figure 26.5-1
Wind Directionality Factor, K_d =	0.85		Table 26.6-1
Exposure Category =	C		Section 26.7
Topographic Factor, K_{zt} =	1.00		Figure 26.8-1
Gust-effect Factor, G =	0.85		Section 26.9
Velocity Pressure Coefficient, K_h =	0.813		Exposure C. Table 29.3-1
Velocity Pressure, q_h =	21.42	psf	Equation 29.3-1
B/s =	0.116		
s/h =	1.000		
Force Coefficient, C_f =	1.7		Only CASE A&B considered
Wind Force, F =	0.54	kip	Equation 29.4-1
Pole Moment =	3.30	k-ft	

PIER/POLE BASE ANALYSIS**WIGGINS METHOD**

MA = 11.69 k-ft APPLIED MOMENT AT TOP OF PIER (*Includes ASD 0.6 factor*)
P = 0.94 kip SHEAR AT TOP OF PIER OR FOUNDATION (*Includes ASD 0.6 factor*)
D = 2.00 ft PIER DIAMETER
R = 3.00 ft PROJECTION ABOVE GRADE
E = 9.00 ft EMBEDMENT LENGTH
G = 3.00 ft DEPTH OF SOIL FROM TOP OF GRADE IGNORED (*Frost Depth*)

Alternative Method - IBC 1807.3

Assumes pier is nonconstrained at the top

Check depth calculated above using IBC equations

Table S1 = 200.00 psf/ft 400psf typ. (IBC Table 1806.2)
Depth (d) = 9.0 ft
Pier Ø (b) = 2.0 ft
S1 = depth * S1 600 psf/ft Increased to 1/3 of assumed depth, 12' depth max

P = 936.1 lbs Applied lateral force
M = 11686.1 lb-ft Moment at top of pier
h = 12.48 ft Equivalent height of applied force for base moment

A = (2.34*P) / (S1*b) 1.825 See IBC 1807.3.2.1
Required Depth (d) = 5.98 ft IBC Eq. 18-1
Depth + Neglected Depth = 8.979 ft

ASCE 7, Chapter 29 - Coefficient Lookup Values

HIGH SIGN LOOKUP VALUES													
Cf, Case A & Case B - ASCE 7 Figure 29.4-1													
B/s LOOKUP VALUE			0.467	0.200									
s/h LOOKUP VALUE			0.3899339	0.300									
s/h		B/s											
		0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	45
0.16	1	1.80	1.70	1.65	1.55	1.45	1.40	1.35	1.35	1.30	1.30	1.30	1.30
0.2	0.9	1.85	1.75	1.70	1.60	1.55	1.50	1.45	1.45	1.40	1.40	1.40	1.40
0.3	0.7	1.90	1.85	1.75	1.70	1.65	1.60	1.60	1.55	1.55	1.55	1.55	1.55
0.5	0.5	1.95	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.75
0.7	0.3	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85
0.9	0.2	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.85	1.90	1.90	1.95
1	0.16	1.95	1.90	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	1.90	1.95

LOW SIGN LOOKUP VALUES													
Cf, Case A & Case B - ASCE 7 Figure 29.4-1													
B/s LOOKUP VALUE			0.050	0.050									
s/h LOOKUP VALUE			0.160	0.160									
s/h		B/s											
		0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	45
0.16	1	1.80	1.70	1.65	1.55	1.45	1.40	1.35	1.35	1.30	1.30	1.30	1.30
0.2	0.9	1.85	1.75	1.70	1.60	1.55	1.50	1.45	1.45	1.40	1.40	1.40	1.40
0.3	0.7	1.90	1.85	1.75	1.70	1.65	1.60	1.60	1.55	1.55	1.55	1.55	1.55
0.5	0.5	1.95	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.75
0.7	0.3	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85
0.9	0.2	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.85	1.90	1.90	1.95
1	0.16	1.95	1.90	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	1.90	1.95

POLE LOOKUP VALUES													
Cf, Case A & Case B - ASCE 7 Figure 29.4-1													
B/s LOOKUP VALUE			0.116	0.100									
s/h LOOKUP VALUE			1.000	1.000									
s/h		B/s											
		0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	45
0.16	1	1.80	1.70	1.65	1.55	1.45	1.40	1.35	1.35	1.30	1.30	1.30	1.30
0.2	0.9	1.85	1.75	1.70	1.60	1.55	1.50	1.45	1.45	1.40	1.40	1.40	1.40
0.3	0.7	1.90	1.85	1.75	1.70	1.65	1.60	1.60	1.55	1.55	1.55	1.55	1.55
0.5	0.5	1.95	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.75
0.7	0.3	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85
0.9	0.2	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.85	1.90	1.90	1.95
1	0.16	1.95	1.90	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	1.90	1.95