



Foundation Repair & Waterproofing

A Lifetime of Support

4500 Highlands Parkway SE Smyrna, GA 30082
ofc. 678.290.1325 fax 770.956.7403 www.esogrepair.com

**HELICAL PILE FOUNDATION
SUBMITTAL FOR:**

Monteith Construction Corp

RB Stall High School – Charleston, SC

August 12, 2025

PREPARED UNDER THE DIRECT CONTROL AND SUPERVISION OF:

THIS SEAL PERTAINS ONLY TO THE PIERS INSTALLED BY ENGINEERED SOLUTIONS OF GEORGIA. THIS SEAL DOES NOT SERVE AS OR REPRESENT THE PROJECT ENGINEER OF RECORD AND SHALL NOT BE CONSTRUED AS SUCH.



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Table of Contents

	Page
DESIGN REQUIREMENT SUMMARY FOR PIERS	3
INSTALL SUMMARY FOR PIERS	4
PIER DESIGN CAPACITY CHECKS	5
PIER LOCATION PLAN	7
VENDOR SHEETS FOR PIERS	9



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Design Requirement Summary For Piers

Significant Requirements Per Drawing S-303.
RFI 017, S-SK1 and S-SK2 dated 7/18/2025

Minimum Depth = 35' (156")

Shaft Diameter = 4.5" O.D. Pipe

Helix 1 = 12"

Helix 2 = 14"

Helix 3 = 16"

Helix 4 = 16"

New Construction Cap: 8"x8"x3/4"

Allowable Compression = 32 kip

Allowable lateral load = 5.0 kip

Maximum center to center spacing between piers = 5'-4"



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Install Summary For Piers

- Pile: 4 1/2" OD x 0.29" Wall triple Helix 12-14-16 and flighted extension single helix by IDEAL
- Pile Finish: Galvanized Steel
- Pier Bracket: New Construction 8"x8"x3/4".
- Required minimum installation torque: 10,700 ft-lbs Ultimate.
- Torque not to exceed: 26,500 ft-lbs.
- Minimum helical pier tip depth below ground surface is 35'-0".
- Piles may need to be installed beyond the specified minimum depth to achieve the required torque.
- Notify engineering if piers reach torque not to exceed limit or if they flat spin before reaching minimum depth.
- The property owner hired a special inspector to be present during pile installation. Inspector to follow special inspection schedule attached to this shop submittal and provide pile as-built certification letter when pile installation is complete.



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Pier Design Capacity Checks

Compression

Torque Correlation (K_t) = 6	
Minimum Installed Torque = 64.0 kip / 6 = 10,700 ft-lbs	
Maximum Torque Rating 26,500 ft-lbs > 10,700 ft-lbs	OK
Maximum Pile Shaft Rating (See Analysis Attached)	
61.8 kips Allowable > 32 kips	OK
Minimum Helix Rating shall be verified by the manufacturer	
Pier Cap (See Analysis Attached), 8" x 8" x 3/4"	OK
Geotechnical Soil Limit (see Analysis Attached)	
67.3 Kips Ultimate > 32 kips/ 2 FS	OK

Lateral Analysis (See Analysis Attached)

Yield Moment 12.269 kip-ft < 20.359 kip-ft Allowable moment	OK
---	----



Foundation Repair & Waterproofing

Lateral Analysis:

Lateral load analysis and design for helical pile (cohesionless soil) per Bengt B. Broms (
Long Restrained Pile			
P	5000 lb		
FS =	2		
PF =	10000 lb		
M =	0 ft.lb		
MF =	0 ft.lb		
φ =	32	From Geotech report	
Li =	34	Initial length of the foundation	
Kp =	3.254588		
Y =	112 pcf	From Geotech report	
Water Table =	-5 ft		
Yeff. =	49.6 PCF	Effective unit weight of soil	
D =	4.5 in	0.375 ft	Diameter of the shaft
e =	0 ft		
Long restrained pile			
			$P = \frac{2 M_{yield}}{e + 0.54 \sqrt{\frac{P}{\gamma D K_p}}} \dots \dots \dots (15b)$
Myield =	12269.14 lb.ft	OK	
M allowable =	20359 lb.ft	From Enercalc Analysis	



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BEARING CAPACITY HELICALPILE TO PILE CAP			
DESIGN CONSTRAINTS		Customer: Montieth	
		Date: 6/26/2025	
Design Allowable Load (P)	32.00 kips	Designed By: Ranj Hassan, PE	
Bearing Plate Yield Strength	36 ksi	Project: Helical piers	
Bearing Plate Shape	Square		
Micropile Diameter or Bearing Plate Size	8.00 in		
Hollow Bar Diameter	4.50 in		
Nut Dimension Across Flats	4.00 in		
Pile Cap Thickness Above Bearing Area	8.00 in		
Min Edge Distance Micropile to Cap	3.00 in		
Min. Concrete & Grout Strength	3000 psi		
Area calculations per ACI 318-14 Figure R22.8.3.2			
A_g Plate Area =	64.0 in ²		
A_1 =	64.0 in ²	Area of Micropile Cross Section	
Distance A_1 to A_2 =	1.5 in		
A_2 =	196.0 in ²		
CONCRETE BEARING CAPACITY			
ACI 318-14 Table 22.8.3.2			
Eq. a	285.6 kips		
Eq. b	326.4 kips		
Eq. c	163.2 kips		
ϕ =	0.65	ACI 318-14, Table 21.2.1	
ϕ Nominal Bearing Strength =	106.1 kips		
Allowable Bearing Load (H/1.6) =	66.3 kips	> 32.00 Kips	OK-Bearing
PUNCHING SHEAR CAPACITY			
Calculations per ACI 318-14 Section 22.6.4			
Effective Perimeter (b_o) =	44.0 in		
Area =	352 in ²		
ϕ =	0.75		
Ultimate Shear Strength =	58 kips		
Allowable Shear Strength (H/1.6) =	36 kips	> 32.00 Kips	OK-Punching Shear
STEEL PLATE CAPACITY			
Plate Effective Cantilever Length, $L = (B - (0.8 * d))/2 =$	2.40	in	
Area of Plate, $A_{plate} = B * N =$	64	in ²	
Plate Thickness Required, $t_{req'd} =$ $L * ((2 * \Omega * P_a) / (F_y * A_{plate}))^{0.5} =$	0.52	in	$\Omega = 1.67$
USE:	0.75	Inch Thick Plate	

Steel Column

Project File: Montieth.ec6

LIC# : KW-06012736, Build:20.25.07.31

Engineered Solutions of Georgia, Inc.

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Code References

Governing Code : IBC 2021
 Referenced Design Standard(s) : AISC 360-16
 Load Combinations Used : IBC 2018

General Information

Steel Section Name : **Pipe4 Std0.29** Overall Column Height 35.0 ft
 Analysis Method : Allowable Strength Top & Bottom Fixity Top Pinned, Bottom Fixed
 Steel Stress Grade , A500, Grade C, Fy = 46 ksi, Carbon Steel Brace condition :
 Fy : Steel Yield 80.0 ksi Unbraced Length for buckling ABOUT X-X Axis = 10 ft, K = 1.20
 E : Elastic Bending Modulus 29,000.0 ksi Unbraced Length for buckling ABOUT Y-Y Axis = 10 ft, K = 1.20

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 380.032 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 35.0 ft, L = 32.0 k

BENDING LOADS . . .

Lat. Point Load at 34.50 ft creating My-y, L = 5.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.6298** : 1
 Load Combination +D+L
 Location of max.above base 34.295 ft
 At maximum location values are . . .
 Pa : Axial 32.380 k
 Pn / Omega : Allowabl 61.796 k
 Ma-x : Applied 0.0 k-ft
 Mn-x / Omega : Allowable 20.359 k-ft
 Ma-y : Applied 2.425 k-ft
 Mn-y / Omega : Allowable 20.359 k-ft

Maximum Load Reactions . .
 Top along X-X 4.893 k
 Bottom along X-X 0.1071 k
 Top along Y-Y 0.0 k
 Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .
 Along Y-Y 0.0 in at 0.0ft above base
 for load combination :
 Along X-X 0.7910 in at 23.490ft above base
 for load combination : +D+L

PASS Maximum Shear Stress Ratio = **0.08866** : 1
 Load Combination +D+L
 Location of max.above base 34.530 ft
 At maximum location values are . . .
 Va : Applied 4.893 k
 Vn / Omega : Allowable 55.186 k

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios				Maximum Shear Ratios					
	Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Stress Ratio	Status	Location
D Only	0.006	PASS	0.00 ft	1.00	2.12	96.64	96.64	0.000	PASS	0.00 ft
+D+L	0.630	PASS	34.30 ft	1.00	2.12	96.64	96.64	0.089	PASS	34.53 ft
+D+0.750L	0.474	PASS	34.30 ft	1.00	2.12	96.64	96.64	0.066	PASS	34.53 ft
+0.60D	0.004	PASS	0.00 ft	1.00	2.12	96.64	96.64	0.000	PASS	34.53 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial (k)		Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
	@ Base		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only	0.380									
+D+L	32.380		-0.107	-4.893					-1.250	
+D+0.750L	24.380		-0.080	-3.670					-0.937	
+0.60D		0.228								
L Only	32.000		-0.107	-4.893					-1.250	

Project Title: RD Stall High School
 Engineer: RH
 Project ID:
 Project Descr:

Steel Column

Project File: Montith.ec6

LIC# : KW-06012736, Build:20.25.07.31

Engineered Solutions of Georgia, Inc.

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DESCRIPTION: --None--

Extreme Reactions

Item	Extreme Value	Axial (k)		Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial, Base Max		32.380									
Axial, Base Min		0.228									
Rx, Base Max											
Rx, Base Min				-0.107							
Rx, Top Max											
Rx, Top Min					-4.893						
Ry, Base Max											
Ry, Base Min											
Ry, Top Max											
Ry, Top Min											
Mx, Base Max											
Mx, Base Min											
My, Base Max											
My, Base Min											-1.250

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L	0.7910 in	23.490 ft	0.000 in	0.000 ft
+D+0.750L	0.5933 in	23.490 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.7910 in	23.490 ft	0.000 in	0.000 ft

Steel Section Properties : Pipe4 Std0.29

Depth	=	4.500 in	I xx	=	8.54 in ⁴	J	=	17.100 in ⁴
			S xx	=	3.79 in ³			
Diameter	=	4.500 in	R xx	=	1.490 in			
Wall Thick	=	0.290 in	Zx	=	5.100 in ³			
Area	=	3.840 in ²	I yy	=	8.540 in ⁴			
Weight	=	10.858 plf	S yy	=	3.790 in ³			
			R yy	=	1.490 in			
Ycg	=	0.000 in						

Steel Column

Project File: Montieth.ec6

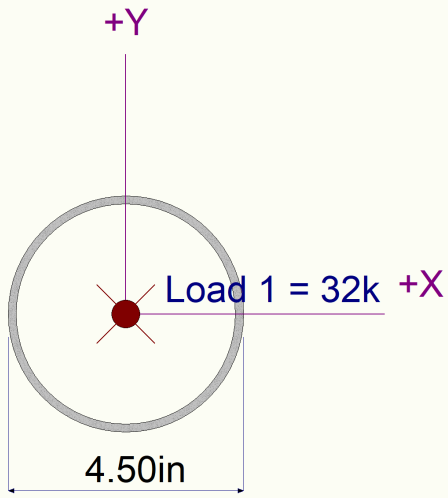
LIC# : KW-06012736, Build:20.25.07.31

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DESCRIPTION: --None--

Sketches



32.0k

Height = 35.0

32.0k
5.00k

Height = 35.0 ft



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Pier Location Plan

REVISED AREA D PARTIAL PLAN FOR NEW REVISED PILE LAYOUT CONFIGURATION

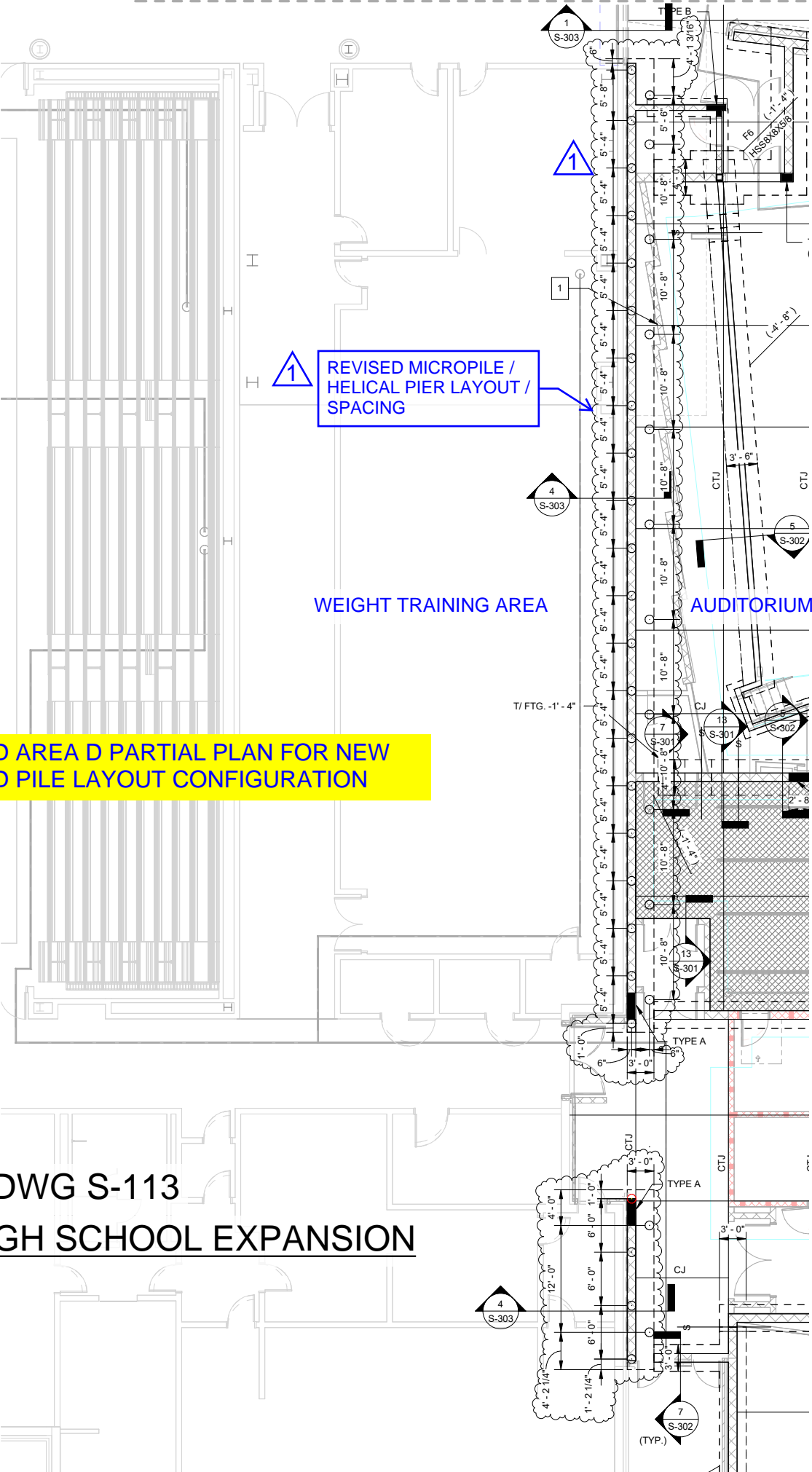
1 REVISED MICROPILE / HELICAL PIER LAYOUT / SPACING

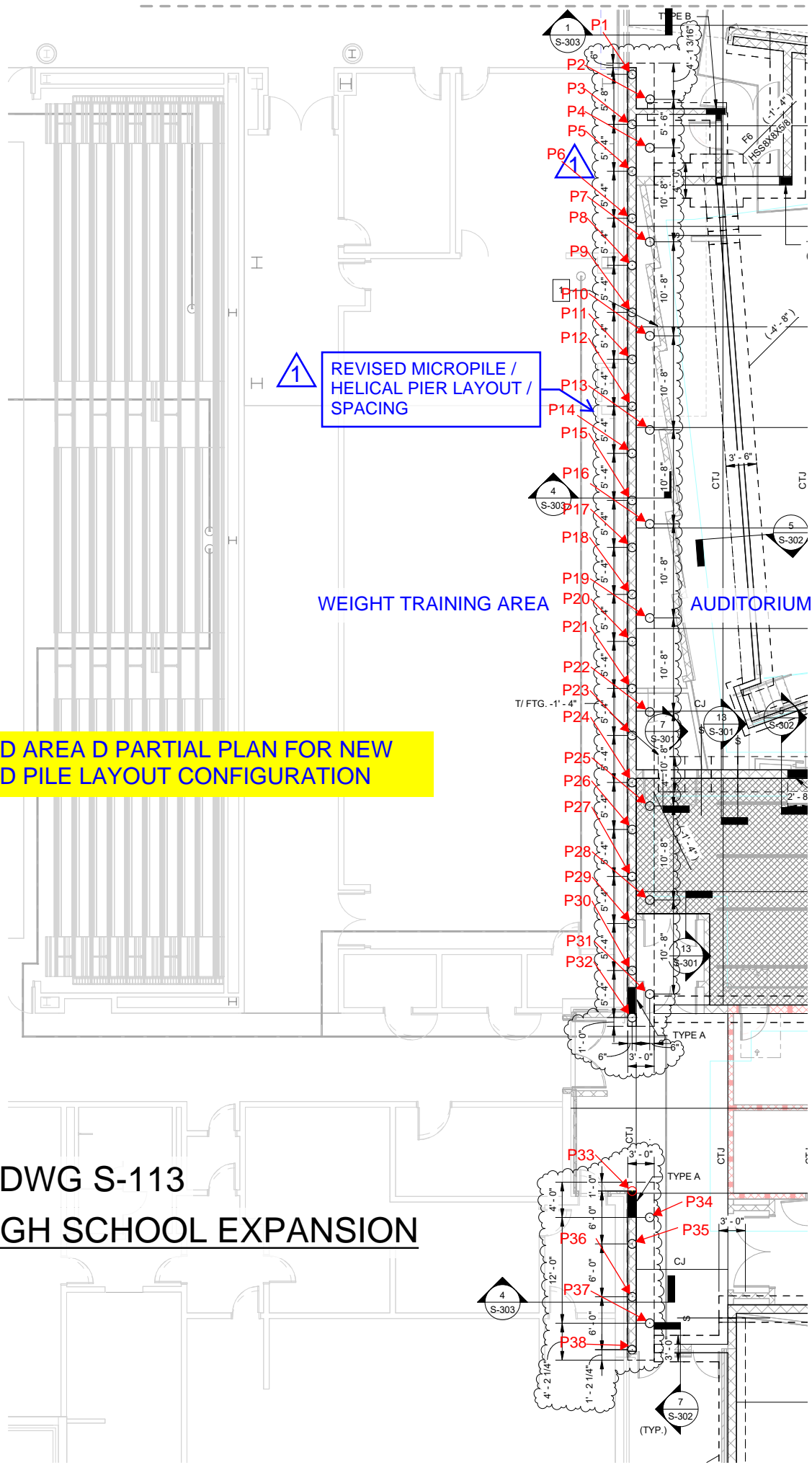
WEIGHT TRAINING AREA

AUDITORIUM

REFERENCE DWG S-113
R.B. STALL HIGH SCHOOL EXPANSION

MMSA
STRUCTURAL ENGINEERS
SKETCH S-SK1
RFI #017
07/18/2025

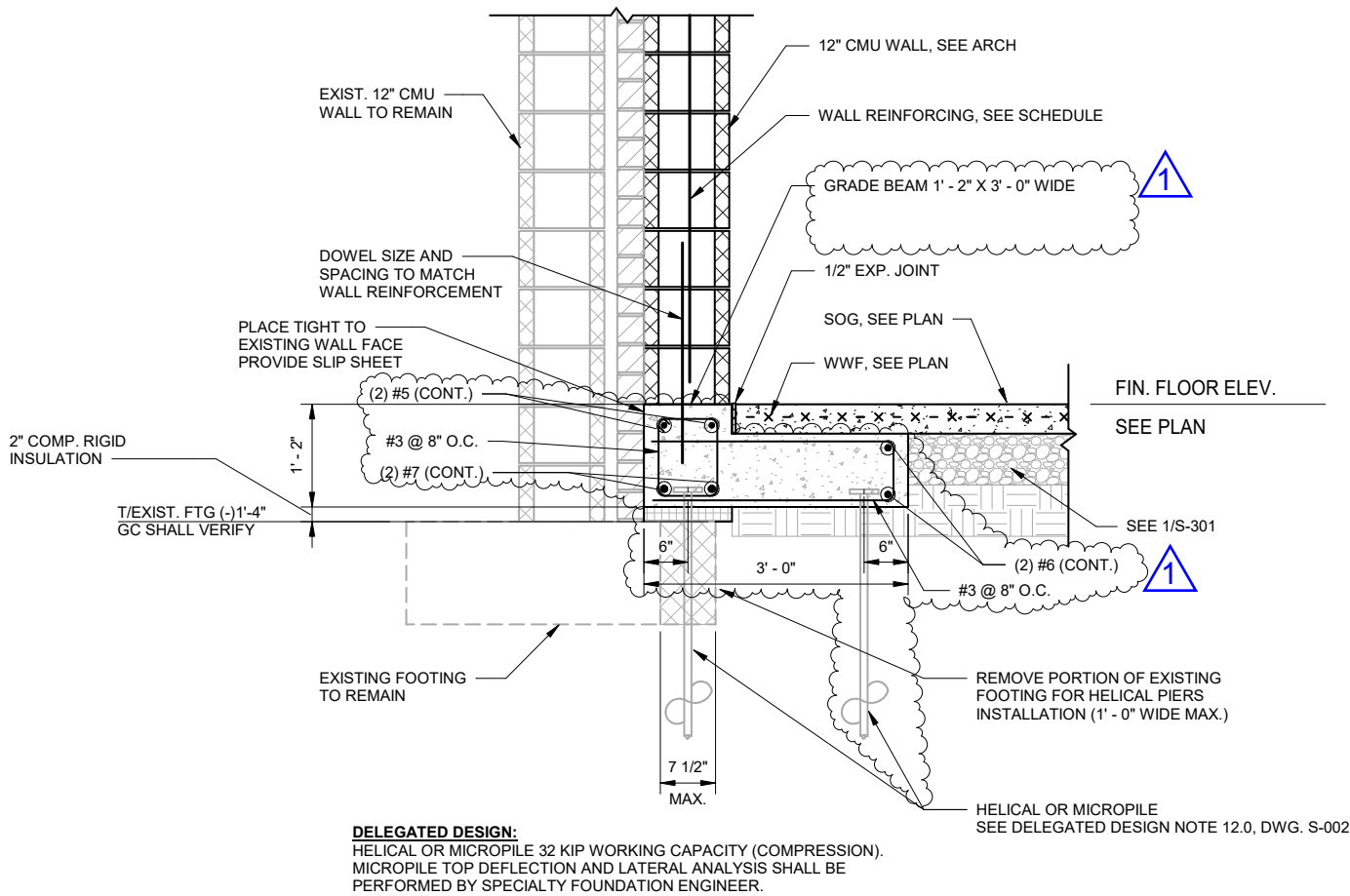




REVISED AREA D PARTIAL PLAN FOR NEW REVISED PILE LAYOUT CONFIGURATION

REFERENCE DWG S-113
R.B. STALL HIGH SCHOOL EXPANSION

MMSA
 STRUCTURAL ENGINEERS
SKETCH S-SK1
 RFI #017
 07/18/2025



REVISED SECTION 4/S-303

4 SECTION
S-303 SCALE: 3/4" = 1'-0"

R.B. STALL HIGH SCHOOL EXPANSION

MMSA
STRUCTURAL ENGINEERS
SKETCH S-SK2
RFI #017
07/18/2025



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Vendor Sheets For Piers



**Preliminary Design Prepared For:
Engineered Solutions of Georgia (ESOG)**

**Project:
R.B. Stall High School Additions**

**Helical Pile
Foundation System**

Ideal Manufacturing, Inc.

999 Picture Parkway
Webster, New York 14580
Tel: 1.800.789.4810
www.idl-grp.com

**June 17, 2025
R1: June 19, 2025
R2: August 6, 2025**

Included in Preliminary Design:

- Preliminary Design Summary & Notes
- Helical Pile Analysis
- Manufacturer Drawing(s)

PRELIMINARY DESIGN SUMMARY

Production Piles:

- Pile Shaft: 4 1/2" O.D. x 0.290" W.T., 80 KSI Min. Yield
- Helix Configuration: 12-14-16-16 X 1/2"
- Coating: Galvanized
- Pile Cutoff Elevation (PCOE): Grade
- Estimated Pile Length (From PCOE): 34-ft
- Minimum Installation Torque: 10,700 ft-lbs.
- Specified Drive Head: 31,489 ft-lbs. (30ADT) or Equal

Allowable Loading Requirements:

- Compression (FS=2): 32 Kips
- Tension (FS=2): 0 Kips
- Lateral ($\leq 3/8$ " Deflection): 5 Kips (Fixed Head)

PRELIMINARY DESIGN NOTES

- Preliminary design is based upon the following documents provided to IDEAL:
 - Plans dated 03/21/2025
 - Lateral loading provided via email on 08/05/2025
 - Geotechnical report by Insight Group, LLC dated May 30, 2024
- Contractor to verify pile count and PCOE.
- The minimum installation torque shall be taken as the average torque over the last three feet of penetration (the last three readings recorded at one-foot intervals).
- Piles may need to be installed beyond the estimated length to achieve required torque.
- All drive pins must be inserted at the drive adapter-to-pile connection, prior to applying any torque to the pile sections.

HelixPile 2025: Report Output

Copyright@2009 - 2024 Deep Excavation LLC: www.deepexcavation.com A program for the evaluation and design of Deep Foundations Deep Excavation LLC, Astoria, New York, www.deepexcavation.com

Project: R.B. Stall High School Additions



Company: IDEAL Group
Prepared by engineer: AP
File number: 1
Time: 8/6/2025 8:10:36 AM

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Project: R.B. Stall High School Additions

Results for Design Section 0: 4 1/2"x0.290"-2 (12-14-16-16): UL = 64k C

Analysis summary for design section: 4 1/2"x0.290"-2 (12-14-16-16): UL = 64k C

4 1/2"x0.290"-2 (12-14-16-16): UL = 64k C

Torque= 12.783k-ft
 Fcap.ten.ULT= 58.87 k
 Fcap.comp.ULT= 76.7 k
 Fcap.tension= 29.44 k
 Fcap.comp= 38.35 k
 Fcap.comp.PY= 44.67 k

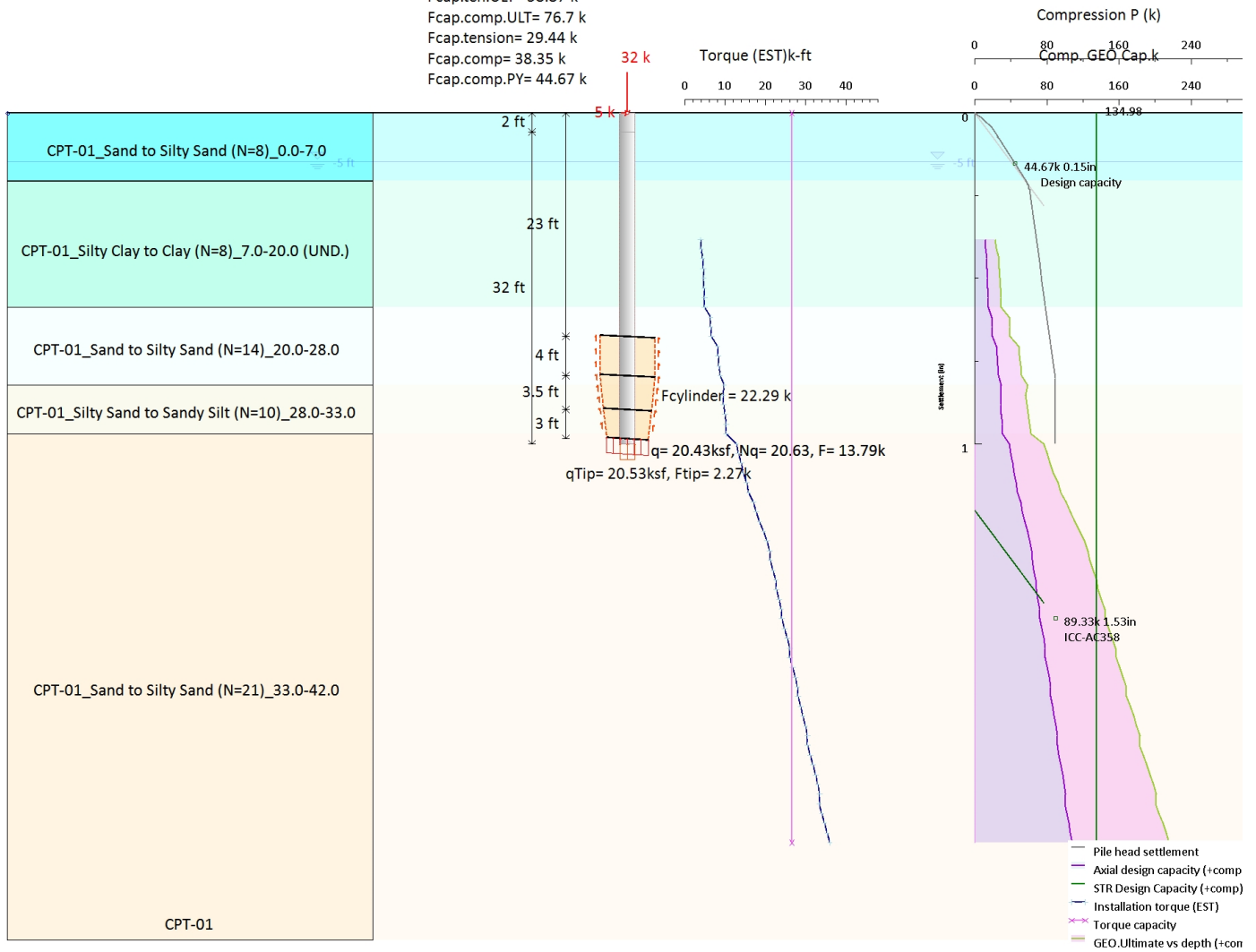


Table: Basic analysis assumptions Stage:Stage 0

Pile STR code	International Building Code 2021
Depth investigation	Max 75ft/1ft
Pile settlements P-y	Soil E, rM= 4, Aeff= 100%
PL install E factors	1/0.8/0.7/0.6
Steel Code: a= 0.5	ASD 1989
Concrete Code:	ACI 318-11/2
Ubraced length	N/A +, k= 1
Drain State Clays	Default
Pile tip resistance	Included (plugged)
Bearing factors	Vesic-1974
Bearing equation	General: $N_c c' + (N_q - 1) s'v + N_g g D$
Bearing disturb reduce	1/0.8/0.7/0.6
Cylinder method	Mitsch-Clemence
Shaft friction	Ignored
Shaft/Cyl. Reduce c, αc	0.8, $c_1 \leq 1$ ksf, 0.5, $c_2 \leq 2$ ksf
Design life	75 years, ICC A358
FS bearing	2
FS shaft	2
Manufacturer	IDEAL Manufacturing
Helical pile	412290-2
Pile diameter O.D.	4.5 in
Helical plates	12S14S16S16S
Pile steel Area A_s	3.84 in ²
Yield strength shaft	307.2 k
Mech. connection strength	157.4 k
Ultimate strength shaft	307.2 k
Zinc coated	4 mils
Torque cap. (yield)	26.5 k-ft
Lateral analysis	Single load
Pile head (rotation)	Fixed head
Cyclic loading	No
Pile section	Elastic
Lateral load	5 k

Table: Analysis summary for helical pile for critical stages

	Factored load	Factored load	CAP. compressi	CAP. tension	Structural cap.	LOAD/CAP	LOAD/CAP	LOAD/CAP
Critical	Compress. (k)	Tension (k)	GEO. (k)	GEO. (k)	(k)	RATIO	STRUCTURAL	GEOTECH
Stage	Stage 0	Stage 0	Stage 0	Stage 0	Stage 0	Stage 0	Stage 0	Stage 0
Stage 0	32	0	38.35	29.44	134.98	0.959	0.959	0.834

Table: Settlement analysis result summary

Stage	Ult. capacity	Settlement @ult. cap.	Design capacity	Settlement @des. cap.
Name	(k)	(in)	(k)	(in)
Stage 0	89.33	1.527	44.67	0.154

Table: Depth vs. capacity summary

Z	Q.Comp.Des	Q.Comp.Ult	Q.Tension.Des	Q.Tension.Ult	Est. Torque
(ft)	(k)	(k)	(k)	(k)	(k-ft)
13	11.43	22.87	8.64	17.28	3.81
14	12.15	24.3	9.32	18.63	4.05
15	13.36	26.73	10.67	21.33	4.45
16	13.68	27.36	11.12	22.25	4.56
17	13.89	27.78	11.3	22.59	4.63
18	14.1	28.2	11.47	22.94	4.7
19	14.74	29.48	12	24	4.91
20	14.74	29.48	12	24	4.91
21	19.05	38.11	14.96	29.93	6.35
22	19.37	38.73	15.18	30.36	6.46
23	19.68	39.36	15.39	30.79	6.56
24	24.22	48.44	19.31	38.62	8.07
25	24.84	49.68	19.79	39.58	8.28
26	25.45	50.91	20.27	40.54	8.48
27	26.07	52.14	20.75	41.5	8.69
28	29.21	58.42	22.06	44.12	9.74
29	28.24	56.48	22.63	45.25	9.41
30	28.97	57.95	23.12	46.25	9.66
31	29.61	59.23	23.52	47.05	9.87
32	30.54	61.09	27.91	55.82	10.18
33	31	62	28.38	56.76	10.33
34	38.35	76.7	29.44	58.87	12.78
35	40.07	80.15	30.95	61.91	13.36
36	41.75	83.51	32.43	64.86	13.92
37	43.44	86.89	33.92	67.83	14.48
38	46.1	92.2	36.37	72.74	15.37
39	47.61	95.22	37.67	75.35	15.87
40	50.79	101.58	39.09	78.19	16.93
41	52.78	105.56	40.82	81.64	17.59
42	55.46	110.93	43.24	86.48	18.49
43	58.3	116.61	45.82	91.63	19.43
44	60.98	121.96	48.23	96.45	20.33
45	62.84	125.68	55.12	110.24	20.95
46	63.67	127.35	55.87	111.74	21.22
47	65.62	131.24	57.73	115.46	21.87
48	67.41	134.81	59.44	118.87	22.47
49	68.16	136.33	60.11	120.22	22.72
50	70.1	140.2	61.96	123.93	23.37
51	71.89	143.78	63.67	127.34	23.96
52	72.41	144.81	64.1	128.2	24.14
53	74.41	148.81	66.02	132.04	24.8
54	76.28	152.55	67.8	135.61	25.43
55	78	156	69.45	138.89	26
56	78.43	156.86	69.79	139.58	26.14
57	80.41	160.81	71.69	143.37	26.8
58	82.26	164.53	73.46	146.92	27.42
59	84	168	75.11	150.23	28
60	84.1	168.2	75.13	150.26	28.03
61	86.14	172.29	77.09	154.18	28.71

62	88.06	176.12	78.92	157.85	29.35
63	89.87	179.74	80.65	161.29	29.96
64	91.56	183.13	82.26	164.52	30.52
65	91.36	182.73	81.98	163.95	30.45
66	93.41	186.83	83.94	167.88	31.14
67	95.37	190.74	85.82	171.63	31.79
68	97.23	194.47	87.6	175.19	32.41
69	99	198	89.28	178.56	33
70	100.67	201.35	90.87	181.74	33.56
71	100.14	200.28	90.25	180.5	33.38
72	102.19	204.38	92.22	184.43	34.06
73	104.16	208.32	94.1	188.21	34.72
74	106.05	212.09	95.91	191.82	35.35
75	107.86	215.71	97.63	195.27	35.95

Helical anchor section data

Section	Fy	Fu	Dp	tP	Ap	I	Sxx	Zxx	J	rx	Tel	Tpl	Qy	Qult	Numbe
Name	(ksi)	(ksi)	(in)	(in)	(in ²)	(in ⁴)	(in ³)	(in ³)	(in ⁴)	(in)	(k-ft)	(k-ft)	(k)	(k)	Helix
412290-2	80	120	4.5	0.29	3.84	8.54	3.79	5.1	17.1	1.49	26.5	26.5	307.2	157.4	4

Helical anchor: 412290-2, uses different plate sizes.

Plate	Dhel	Shel	Ahel	Qhel
Number	(in)	(ft)	(ft ²)	(k)
1	12	2.5	0.675	223
2	14	3	0.959	223
3	16	3.5	1.286	223
4	16	4	1.286	223

Manufacturer: IDEAL Manufacturing

Torque rating method parameters for helical anchor.

Torque rating (by Manufacturer) Tel= 26.5 k-ft

Torque installation factor $kT = 6/k$

$F_y = f_y k$ = Characteristic yield strength for steel

$F_u = f_u$ = Ultimate steel strength

D_p = Shaft (pipe) diameter

t_P = Shaft thickness (pipe thickness)

A_p = Effective shaft area (pipe area)

I = Shaft moment of inertia

S_{xx} = Shaft elastic section modulus

Z_{xx} = Shaft plastic section modulus

J = Torsional moment of inertia for shaft

r_x = Radius of gyration for shaft

Tel = Elastic torsional resistance for shaft

Tpl = Plastic torsional resistance for shaft

Q_y = Yield tensile strength of shaft

Qult = Ultimate tensile strength of shaft

Dhel = Helix plate diameter

Shel = Horizontal helical plate spacing

Ahel = Effective helix area (used for bearing capacity calculations)

Qhel = Ultimate helix structural capacity in tension

Table: Helical pile analysis summary for all stages (Design values)

Parameter	Factored Load	Factored Load	Capacity GEO.	Capacity GEO.	Capacity Struct.	Comp. Cylinder	Comp. Plate	Tension Cylinder	Tension Plate	Settleme GEO.Ult	Settleme GEO.ult y	Settleme GEO.Des	Settleme GEO.Des
Stage	Comp. (k)	Tension (k)	Comp. (k)	Tension (k)	(k)	(k)	(k)	(k)	(k)	Comp. (k)	(in)	Comp. (k)	(in)
Stage 0	32	0	38.35	29.44	134.98	38.35	44.89	29.44	35.7	89.33	1.527	44.67	0.154

Table: Helical pile analysis summary for all stages (Ultimate values)

Parameter	Capacity GEO.Ult	Capacity GEO.Ult	Capacity Struct.Ult	Comp.Ult Cylinder	Comp.Ult Plate	Tension.Ult Cylinder	Tension.Ult Plate
Stage	Comp. (k)	Tension (k)	(k)	(k)	(k)	(k)	(k)
Stage 0	76.7	58.87	229.47	76.7	89.79	58.87	71.4

Table: Individual plate results stage for compression: Stage 0

Plate Number	Area (ft2)	X (ft)	El. (ft)	Nspt /ft	Φ (deg)	c' or Su (psf)	Nq	σ'v (ksf)	Quit (k)	QuitTension (k)
4	1.286	0	-23	N/A	31.3	0	15.537	1.494	17.15	14.29
3	1.286	0	-27	N/A	31.3	0	15.537	1.712	22.86	19.6
2	0.959	0	-30.5	N/A	29.9	0	12.99	1.893	17.66	15.45
1	0.675	0	-33.5	N/A	33.5	0	20.633	2.05	27.58	22.07
Tip	0.11	0	-34	N/A	33.5	0	20.633	2.079	4.53	4.53

Table: Corrosion loss results

Stage	Design Life (years)	Thickness loss Protection (mils)	Thickness loss Steel (in)	Steel loss %	Other Warning
Stage 0	75	4	0.04	12.39	N/A

Table: Lateral pile analysis results

Stage	Top Of pile	Cyclic Conditions	Pile section Response	Lat. Force Fx (k)	δ.x (in)	Mx.max (k-ft)	Lat. Force Fy (k)	δ.y (in)	My.max (k-ft)
Stage 0	Fixed	No	Elastic	-5	0.371	11.32	0	0	0

Soil type property data

Name	γtot (pcf)	γmoist (pcf)	Φ (deg)	c' (psf)	Su (psf)	qBond (psi)	Elastic model	E (ksf)	Exponent	Color
CPT-01_Sand	112	112	29.2	0	N/A	0	Linear	300	-	
CPT-01_Silty	114	114	0	0	1015.7	0	Linear	300	-	
CPT-01_Sand	117	117	31.3	0	N/A	0	Linear	300	-	
CPT-01_Silty	113	113	29.9	0	N/A	0	Linear	300	-	
CPT-01_Sand	122	122	33.5	0	N/A	0	Linear	300	-	

Soil type: Lateral pile analysis data

Name	Model	Ksub (pci)	e50	qU (ksf)	RQD (%)	krm
CPT-01_Sand	Sand Reese	25	-	-	-	-
CPT-01_Silty	Stiff clay no free water	-	0.007	-	-	-
CPT-01_Sand	Sand Reese	60	-	-	-	-
CPT-01_Silty	Sand Reese	60	-	-	-	-
CPT-01_Sand	Sand Reese	60	-	-	-	-

SOIL BORINGS

Top Elev= superior SOil level
Soil type=type of the soil (sand , clay , etc)
OCR=overconsolidation ratio
K0=at rest coefficient

Name: CPT-01, pos: (50, 0)

Top elev.	Soil type	OCR	Ko
0	CPT-01_Sand t	1	0.51
-7	CPT-01_Silty C	1	0.55
-20	CPT-01_Sand t	1	0.48
-28	CPT-01_Silty S	1	0.5
-33	CPT-01_Sand t	1	0.45

Summary of loads on pile head

Summary of stage assumptions

Load: Live load, type: LL: Live load/Variable

Table: Load Live load data

Stage	Load is	Axial load	F.xx	F.yy	M.xx	M.yy
Number	Active	(k)	(k)	(k)	(k-ft)	(k-ft)
0	Yes	32	5	0	0	0

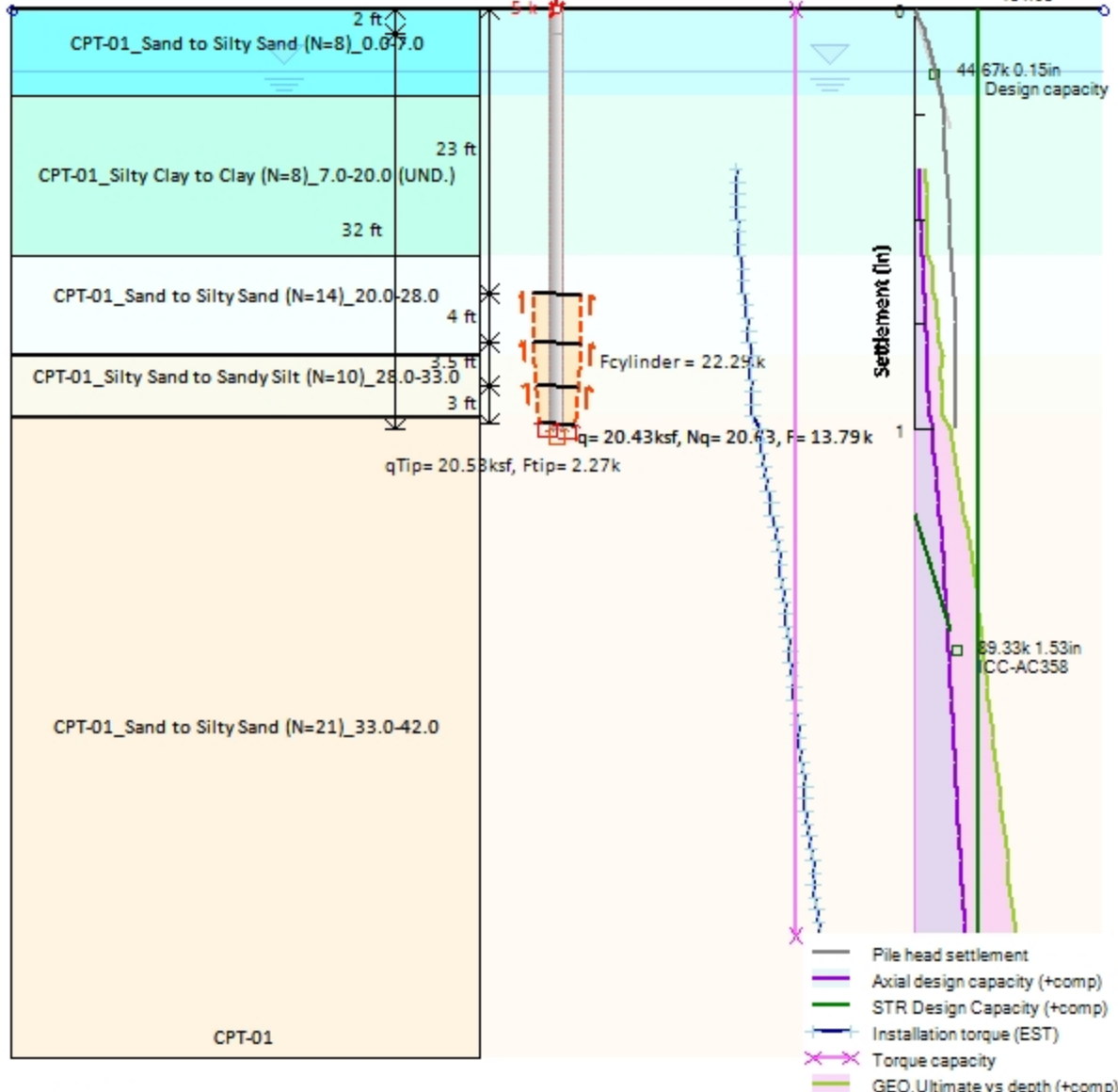
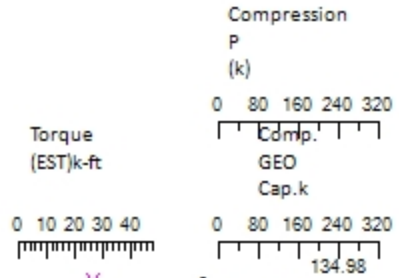
Note: Positive loads = compression, Negative loads= Tension

MODEL STAGES

A sequence of figures for each excavation stage is reported

4 1/2"x0.290"-2 (12-14-16-16): UL = 64k C

Torque= 12.783k-ft
 Fcap.ten.ULT= 58.87 k
 Fcap.comp.ULT= 76.7 k
 Fcap.tension= 29.44 k
 Fcap.comp= 38.35 k
 Fcap.comp.PY= 44.67 k



Company: IDEAL Group

Engineer: AP

DS: 0, Stage 0

Deep Excavation LCC

HelixPile 2017

C:\Us...ry Design - R.B. Stall High School Additions - 08.06.25.HELX

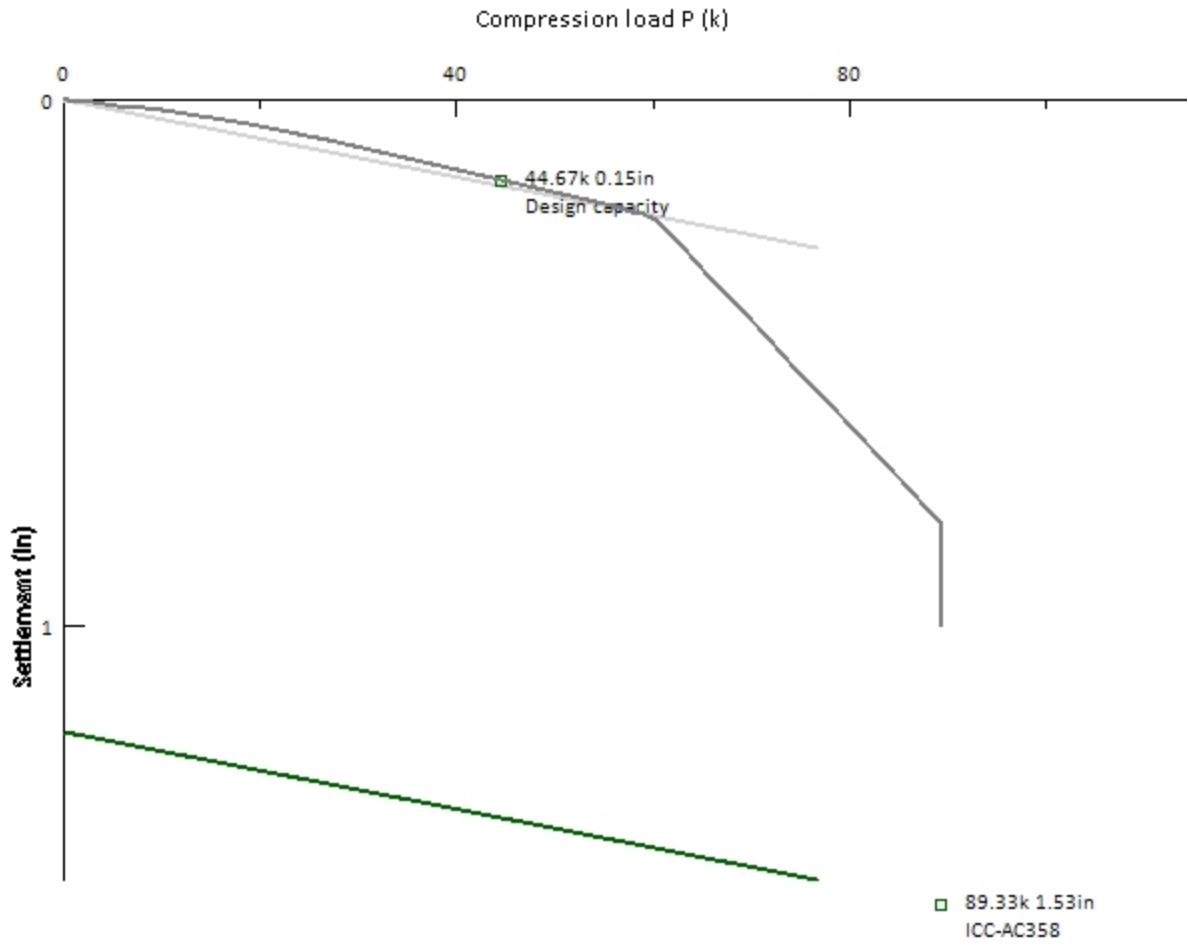
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Summary of settlement acceptance criteria methods 4 1/2"x0.290"-2 (12-14-16-16): UL = 64k C

Stage	Elastic	ICC-AC358	ICC-AC358	ICC-AC358	ICC-AC358
Name	P method	Pult (k)	Yult (in)	Pdes (k)	Ydes (in)
Stage 0	N/A	89.33	1.527	44.67	0.154

Settlement response for helical pile, stage Stage 0

Point	Load P (k)	Settlement y (in)
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0.39	0.001
6	3.05	0.006
7	5.44	0.011
8	8.36	0.017
9	9.18	0.019
10	9.59	0.02
11	9.92	0.02
12	18.87	0.044
13	24.77	0.068
14	24.77	0.068
15	25.89	0.073
16	26.29	0.075
17	26.45	0.075
18	26.45	0.075
19	26.89	0.077
20	26.89	0.077
21	56.03	0.203
22	58.54	0.215
23	58.72	0.216
24	59.09	0.218
25	59.68	0.222
26	59.95	0.225
27	59.97	0.225
28	60.24	0.229
29	60.44	0.231
30	62.93	0.278
31	65.86	0.337
32	68.79	0.395
33	71.72	0.453
34	74.65	0.511
35	77.58	0.569
36	80.51	0.628
37	83.44	0.686
38	86.37	0.744
39	87.83	0.773
40	89.3	0.802
41	89.33	1



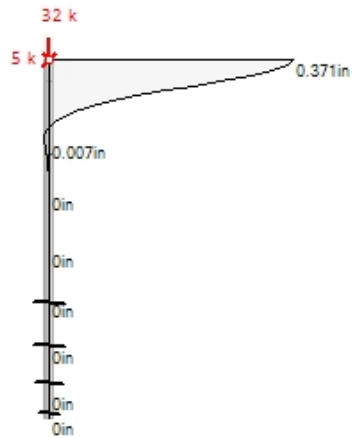
Support 0
Installation torque (estimate) design section: 0

Depth	Est. Torque	Design Comp.	Ultimate Com
(ft)	(k-ft)	(k)	(k)
13	3.81	11.43	22.87
14	4.05	12.15	24.3
15	4.45	13.36	26.73
16	4.56	13.68	27.36
17	4.63	13.89	27.78
18	4.7	14.1	28.2
19	4.91	14.74	29.48
20	4.91	14.74	29.48
21	6.35	19.05	38.11
22	6.46	19.37	38.73
23	6.56	19.68	39.36
24	8.07	24.22	48.44
25	8.28	24.84	49.68
26	8.48	25.45	50.91
27	8.69	26.07	52.14
28	9.74	29.21	58.42
29	9.41	28.24	56.48
30	9.66	28.97	57.95
31	9.87	29.61	59.23
32	10.18	30.54	61.09
33	10.33	31	62
34	12.78	38.35	76.7
35	13.36	40.07	80.15
36	13.92	41.75	83.51
37	14.48	43.44	86.89
38	15.37	46.1	92.2
39	15.87	47.61	95.22
40	16.93	50.79	101.58
41	17.59	52.78	105.56
42	18.49	55.46	110.93
43	19.43	58.3	116.61
44	20.33	60.98	121.96
45	20.95	62.84	125.68
46	21.22	63.67	127.35
47	21.87	65.62	131.24
48	22.47	67.41	134.81
49	22.72	68.16	136.33
50	23.37	70.1	140.2
51	23.96	71.89	143.78
52	24.14	72.41	144.81
53	24.8	74.41	148.81
54	25.43	76.28	152.55
55	26	78	156
56	26.14	78.43	156.86

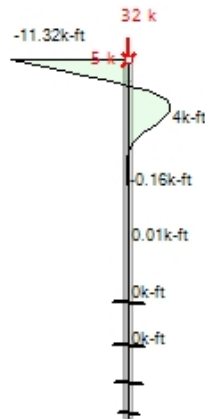
57	26.8	80.41	160.81
58	27.42	82.26	164.53
59	28	84	168
60	28.03	84.1	168.2
61	28.71	86.14	172.29
62	29.35	88.06	176.12
63	29.96	89.87	179.74
64	30.52	91.56	183.13
65	30.45	91.36	182.73
66	31.14	93.41	186.83
67	31.79	95.37	190.74
68	32.41	97.23	194.47
69	33	99	198
70	33.56	100.67	201.35
71	33.38	100.14	200.28
72	34.06	102.19	204.38
73	34.72	104.16	208.32
74	35.35	106.05	212.09
75	35.95	107.86	215.71

Design section 4 1/2"x0.290"-2 (12-14-16-16): UL = 64k C, lateral analysis r

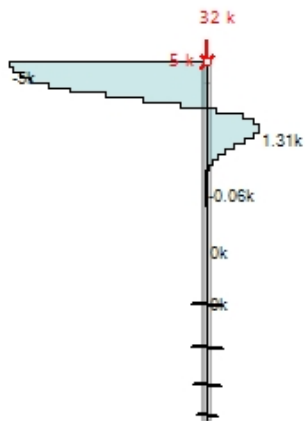
Displacement x-x: Stage 0



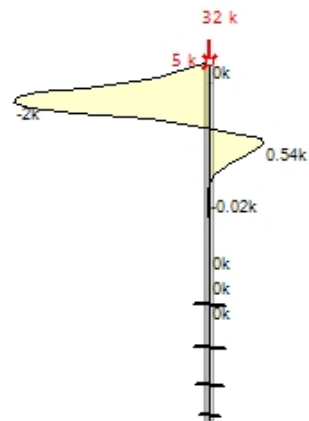
Moment x-x: Stage 0



Shear x-x: Stage 0



Hor. soil react x-x: Stage 0



Stress checks

Lateral soil data points along pile Design section: 0, stage 0

El. (ft)	X (ft)	Model Model	Ka	Kp	Kreese	e50 (pci)	Krm Krm	RQD (%)	Qu (ksf)
0	0	Sand Reese	0.344	2.905	25				
-0.486	0	Sand Reese	0.344	2.905	25				
-0.971	0	Sand Reese	0.344	2.905	25				
-1.457	0	Sand Reese	0.344	2.905	25				
-2	0	Sand Reese	0.344	2.905	25				
-2.429	0	Sand Reese	0.344	2.905	25				
-2.914	0	Sand Reese	0.344	2.905	25				
-3.4	0	Sand Reese	0.344	2.905	25				
-3.886	0	Sand Reese	0.344	2.905	25				
-4.371	0	Sand Reese	0.344	2.905	25				
-4.857	0	Sand Reese	0.344	2.905	25				
-5.343	0	Sand Reese	0.344	2.905	25				
-5.829	0	Sand Reese	0.344	2.905	25				
-6.314	0	Sand Reese	0.344	2.905	25				
-6.8	0	Sand Reese	0.344	2.905	25				
-7.286	0	Stiff clay NW				0.007			
-7.771	0	Stiff clay NW				0.007			
-8.257	0	Stiff clay NW				0.007			
-8.743	0	Stiff clay NW				0.007			
-9.229	0	Stiff clay NW				0.007			
-9.714	0	Stiff clay NW				0.007			
-10.2	0	Stiff clay NW				0.007			
-10.686	0	Stiff clay NW				0.007			
-11.171	0	Stiff clay NW				0.007			
-11.657	0	Stiff clay NW				0.007			
-12.143	0	Stiff clay NW				0.007			
-12.629	0	Stiff clay NW				0.007			
-13.114	0	Stiff clay NW				0.007			
-13.6	0	Stiff clay NW				0.007			
-14.086	0	Stiff clay NW				0.007			
-14.571	0	Stiff clay NW				0.007			
-15.057	0	Stiff clay NW				0.007			
-15.543	0	Stiff clay NW				0.007			
-16.029	0	Stiff clay NW				0.007			
-16.514	0	Stiff clay NW				0.007			
-17	0	Stiff clay NW				0.007			
-17.486	0	Stiff clay NW				0.007			
-17.971	0	Stiff clay NW				0.007			
-18.457	0	Stiff clay NW				0.007			
-18.943	0	Stiff clay NW				0.007			
-19.429	0	Stiff clay NW				0.007			
-19.914	0	Stiff clay NW				0.007			
-20.4	0	Sand Reese	0.344	2.905	60				
-20.886	0	Sand Reese	0.344	2.905	60				
-21.371	0	Sand Reese	0.344	2.905	60				
-21.857	0	Sand Reese	0.344	2.905	60				
-22.343	0	Sand Reese	0.344	2.905	60				
-22.829	0	Sand Reese	0.344	2.905	60				
-23.314	0	Sand Reese	0.344	2.905	60				

-23.8	0	Sand Reese	0.344	2.905	60				
-24.286	0	Sand Reese	0.344	2.905	60				
-24.771	0	Sand Reese	0.344	2.905	60				
-25.257	0	Sand Reese	0.344	2.905	60				
-25.743	0	Sand Reese	0.344	2.905	60				
-26.229	0	Sand Reese	0.344	2.905	60				
-26.714	0	Sand Reese	0.344	2.905	60				
-27.2	0	Sand Reese	0.344	2.905	60				
-27.686	0	Sand Reese	0.344	2.905	60				
-28.171	0	Sand Reese	0.344	2.905	60				
-28.657	0	Sand Reese	0.344	2.905	60				
-29.143	0	Sand Reese	0.344	2.905	60				
-29.629	0	Sand Reese	0.344	2.905	60				
-30.114	0	Sand Reese	0.344	2.905	60				
-30.6	0	Sand Reese	0.344	2.905	60				
-31.086	0	Sand Reese	0.344	2.905	60				
-31.571	0	Sand Reese	0.344	2.905	60				
-32.057	0	Sand Reese	0.344	2.905	60				
-32.543	0	Sand Reese	0.344	2.905	60				
-33.029	0	Sand Reese	0.344	2.905	60				
-33.514	0	Sand Reese	0.344	2.905	60				
-34	0	Sand Reese	0.344	2.905	60				

Computed Values of Pile Loading and Deflection for all stages

Helical pile section: 412290-2

Load conditions at pile top for Design section: 0, stage 0

Shear force at pile head : 5k

Axial force at pile head : 32k

Moment force at pile head: 0k-ft

Lateral analysis results points along pile Design section: 0, stage 0

El.	X	δ .hor	Moment	Shear	Slope	σ_v	El	Spring R	Spring Pres.	Soil Dist. Loa
(ft)	(ft)	(in)	(k-ft)	(k)	(rad)	(ksf)	(k in ²)	(k)	(ksf)	(k/ft)
0	0	0.371	-11.32	-5	0	0	0	0	0	0
-0.486	0	0.362	-8.89	-4.91	0	0.05	0	-0.19	-0.02	-0.091
-0.971	0	0.339	-6.5	-4.73	0	0.11	0	-0.36	-0.039	-0.174
-1.457	0	0.305	-4.2	-4.46	0	0.16	0	-0.53	-0.06	-0.271
-2	0	0.259	-1.78	-4.03	0	0.22	0	-0.89	-0.096	-0.433
-2.429	0	0.219	-0.05	-3.45	0	0.27	0	-1.26	-0.128	-0.578
-2.914	0	0.175	1.62	-2.59	0	0.33	0	-1.77	-0.191	-0.858
-3.4	0	0.133	2.88	-1.64	0	0.38	0	-1.96	-0.212	-0.953
-3.886	0	0.096	3.68	-0.67	0	0.44	0	-2	-0.216	-0.971
-4.371	0	0.064	4	0.22	0	0.49	0	-1.83	-0.197	-0.889
-4.857	0	0.039	3.89	0.89	0	0.54	0	-1.36	-0.147	-0.662
-5.343	0	0.02	3.46	1.19	0	0.6	0	-0.62	-0.067	-0.302
-5.829	0	0.007	2.88	1.31	0	0.65	0	-0.26	-0.028	-0.128
-6.314	0	-0.001	2.25	1.3	0	0.71	0	0.03	0.003	0.015
-6.8	0	-0.005	1.61	1.19	0	0.76	0	0.23	0.024	0.11
-7.286	0	-0.007	1.04	0.93	0	0.82	0	0.53	0.057	0.255
-7.771	0	-0.007	0.58	0.67	0	0.87	0	0.54	0.058	0.261
-8.257	0	-0.007	0.25	0.44	0	0.93	0	0.48	0.051	0.231

-8.743	0	-0.005	0.04	0.26	0	0.98	0	0.38	0.041	0.185
-9.229	0	-0.004	-0.09	0.12	0	1.04	0	0.28	0.03	0.136
-9.714	0	-0.003	-0.15	0.03	0	1.09	0	0.19	0.02	0.092
-10.2	0	-0.002	-0.16	-0.02	0	1.15	0	0.11	0.012	0.055
-10.68	0	-0.001	-0.15	-0.05	0	1.2	0	0.06	0.006	0.028
-11.17	0	0	-0.12	-0.06	0	1.26	0	0.02	0.002	0.009
-11.65	0	0	-0.09	-0.06	0	1.31	0	-0.01	-0.001	-0.003
-12.14	0	0	-0.07	-0.05	0	1.37	0	-0.02	-0.002	-0.009
-12.62	0	0	-0.04	-0.04	0	1.43	0	-0.02	-0.002	-0.011
-13.11	0	0	-0.02	-0.03	0	1.48	0	-0.02	-0.002	-0.011
-13.6	0	0	-0.01	-0.02	0	1.54	0	-0.02	-0.002	-0.01
-14.08	0	0	0	-0.01	0	1.59	0	-0.02	-0.002	-0.008
-14.57	0	0	0	0	0	1.65	0	-0.01	-0.001	-0.006
-15.05	0	0	0.01	0	0	1.7	0	-0.01	-0.001	-0.004
-15.54	0	0	0.01	0	0	1.76	0	0	0	-0.002
-16.02	0	0	0.01	0	0	1.81	0	0	0	-0.001
-16.51	0	0	0.01	0	0	1.87	0	0	0	0
-17	0	0	0	0	0	1.92	0	0	0	0
-17.48	0	0	0	0	0	1.98	0	0	0	0
-17.97	0	0	0	0	0	2.03	0	0	0	0
-18.45	0	0	0	0	0	2.09	0	0	0	0
-18.94	0	0	0	0	0	2.15	0	0	0	0
-19.42	0	0	0	0	0	2.2	0	0	0	0
-19.91	0	0	0	0	0	2.26	0	0	0	0
-20.4	0	0	0	0	0	2.31	0	0	0	0
-20.88	0	0	0	0	0	2.37	0	0	0	0
-21.37	0	0	0	0	0	2.43	0	0	0	0
-21.85	0	0	0	0	0	2.48	0	0	0	0
-22.34	0	0	0	0	0	2.54	0	0	0	0
-22.82	0	0	0	0	0	2.6	0	0	0	0
-23.31	0	0	0	0	0	2.65	0	0	0	0
-23.8	0	0	0	0	0	2.71	0	0	0	0
-24.28	0	0	0	0	0	2.77	0	0	0	0
-24.77	0	0	0	0	0	2.82	0	0	0	0
-25.25	0	0	0	0	0	2.88	0	0	0	0
-25.74	0	0	0	0	0	2.94	0	0	0	0
-26.22	0	0	0	0	0	2.99	0	0	0	0
-26.71	0	0	0	0	0	3.05	0	0	0	0
-27.2	0	0	0	0	0	3.11	0	0	0	0
-27.68	0	0	0	0	0	3.17	0	0	0	0
-28.17	0	0	0	0	0	3.22	0	0	0	0
-28.65	0	0	0	0	0	3.28	0	0	0	0
-29.14	0	0	0	0	0	3.33	0	0	0	0
-29.62	0	0	0	0	0	3.39	0	0	0	0
-30.11	0	0	0	0	0	3.44	0	0	0	0
-30.6	0	0	0	0	0	3.5	0	0	0	0
-31.08	0	0	0	0	0	3.55	0	0	0	0
-31.57	0	0	0	0	0	3.61	0	0	0	0
-32.05	0	0	0	0	0	3.66	0	0	0	0
-32.54	0	0	0	0	0	3.72	0	0	0	0
-33.02	0	0	0	0	0	3.77	0	0	0	0

-33.51	0	0	0	0	0	3.83	0	0	0	0
-34	0	0	0	0	0	3.89	0	0	0	0

Helical Pile Structural Analysis - AISC 360 - 15th Edition (ASD)

Project: RB Stall High School Additions

Date: 8/6/2025

Pile Shaft: <u>412290</u>	Shaft: <u>RS</u>	Pile Shaft O.D.: <u>4 1/2 in</u>
Coating: <u>Galv.</u>	Grouted: <u>FALSE</u>	Pile Shaft W.T.: <u>0.290 in</u>
Req. Comp., P_r: <u>32 kip</u> F.S. = 1.67 <u>(53.44 kip ult)</u>		Design Shaft W.T.: <u>0.270 in</u>
Req. Ten.: <u>0 kip</u> F.S. = 1.67 <u>(0 kip ult)</u>		Pile Shaft I.D.: <u>3.961 in</u>
Req. Moment, M_r: <u>11.6 kip-ft</u> F.S. = 1.67 <u>(19.372 kip ult)</u>		Steel Strength, F_y: <u>80 ksi</u>
Pile Length: <u>34 ft</u>		Grout Diam, D_g: <u>0.00 in</u>
		Grout Strength, F_c: <u>4 ksi</u>
		Modulus of Elasticity of Steel, E_s: <u>29,000 ksi</u>

Initial Pile Shaft Section Properties

Steel Area, A_s: <u>3.58 in²</u>
Grout Area, A_g: <u>0.00 in²</u>
Steel Moment of Inertia, I_i = π/6*(OD⁴ - ID⁴): <u>8.05 in⁴</u>
Steel Plastic Modulus, Z_i = (OD³ - ID³)/6: <u>4.83 in³</u>

Soil Corrosivity Data

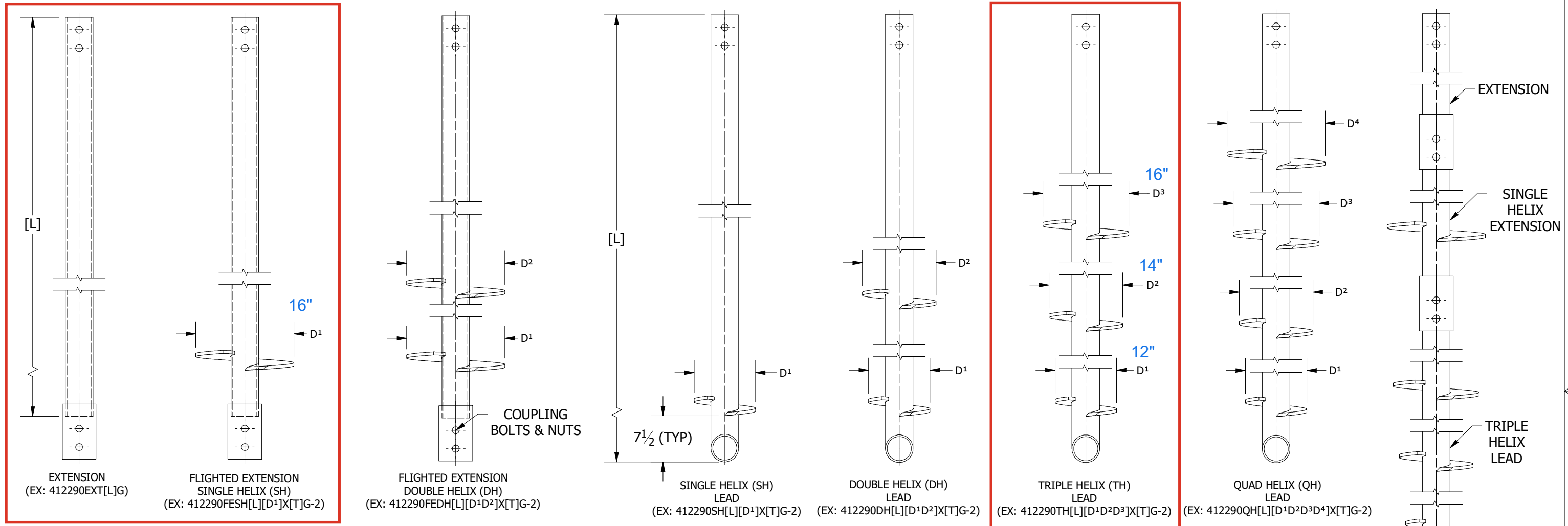
Design Life: <u>50 years</u>
Soil Corrosivity: <u>Moderate (AC358)</u>
Thickness Loss: <u>0.25 mils/year</u> Source: (ICC AC358)
Thickness Loss @ Design Life: <u>12.5 mils</u>
<u>0.0125 in</u>

Corroded Pile Shaft Section Properties

Design Shaft O.D.: <u>4.475 in</u>	
Design Shaft W.T.: <u>0.257 in</u>	
Design Shaft I.D.: <u>3.961 in</u>	
Design Steel Area, A_s: <u>3.41 sq. in. (5% reduction)</u>	
Grout Area, A_g: <u>0.00 in²</u>	
Modulus of Elasticity of Grout, E_g: <u>3,604,997 psi</u>	
Modular Ratio, n = E_g/E_s: <u>0.12</u>	
Combined Section Area, A = A_s + (A_g * n): <u>3.41 in²</u>	
Steel Plastic Modulus, Z = (OD³ - ID³)/6: <u>4.58 in³</u>	
λ = D/t: <u>17.40</u>	(Table B4.1b)
λ_p = 0.07*(E_s/F_y): <u>25.38</u>	(Table B4.1b)
λ_r = 0.31*(E_s/F_y): <u>112.38</u>	(Table B4.1b)
Compact Section (λ < λ_p < λ_r): <u>TRUE</u>	
Effective Length Factor, K: <u>0.65 Fixed-Fixed</u>	(Table C-A-7.1)
Laterally Unbraced Length, L: <u>5 ft</u>	
L_c = K*L: <u>3.25 ft</u>	(Chapter E2)
D/t: <u>17.40 < 39.9 => Ae = Ag</u>	(Chapter E7-6)
Steel Moment of Inertia, I_s = π/64*(OD⁴ - ID⁴): <u>7.61 in⁴</u>	
Grout Moment of Inertia, I_g = π/64*(OD⁴ - ID⁴): <u>0.00 in⁴</u>	
Combined Moment of Inertia, I = I_s + (I_g * n): <u>7.61 in⁴</u>	
Radius of Gyration, r = √(I/A): <u>1.49 in</u>	
Elastic Buckling Stress, F_e = π²*E_s/(L_c/r)²: <u>420.01 ksi</u>	(Chapter E3-4)
L_c/r: <u>26.10 < 89.7 => L_c/r < 4.71*√(E/F_y)</u>	(Chapter E3-2)
Flexural Buckling Stress, F_{cr}: <u>73.87 ksi</u> F _{cr} = 0.658*(F _y /Fe)*F _y	(Chapter E3-2)
Nominal Compressive Strength, P_n = F_{cr} * A: <u>251.8 kip</u> Ω _c = 1.67 (ASD)	(Chapter E3-1)
Allowable Compressive Strength, P_c = P_n/Ω_c: <u>150.8 kip ≥ 32.0 kip O.K. ✓</u>	(Chapter E1)
0.45 * (E_s/F_y): <u>163.1 > 17.4 O.K. ✓</u>	(Chapter F8)
Flexural Strength (Yielding), M_p = F_y * Z: <u>30.5 kip-ft</u>	(Chapter F8-1)
Flexural Strength (Local Buckling): Compact Section, the limit state of local buckling does not apply.	(Chapter F8-2a)
Nominal Flexural Strength, M_p: <u>30.5 kip-ft</u> Ω _c = 1.67 (ASD)	
Allowable Flexural Strength, M_{all} = M_p/Ω_b: <u>18.3 kip-ft ≥ 11.6 kip-ft O.K. ✓</u>	(Chapter F1-a)
P/P_c: <u>0.21 ≥ 0.2 Compression Controls</u>	
Combined Strength Ratio, CSR: <u>0.78 < 1.00 O.K. ✓</u> (Pr/Pc) + 8/9*(Mr/Mc)	(Chapter H1-1a)
Source: <u>AISC Steel Construction Manual 15th Edition</u>	

MAXIMUM TORQUE NOT TO EXCEED 26,500 FT-LBS.
 ULTIMATE CAPACITY IS 159 KIPS BASED ON A CAPACITY TO
 TORQUE RATIO OF $k_t = 6 \text{ FT}^{-1}$

4 1/2" O.D. X 0.290" W.T. HELICAL LEADS & EXTENSIONS

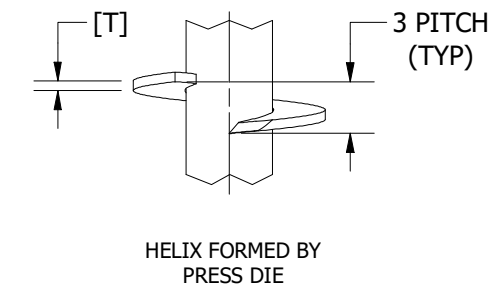
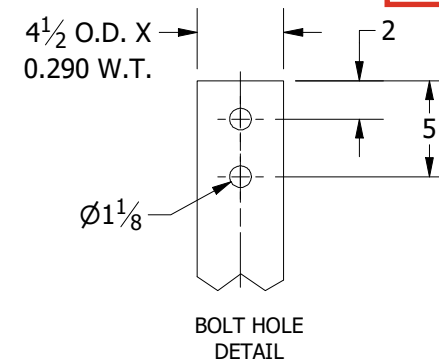


NOTES:

- PILE SHAFT TO MEET OR EXCEED 80 KSI.
- PLATE STEEL TO MEET OR EXCEED REQUIREMENTS OF ASTM A572, GRADE 50.
- ALL HELICES ARE FORMED BY PRESS DIE. LEADING EDGE OF HELICES ARE TAPERED TO IMPROVE INSTALLATION CAPABILITIES.
- HELIX SPACING IS THREE (3) TIMES THE DIAMETER OF THE LOWER HELIX. SPACING OF LEADING HELIX ON FLIGHTED EXTENSIONS IS THREE (3) TIMES THE DIAMETER OF THE LAST HELIX ON THE PRECEDING SHAFT.
- STANDARD HELIX DIAMETERS ARE 8", 10", 12", 14" & 16". STANDARD HELIX THICKNESS IS 1/2".
- ALL WELDING TO BE PERFORMED BY CERTIFIED WELDOR IN ACCORDANCE WITH AWS D1.1 STRUCTURAL WELDING CODE - STEEL.
- BARE STEEL IS STANDARD. **HOT DIP GALVANIZING PER ASTM A153/ASTM A123 IS AVAILABLE IF REQUIRED.**
- (2) 1" DIAMETER X 7" LONG PLAIN FINISH HEAVY HEX BOLT ASTM A325 AND (2) 1" PLAIN FINISH HEAVY HEX NUT ASTM A194 (GRADE 8).
- HELICAL PILE ASSEMBLIES MANUFACTURED IN ACCORDANCE WITH ICC-ES AC308 ACCEPTANCE CRITERIA FOR HELICAL FOUNDATION SYSTEMS AND DEVICES.

IDEAL PART # ABBREVIATIONS:

- 412 = SHAFT DIAMETER
- 290 = SHAFT WALL THICKNESS
- EXT = EXTENSION
- FE = FLIGHTED EXTENSION
- SH, DH, TH, QH = SINGLE, DOUBLE, TRIPLE, OR QUAD. HELIX
- [L] = SHAFT LENGTH IN FEET (EXAMPLE: 7' = 7)
- [D] = HELIX DIAMETER(S) IN INCHES (EXAMPLE: 10" = 10)
- X = X (SEPARATES HELIX DIAMETER(S) AND HELIX THICKNESS)
- [T] = HELIX THICKNESS (EXAMPLE: 1/2" = 12)
- G = GALVANIZED
- 2 = BOLT QUANTITY



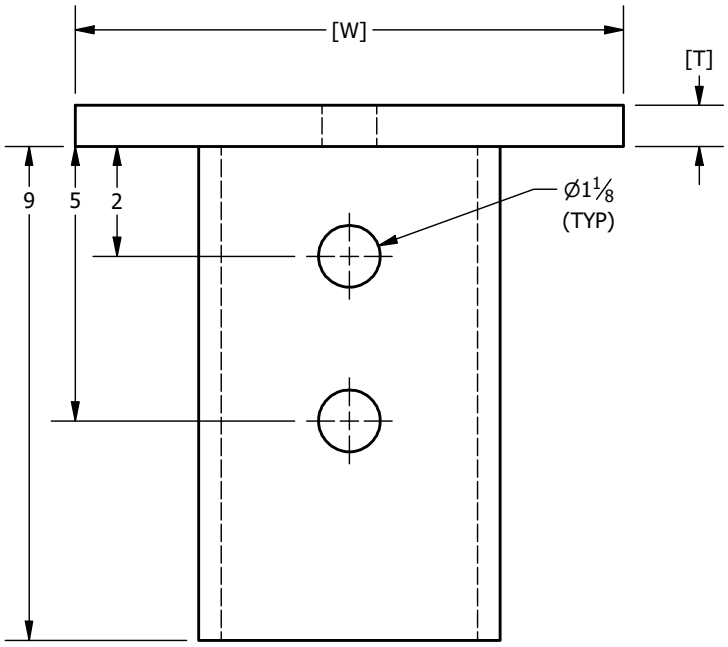
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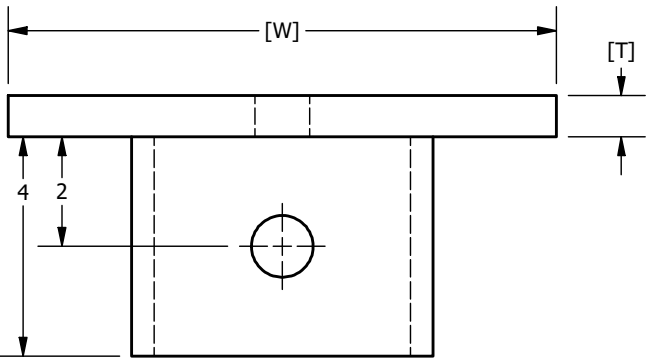
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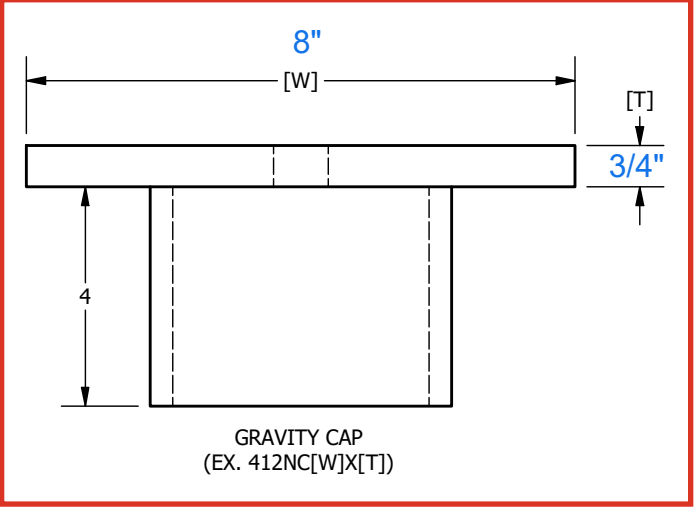
NEW CONSTRUCTION CAPS FOR 4 1/2" O.D. PILE SHAFTS



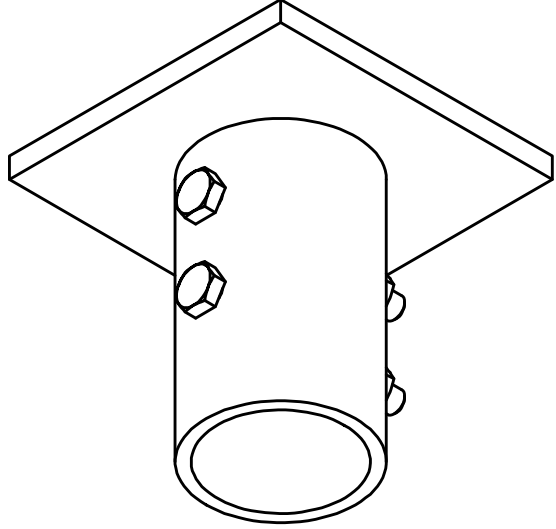
DOUBLE BOLT-ON CAP
(EX. 412NC[W]X[T]B)



SINGLE BOLT-ON CAP
(EX. 412NC[W]X[T]SB)



GRAVITY CAP
(EX. 412NC[W]X[T])



DOUBLE BOLT PILE CAP PROFILE

- NOTES:**
- SLEEVE TO MEET OR EXCEED 80 KSI.
 - PLATE STEEL TO MEET OR EXCEED REQUIREMENTS OF ASTM A572, GRADE 50.
 - CAP SLEEVE TO FIT OVER 4 1/2" O.D. PILE SHAFT.
 - STANDARD SQUARE PLATE WIDTHS RANGE FROM 8" TO 12". STANDARD PLATE THICKNESS IS 1/2" OR 3/4".
 - ALL WELDING TO BE PERFORMED BY CERTIFIED WELDOR IN ACCORDANCE WITH AWS D1.1 STRUCTURAL WELDING CODE - STEEL.
 - BARE STEEL IS STANDARD** GALVANIZING IS AVAILABLE IF REQUIRED.
 - (1) OR (2) 1" DIAMETER X 7" LONG PLAIN FINISH HEX BOLT ASTM A325 AND (1) OR (2) 1" PLAIN FINISH HEAVY HEX NUT ASTM A194 (GRADE 8).

IDEAL PART # ABBREVIATIONS:
 412 = PILE SHAFT DIAMETER
 NC = NEW CONSTRUCTION
 [W] = PLATE WIDTH (EX. 10" = 10)
 X = X (SEPARATES PLATE WIDTH AND PLATE THICKNESS)
 [T] = PLATE THICKNESS (EX. 3/4" = 34)
 SB = SINGLE BOLTED
 B = DOUBLE BOLTED
 G = GALVANIZED

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