ROBERT-JAMES & ASSOCIATES, Inc.
12255 West 187th Street
Mokena, Illinois 60448
(708) 479-8385

File : CIS150a.mcd

Site : Circle K
143 North West Centurion Court
Lake City, Florida 32055

Sign Type : 100'-0" overall height single pole for 13'-0" x 10'-0" combination ID / Truck Diesel sign, a 1'-9" gap, and two (2) 6'-6" x 22'-0" single face electronic price signs mounted back to back around the pole with both caisson and spread footing options. Footing designs are based on soil conditions found in Universal Engineering Sciences, Inc. Project No. 0730.2100169.0000 and Report No. 1905351 geotechnical exploration dated October 08, 2021.
Drawing No. 2205129 rev. B sheets 1 and 2 of 2.

Design wind load based on the 2020 Florida Building Code, 7th Edition (ASCE 7-16) using Exposure C and 120 mph wind speed.

Design Wind Speed : (mph.) $V := 120.0$ Based on Risk Category II

Velocity Pressure Coefficient at a Height of Less Than 100', Exposure C : $Kz := 1.26$ Based on Table 29.3-1

Topographic Factor : $Kzt := 1.00$ Based on Table 26.8-1

Wind Directionality Factor : $Kd := 0.95$ Based on Table 26.6-1

Velocity Pressure : (PSF) $qz := 0.00256 \cdot Kz \cdot Kzt \cdot Kd \cdot V^2$ $qz = 44.126$ Based on 29.3-1

Force Coefficient : $Cf := 1.80$ Based on Figure 29.4-1

Gust Effect Factor : $G := 0.85$ Based on 26.9.4 for Other Structures

ASD Conversion Factor : $LCF := 0.60$

Design Pressure : (PSF) $F := qz \cdot Cf \cdot G \cdot LCF$ $F = 40.508$ Use : $WL := 40.6$

Reference : Manual of Steel Construction, AISC 13th Edition.

Pipe : ASTM A-252 Gr. 3 Fy = 42.0 ksi. ; Fb = 27.72 ksi. ; Fv = 16.80 ksi.

Plate : ASTM A-36 Fy = 36.0 ksi. ; Fb = 27.00 ksi. ; Fv = 14.40 ksi.

Anchor Bolts : ASTM F-1554 Gr. 55 Fu = 75.0 ksi. ; Ft = 24.75 ksi. ; Fv = 18.62 ksi.

Reference : American Concrete Institute, Code 318.14

Rebar : ASTM A-615 Grade 60 Fy = 60.0 ksi.

Concrete : 3,000 psi. compressive strength at 28 days.

Jeffrey L Griffin
Digitally signed by Jeffrey L Griffin
Date: 2022.11.10 11:14:44 -06'00'

JEFF L. GRIFFIN LICENSE No. 43607 STATE OF FLORIDA PROFESSIONAL ENGINEER

Design Loads at EL. 86.92' : (ID sign plus 1" thick cap ring.)

Shear : (lbs.) $ShrEL86_{92} := (13.08 \cdot 10.0 \cdot WL)$ $ShrEL86_{92} = 5310.48$

Moment : (ft.lbs.) $MtEL86_{92} := ShrEL86_{92} \cdot \left(\frac{13.08}{2}\right)$ $MtEL86_{92} = 34730.539$

Design of Pole Structure at EL. 86.92' : (Inside of the ID sign.)

Section Modulus of Pipe : (in.^{3}) 10-3/4" Dia. x 0.365" wall - (10" Sch. 40) $PipeSM := 15.8$

Bending Stress : (psi.) $f_b := \frac{MtEL86_{92} \cdot 12}{PipeSM}$ $f_b = 26377.625$

Area of Pipe : ($in.^2$) 10-3/4" Dia. x 0.365" wall - (10" Sch. 40) $PipeArea := 11.1$

Shear Stress : (psi.) $f_v := \frac{ShrEL86_{92}}{PipeArea}$ $f_v = 478.422$

Unity Check - Sign Pole : $UCSgnPole := \frac{f_b}{27720} + \frac{f_v}{16800}$ $UCSgnPole = 0.98$ < 1.00 OK

Design of Pole Splice Rings at EL. 86.92' :

Lower Pipe Diameter : (in.) $LwrDia := 18.0$ Upper Pipe Diameter : (in.) $UprDia := 10.75$

Cap Plate Diameter : (in.) $PltDia := 19.0$ Cap Plate Thickness : (in.) $PltThk := 1.00$

Transfer Distance : (in.) $PltSpcm := LwrDia - UprDia$ $PltSpcm = 7.25$

Minimum Thickness Required : (in.) $$ReqdThk := \sqrt{\left[\frac{\left[\frac{(MtEL86_{92}\cdot 12)}{LwrDia\cdot\pi}\right]\cdot\left(\frac{PltSpcm}{2}\right)\cdot 6}{(PltDia\cdot 27000)}\right]}$$

$ReqdThk = 0.559$

Unity Check - Splice Rings : $UCSplcRng := \frac{ReqdThk}{PltThk}$ $UCSplcRng = 0.559$ < 1.00 OK

Design Loads at EL. 74.75' :

ID Sign : $IDSgn := (13.0\cdot 10.0\cdot WL)\cdot\left[\left(\frac{13.0}{2}\right) + 12.25\right]$ $IDSgn = 98962.5$ ft.lbs.

Upper Exposed $Pole_1$: $UprP_1 := \left[1.75\cdot\left(\frac{18}{12}\right)\cdot WL\right]\cdot\left[\left(\frac{1.75}{2}\right) + 10.5\right]$ $UprP_1 = 1212.291$ ft.lbs.

Price Signs : $PrcSgns := (6.5\cdot 22.0\cdot WL)\cdot\left[\left(\frac{6.5}{2}\right) + 4.0\right]$ $PrcSgns = 42092.05$ ft.lbs.

Lower Exposed $Pole_1$: $LwrP_1 := \left[4.0\cdot\left(\frac{18}{12}\right)\cdot WL\right]\cdot\left(\frac{4.0}{2}\right)$ $LwrP_1 = 487.2$ ft.lbs.

Moment : (ft.lbs.) $MtEL74_{75} := IDSgn + UprP_1 + PrcSgns + LwrP_1$ $MtEL74_{75} = 142754.041$

Shear : (lbs.) $ShrEL74_{75} := ShrEL86_{92} + (6.5\cdot 22.0\cdot WL) + \left[5.75\cdot\left(\frac{18}{12}\right)\cdot WL\right]$ $ShrEL74_{75} = 11466.455$

Design of Pole Structure at EL. 74.75' :

Section Modulus of Pipe : ($in.^3$) 18" Dia. x 3/8" wall - $PipeSM := 89.6$

Bending Stress : (psi.) $f_b := \frac{MtEL74_{75}\cdot 12}{PipeSM}$ $f_b = 19118.845$

Area of Pipe : ($in.^2$) 18" Dia. x 3/8" wall - $PipeArea := 23.12$

Shear Stress : (psi.) $f_v := \frac{ShrEL74_{75}}{PipeArea}$ $f_v = 495.954$

Unity Check - Pole : $UCPole := \frac{f_b}{27720} + \frac{f_v}{16800}$ $UCPole = 0.719$ < 1.00 OK

Design of Pole Splice Rings at EL. 74.75' :

Lower Pipe Diameter : (in.) $LwrDia := 36.0$ Upper Pipe Diameter : (in.) $UprDia := 18.0$

Cap Plate Diameter : (in.) $PltDia := 37.0$ Cap Plate Thickness : (in.) $PltThk := 1.00$

Transfer Distance : (in.) $PltSpcm := LwrDia - UprDia$ $PltSpcm = 18$

Minimum Thickness Required : (in.) $$ReqdThk := \sqrt{\frac{\left[\frac{(MtEL74_{75} \cdot 12)}{LwrDia \cdot \pi}\right] \cdot \left(\frac{PltSpcm}{2}\right) \cdot 6}{(PltDia \cdot 27000)}}$$

$ReqdThk = 0.905$

Unity Check - Splice Rings : $UCSplcRng := \frac{ReqdThk}{PltThk}$ $UCSplcRng = 0.905$ < 1.00 OK

Design Loads at EL. 40.0' :

ID Sign : $IDSgn := (13.0 \cdot 10.0 \cdot WL) \cdot \left[\left(\frac{13.0}{2}\right) + 47.0\right]$ $IDSgn = 282373$ ft.lbs.

Upper Exposed Pole₁ : $UprP_1 := \left[1.75 \cdot \left(\frac{18}{12}\right) \cdot WL\right] \cdot \left[\left(\frac{1.75}{2}\right) + 45.0\right]$ $UprP_1 = 4889.128$ ft.lbs.

Price Signs : $PrcSgns := (6.5 \cdot 22.0 \cdot WL) \cdot \left[\left(\frac{6.5}{2}\right) + 38.75\right]$ $PrcSgns = 243843.6$ ft.lbs.

Lower Exposed Pole₁ : $LwrP_1 := \left[4.0 \cdot \left(\frac{18}{12}\right) \cdot WL\right] \cdot \left[\left(\frac{4.0}{2}\right) + 34.75\right]$ $LwrP_1 = 8952.3$ ft.lbs.

Pole₂ : $P_2 := \left[34.75 \cdot \left(\frac{36}{12}\right) \cdot WL\right] \cdot \left(\frac{34.75}{2}\right)$ $P_2 = 73540.556$ ft.lbs.

Moment : (ft.lbs.) $MtEL40_0 := IDSgn + UprP_1 + PrcSgns + LwrP_1 + P_2$ $MtEL40_0 = 613598.584$

Shear : (lbs.) $ShrEL40_0 := ShrEL74_{75} + \left[34.75 \cdot \left(\frac{36}{12}\right) \cdot WL\right]$ $ShrEL40_0 = 15699.005$

Design of Pole Structure at EL. 40.0' :

Section Modulus of Pipe : (in.^{3}) 36" Dia. x 3/8" wall - $PipeSM := 369.9$

Bending Stress : (psi.) $f_b := \frac{MtEL40_0 \cdot 12}{PipeSM}$ $f_b = 19905.875$

Area of Pipe : (in.^{2}) 36" Dia. x 3/8" wall - $PipeArea := 41.9$

Shear Stress : (psi.) $f_v := \frac{ShrEL40_0}{PipeArea}$ $f_v = 374.678$

Unity Check - Pole : $UCPole := \frac{f_b}{27720} + \frac{f_v}{16800}$ $UCPole = 0.74$ < 1.00 OK

Design of Pole Splice Rings at EL. 40.0' :

Lower Pipe Diameter : (in.) $LwrDia := 42.0$ Upper Pipe Diameter : (in.) $UprDia := 36.0$

Cap Plate Diameter : (in.) $PltDia := 43.0$ Cap Plate Thickness : (in.) $PltThk := 1.00$

Transfer Distance : (in.) $PltSpcm := LwrDia - UprDia$ $PltSpcm = 6$

Minimum Thickness Required : (in.) $$ReqdThk := \sqrt{\left[\frac{\left[\frac{(MtEL40_0 \cdot 12)}{LwrDia \cdot \pi}\right] \cdot \left(\frac{PltSpcm}{2}\right) \cdot 6}{(PltDia \cdot 27000)}\right]}$$

$ReqdThk = 0.93$

Unity Check - Splice Rings : $UCSplcRng := \frac{ReqdThk}{PltThk}$ $UCSplcRng = 0.93$ $<$ 1.00 OK

Design Loads at Grade :

ID Sign : $IDSgn := (13.0 \cdot 10.0 \cdot WL) \cdot \left[\left(\frac{13.0}{2}\right) + 87.0\right]$ $IDSgn = 493493$ ft.lbs.

Upper Exposed $Pole_1$: $UprP_1 := \left[1.75 \cdot \left(\frac{18}{12}\right) \cdot WL\right] \cdot \left[\left(\frac{1.75}{2}\right) + 85.25\right]$ $UprP_1 = 9178.772$ ft.lbs.

Price Signs : $PrcSgns := (6.5 \cdot 22.0 \cdot WL) \cdot \left[\left(\frac{6.5}{2}\right) + 78.75\right]$ $PrcSgns = 476075.6$ ft.lbs.

Lower Exposed $Pole_1$: $LwrP_1 := \left[4.0 \cdot \left(\frac{18}{12}\right) \cdot WL\right] \cdot \left[\left(\frac{4.0}{2}\right) + 74.75\right]$ $LwrP_1 = 18696.3$ ft.lbs.

$Pole_2$: $P_2 := \left[34.75 \cdot \left(\frac{36}{12}\right) \cdot WL\right] \cdot \left[\left(\frac{34.75}{2}\right) + 40.0\right]$ $P_2 = 242842.556$ ft.lbs.

$Pole_3$: $P_3 := \left[40.0 \cdot \left(\frac{42}{12}\right) \cdot WL\right] \cdot \left(\frac{40.0}{2}\right)$ $P_3 = 113680$ ft.lbs.

Moment : (ft.lbs.) $MtGrd := IDSgn + UprP_1 + PrcSgns + LwrP_1 + P_2 + P_3$ $MtGrd = 1353966.228$

Shear : (lbs.) $ShrGrd := ShrEL40_0 + \left[40.0 \cdot \left(\frac{42}{12}\right) \cdot WL\right]$ $ShrGrd = 21383.005$

Design of Pole Structure at Grade :

Section Modulus of Pipe : ($in.^3$) 42" Dia. x 0.563" wall - $OD := 42$ $WT := 0.553$ (Non-Compact Section)

$$PipeSM := \frac{\pi \cdot \left[OD^4 - (OD - 2 \cdot WT)^4\right]}{32 \cdot OD} \qquad PipeSM = 736.414$$

Bending Stress : (psi.) $f_b := \frac{MtGrd \cdot 12}{PipeSM}$ $f_b = 22063.111$

Area of Pipe : ($in.^2$) 42" Dia. x 0.563" wall - $$PipeArea := \frac{\left[\pi \cdot \left[OD^2 - [OD - (2 \cdot WT)]^2\right]\right]}{4}$$

$PipeArea = 72.006$

Shear Stress : (psi.) $f_v := \frac{ShrGrd}{PipeArea}$ $f_v = 296.962$

Unity Check - Pole : $UCPole := \frac{f_b}{25200} + \frac{f_v}{16800}$ $UCPole = 0.893$ < 1.00 OK

Design of Anchor Bolts at Grade :

Anchor Bolt Diameter : (in.) $AncBltDia := 1.625$

Stress Area : ($in.^2$)
(Based on nominal diameter per AISC 4-3) $AncBltArea := \frac{\pi \cdot AncBltDia^2}{4}$ $AncBltArea = 2.074$

Allowable Tension : (lbs.) $AllwTen := 24750 \cdot AncBltArea$ $AllwTen = 51330$

Allowable Shear : (lbs.) $AllwShr := 18620 \cdot AncBltArea$ $AllwShr = 38617$

Number of Anchor Bolts in Tension : $NoTen := 8$

Front to Back Distance Between Anchor Bolts : (in.) $LvrArm := 49.0$

Tension Load per Anchor Bolt : (lbs.) $TenAncBlt := \frac{MtGrd \cdot 12}{NoTen \cdot LvrArm}$ $TenAncBlt = 41447.95$

Number of Anchor Bolts in Shear : $NoShr := 16$

Shear Load per Anchor Bolt : (lbs.) $ShrAncBlt := \frac{ShrGrd}{NoShr}$ $ShrAncBlt = 1336.44$

Unity Check :
Anchor Bolts $UCAncBlts := \frac{TenAncBlt}{AllwTen} + \frac{ShrAncBlt}{AllwShr}$ $UCAncBlts = 0.842$ < 1.00 OK

Allowable Bond Stress : (lbs./ $in.^2$) $U := \left(\frac{1}{2}\right) \cdot \left(\frac{4.8 \cdot \sqrt{3000}}{AncBltDia}\right)$ $U = 80.894$

Embedment Reduction : (lbs.)
(For tack welded bottom nut and washer.) $Nt := \left(\frac{1}{2}\right) \cdot 18620 \cdot AncBltArea$ $Nt = 19308.4$

Developement Length : (in.) $Ld := \frac{TenAncBlt - Nt}{U \cdot \pi \cdot AncBltDia}$ $Ld = 53.61$

Embedment Length : (in.) $AncBltEmb := 66 - 6$ $AncBltEmb = 60$
(66" overall length minus 6" of thread projection.)

Unity Check :
Anchor Bolt Embedment $UCABEmb := \frac{Ld}{AncBltEmb}$ $UCABEmb = 0.894$ < 1.00 OK

Use : Sixteen (16) 1-5/8" Dia. x 66" LG. anchor bolts with 6" of top thread and 3" of bottom thread.

Design of Base Plate at Grade :

Plate Thickness : (in.) $PltThk := 1.25$ Plate Length : (in.) $PltLngth := 56.0$

Bolt Spacing : (in.) $BLS := 7.0$ Edge Distance : (in.) $ED := 7.0$

Moment Developed at Bolt Couple : $MD := \left(\frac{TenAncBlt \cdot BLS}{8}\right)$ $MD = 36266.953$

Minimum Thickness Required : (in.) $ReqdThk := \sqrt{\left[\frac{(MD \cdot 6)}{(ED \cdot 27000)}\right]}$ $ReqdThk = 1.07$

Unity Check - Base Plate : $UCBasePlt := \frac{ReqdThk}{PltThk}$ $UCBasePlt = 0.858$ < 1.00 OK

Use :
1-1/4" thick x 56" x 56" base plate with sixteen (16) 1-7/8" diameter holes on seven (7) 7" spaces x 49" bolt pattern and 5/8" thick gussets centered between all holes plus on outside of outer holes.

Design of Spread Footing :

Loads :

Moment : (ft.lbs.) $Ma := MtGrd$ $Ma = 1353966.228$

Shear : (lbs.) $Va := ShrGrd$ $Va = 21383.005$

Allowables :

Lateral passive pressure against foundation : (lbs./sq.ft. per foot) $PP := 225$

Static soil pressure : (lbs./sq.ft.) $SSP := 2500$

Dynamic soil pressure : (lbs./sq.ft.) $DSP := 3325$

Foundation parameters :

Depth of footing below grade : (ft.) $DF := 5.5$

Width of footing : (ft.) $WF := 17.0$

Length of footing : (ft.) (Overturning) $LF := 18.5$

Depth of water table below grade : (ft.)
$Z(D,DWT) := if(D - DWT \le 0, 0, D - DWT)$ $DWT := 3.0$

Weight of structure and foundation :

Design weight of concrete : (lbs./cu.ft.) $CWT := 150$

Signage weight : (lbs.) $SWT := 3250$

Structure weight : (lbs.) $PWT := 18125$

Footing weight : (lbs.) $FTWT := DF \cdot WF \cdot LF \cdot CWT$ $FTWT = 259462.5$

Bouyancy effect of water : (lbs.) $BOUY := Z(DF, DWT) \cdot LF \cdot WF \cdot 62.4$ $BOUY = 49062$

Net weight of foundation : (lbs.)
$NETWT := (SWT + PWT + FTWT) - BOUY$ $NETWT = 231775.5$

Check Factor of Safety :

Overturning moment about heel point of foundation : (ft.lbs.)
$Mo := Va \cdot DF + Ma$ $Mo = 1471572.756$

Total passive pressure on footing : (lbs./sq.ft.) $Tpp := PP \cdot DF^2 \cdot \left(\frac{WF}{2}\right)$ $Tpp = 57853.125$

Resisting moment about the heel point : (ft.lbs.)
$Mr := NETWT \cdot \left(\frac{LF}{2}\right) + Tpp \cdot \left(\frac{DF}{3}\right)$ $Mr = 2249987.438$

Factor of Safety : $FS := \frac{Mr}{Mo}$ $FS = 1.529$ > 1.5 OK

Check soil bearing pressures :

Static soil pressure : (lbs./sq.ft.) $SBP := \frac{NETWT}{LF \cdot WF}$ $SBP = 736.965$ < $SSP = 2500$ OK

Dynamic soil pressure : (lbs./sq.ft.)

$$e := \frac{\left[Mo - Tpp \cdot \left(\frac{DF}{3}\right)\right]}{NETWT} \qquad e = 5.892$$

$$\left(\frac{LF}{2}\right) = 9.25 \quad > \quad e = 5.892 \quad > \quad \left(\frac{LF}{6}\right) = 3.083$$

$$qa := \left[\frac{2 \cdot NETWT}{3 \cdot WF \cdot \left[\left(\frac{LF}{2}\right) - e\right]}\right] \qquad qa = 2706.349 \quad < \quad DSP = 3325$$ OK

Check tensile stress of concrete at pole :

Compressive Strength of Concrete : (psi.) $fc := 3000$

Overturning moment at pole : (ft.lbs./ft.) $Mp := \left(\frac{LF}{2}\right)^2 \cdot \left(\frac{qa}{2}\right)$ $Mp = 115781.007$

Section modulus of footing - Per foot of width : (in.^{3}) $Sw := 12 \cdot \frac{(DF \cdot 12)^2}{6}$ $Sw = 8712$

Tensile stress in concrete : (psi.) $ft := \frac{(Mp \cdot 12)}{Sw}$ $ft = 159.478$

Allowable stress in concrete : (psi.) $\phi Ft := 0.65 \cdot \left(5 \cdot \sqrt{fc}\right)$ $\phi Ft = 178.01$ > $ft = 159.478$

REBAR NOT REQUIRED FOR STRESS

Design of temperature and shrinkage steel :

Rebar size : $Number := 8$

Rebar Area : (in.^{2}) $Area := \frac{\pi \cdot \left(\frac{Number}{8}\right)^2}{4}$ $Area = 0.79$

For length of footing : $Asl := 0.0015 \cdot DF \cdot WF \cdot 144$ $Asl = 20.196$

Number required : $\frac{Asl}{Area} = 25.714$ Use thirteen (13) #8 Rebar x 17'-6" LG. equally spaced top and bottom using 6" typical clear. (Twenty-six (26) total required.)

For width of footing : $Asw := 0.0015 \cdot DF \cdot LF \cdot 144$ $Asw = 21.978$

Number required : $\frac{Asw}{Area} = 27.983$ Use fourteen (14) #8 Rebar x 16'-0" LG. equally spaced top and bottom using 6" typical clear. (Twenty-eight (28) total required.)

Quantity of concrete : (yds.^{3}) $Cy := \left[\frac{(LF \cdot WF \cdot DF)}{27}\right]$ $Cy = 64.065$

Design of Caisson Footing :

Overturning Moment : (ft.lbs.)	$Ma := MtGrd$	$Ma = 1353966.228$
Shear : (lbs.)	$Va := ShrGrd$	$Va = 21383.005$
Applied Lateral Force : (lbs.)	$P := Va$	$P = 21383.005$
Allowable Lateral Soil Pressure : (lbs./ft.^{2} per ft.)		$LP := 225$
Diameter of Round Footing : (ft.)		$b1 := 8.0$
Distance in Feet From Ground Surface to Point of Application of "P"	$h := \frac{Ma}{Va}$	$h = 63.32$
Depth of Footing Below Grade : (ft.)		$d1 := 20.0$
Allowable Lateral Soil Bearing Pressure Pursuant to the 2018 International Building Code Section 1807.3.2.1 and geotechnical data.	$S1 := \frac{LP \cdot d1}{3}$	$S1 = 1500$

$$A := 2.34 \cdot \frac{P}{S1 \cdot b1} \qquad A = 4.17$$

$$d2 := \left(\frac{A}{2}\right) \cdot \left[1 + \left(\sqrt{1 + 4.36 \cdot \frac{h}{A}}\right)\right] \qquad d2 = 19.177 \leq d1 = 20 \qquad \text{OK}$$

Check Tensile Stress in Footing :

Overturning Moment About Heel Point : (ft.lbs.) Treat as a cantilever at bottom.	$Mh := Ma + (Va \cdot d1)$	$Mh = 1781626.328$
Compressive Strength of Concrete : (psi.)		$fc := 3000$
Yield Strength of Rebar : (psi.)		$fy := 60000$
Section Modulus of Footing : (in.^{3})	$Sw := \frac{\pi \cdot (b1 \cdot 12)^3}{32}$	$Sw = 86858.754$
Allowable Concrete Stress : (psi.)	$\phi Ft := 0.65 \cdot (5 \cdot \sqrt{fc})$	$\phi Ft = 178.01$
Tensile Stress in Concrete : (psi.)	$ft := \left[\frac{(Mh \cdot 12)}{Sw}\right]$	$ft = 246.141 > \phi Ft = 178.01$ REBAR REQUIRED FOR STRESS

Design of Reinforcing Steel in Caisson :

Moment for USD Design :	$Mu := 1.7 \cdot Mh$		$Mu = 3028764.758$
	$d := [(b1 \cdot 12) \cdot .80] - 3$		$d = 73.8$
To Plot for " ju " :	$coeff := \frac{Mu \cdot 12}{fc \cdot b1 \cdot 12 \cdot d^2}$	$coeff = 0.023$	$ju := 0.94$
Required Area : (in.^{2})	$As := \frac{Mu \cdot 12}{ju \cdot fy \cdot d \cdot 0.90}$		$As = 9.702$

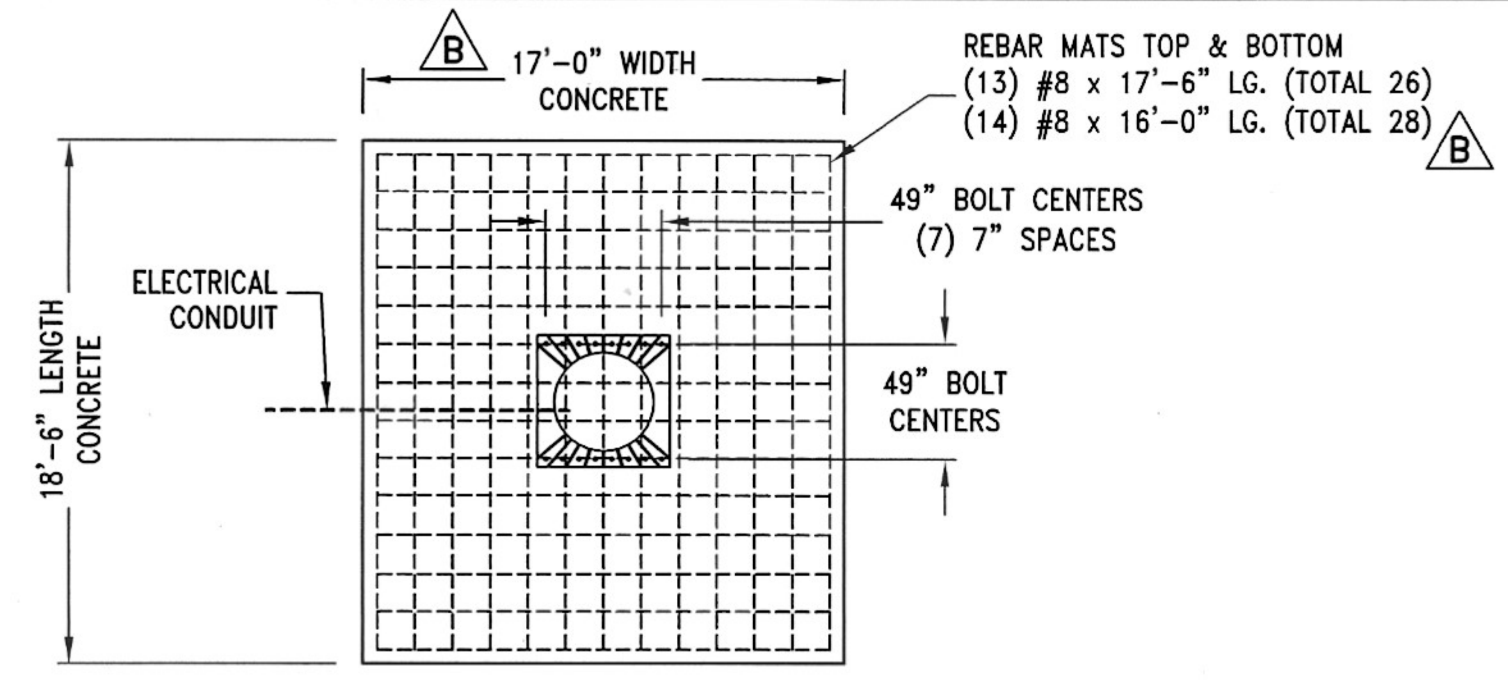
Rebar Size : Number := 10

Rebar Area : (in.^{2}) $\text{Area} := \dfrac{\pi \cdot \left(\dfrac{\text{Number}}{8}\right)^2}{4}$ Area = 1.23

Number Required : $\left(\dfrac{\text{As}}{\text{Area}}\right) \cdot 2 = 15.812$

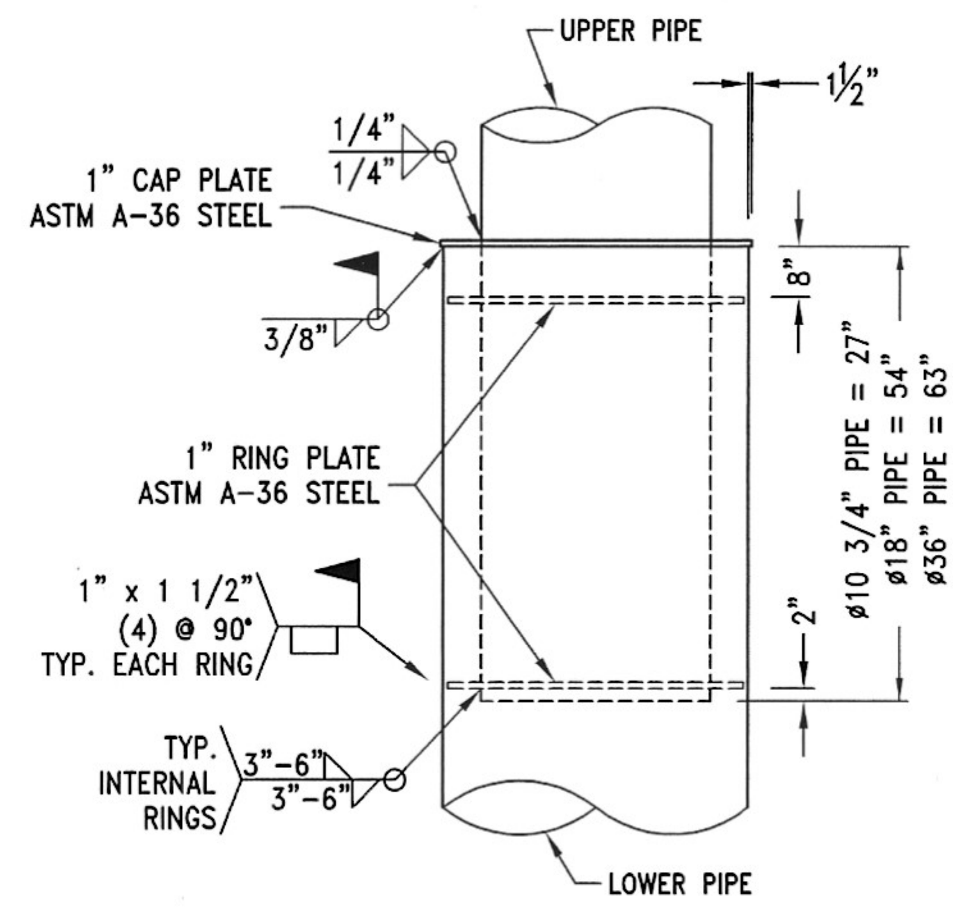
Use sixteen (16) #10 Rebar x 19'-6" LG. equally spaced on a 7'-6" circle with nineteen (19) #3 Rebar ties. The top three (3) ties in the first 5", six (6) on 9" centers and the remaining ten (10) on 17-3/8" centers.

Quantity of Concrete : (yds.^{3}) $\text{CY} := \dfrac{\pi \cdot \text{b1}^2 \cdot \text{d1}}{4 \cdot 27}$ CY = 37.234

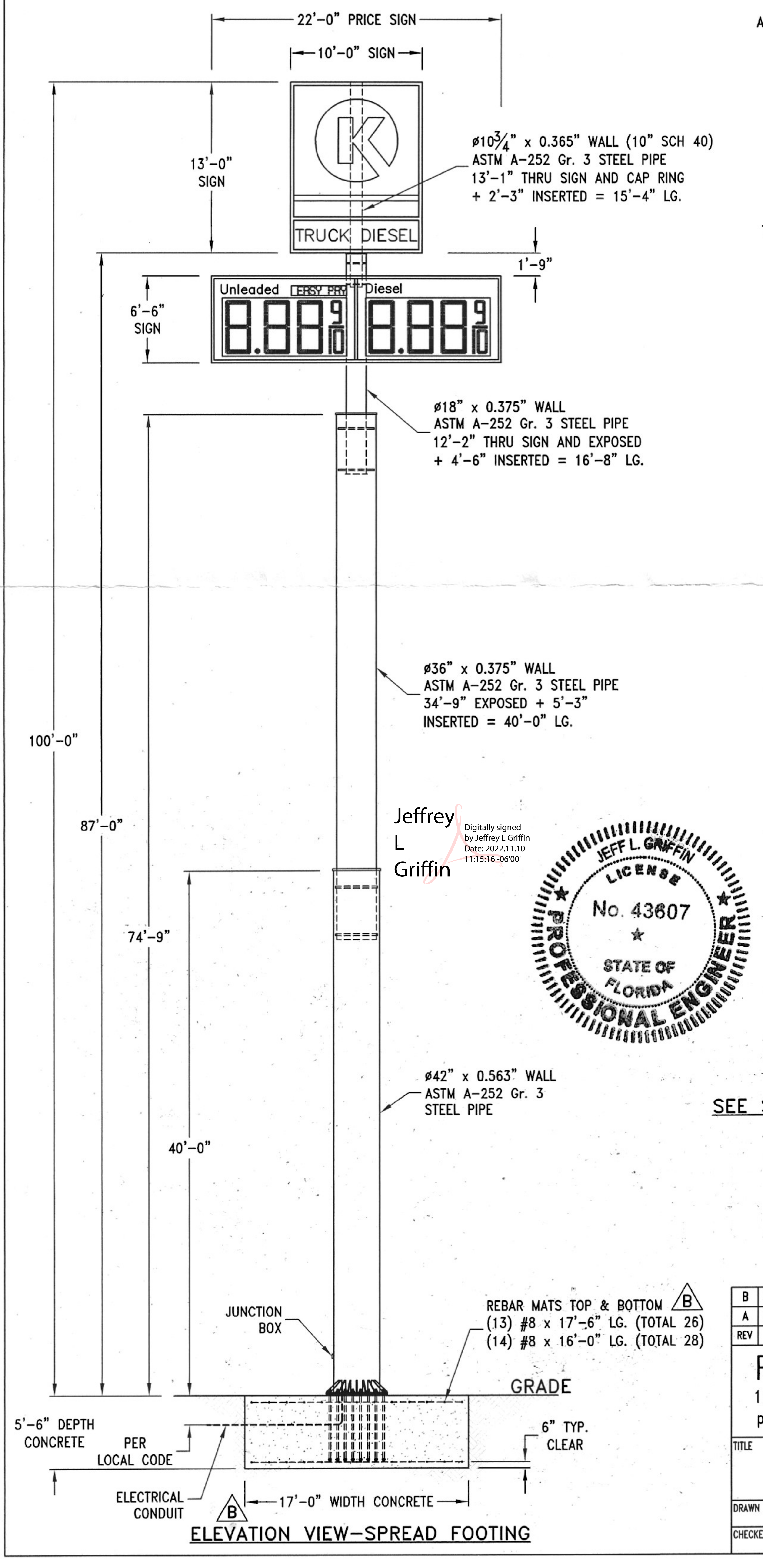


PLAN VIEW–SPREAD FOOTING

QTY. CONCRETE: 64.1 CU. YDS. (B)



JOINT DETAIL



ELEVATION VIEW–SPREAD FOOTING

Jeffrey L Griffin
Digitally signed by Jeffrey L Griffin
Date: 2022.11.10 11:15:16 -06'00'

JEFF L. GRIFFIN
LICENSE
No. 43607
STATE OF FLORIDA
PROFESSIONAL ENGINEER

DESIGN WIND LOAD:

Based on the 2020 Florida Building Code, 7th Edition (ASCE 7-16) using Risk Category II, Exposure C and 120 mph wind speed.

FOUNDATION DESIGN NOTES:

1. Concrete shall have a minimum compressive strength of 3000 PSI at 28 days.
2. Reinforcing steel shall be ASTM A-615 Gr. 60.
3. (B) Footing designs based on soil conditions found in Universal Engineering Sciences geotechnical Project No. 0730.2100190.0000 and Report No. 1905351 dated October 8, 2021.
4. (B) Water is present at 3'-0" below grade.
5. Anchor bolts shall be ASTM F-1554 Gr. 55 steel.

SEE SHEET 2 FOR ALTERNATE CAISSON FOOTING.

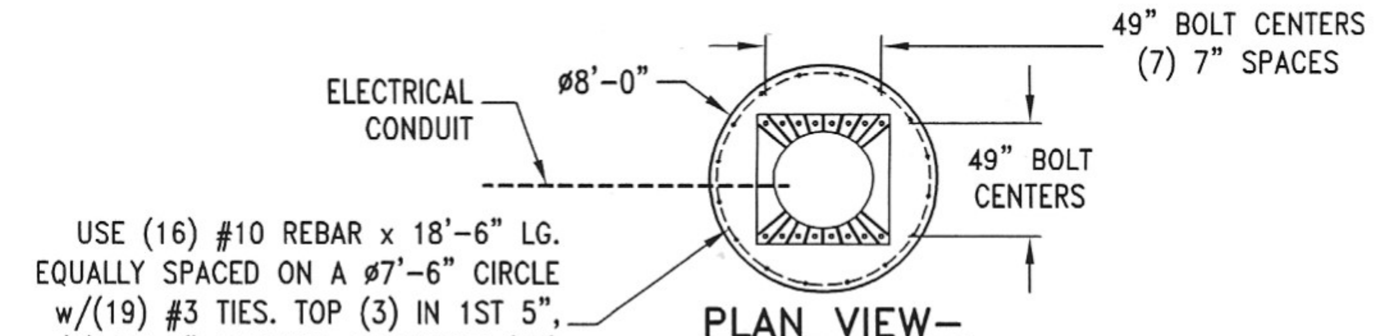
SITE:
Circle K
143 North West Centurion Court
Lake City, Florida 32055

REV	DATE	DESCRIPTION	APPROVED
B	08 Nov 22	REVISED FOOTINGS BASED ON GEOTECHNICAL REPORT	J. HOGAN
A	20 May 22	RELEASED FOR PERMITTING	J. HOGAN

Robert–James & Associates, Inc.
12255 West 187th Street, Mokena Illinois 60448-9737
phone: 708-479-8385 fax: 708-479-8395 email: rja37@comcast.net

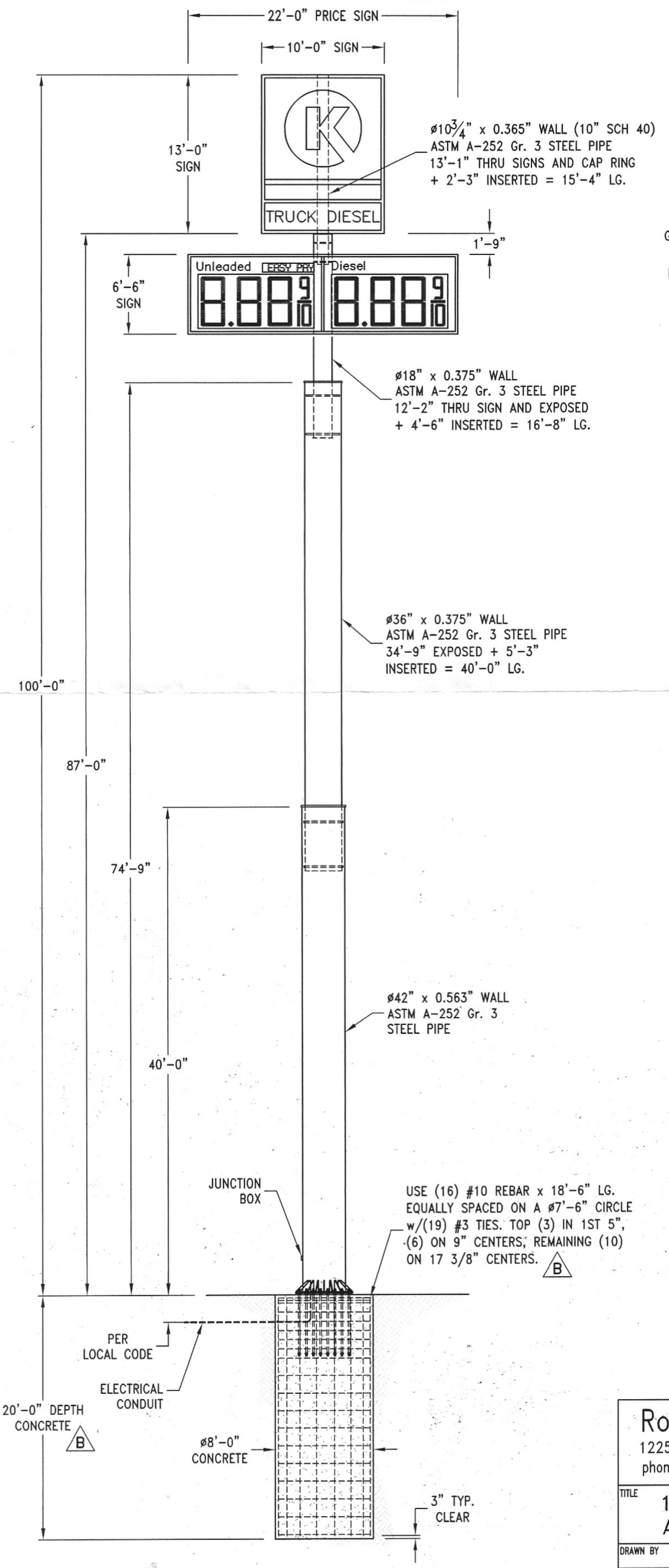
TITLE: 100'-0" OAH SINGLE POLE FOR ID AND TWO PRODUCT PRICE SIGNS

DRAWN BY	DATE	SCALE	DRAWING NUMBER	SHEET	REV.
A. KLOTZKE	20 May 22	NONE	2205129	1 OF 2	B
CHECKED BY J. HOGAN	20 May 22				

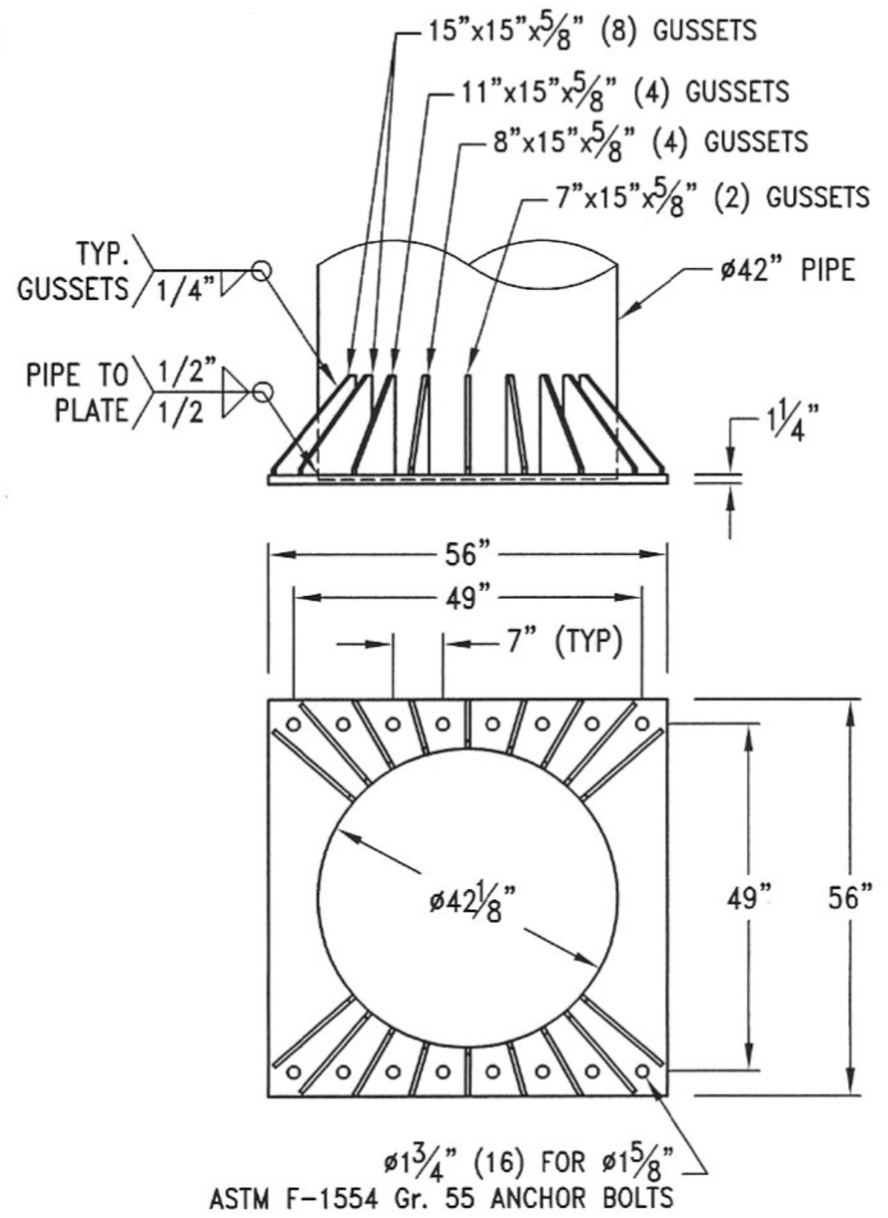


PLAN VIEW– CAISSON FOOTING

QTY. CONCRETE: 37.2 CU. YDS. B

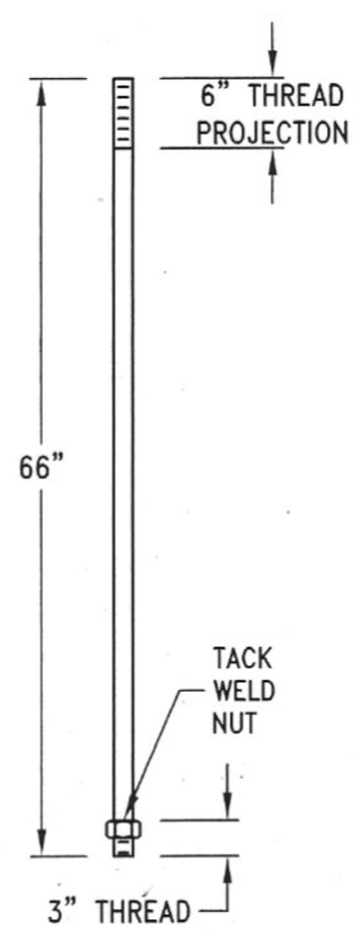


ELEVATION VIEW-CAISSON FOOTING



BASE PLATE DETAIL

1 1/4" ASTM A-36 STEEL



ANCHOR BOLT DETAIL

ø1 5/8" ASTM F-1554 Gr. 55 STEEL

Jeffrey L Griffin

Digitally signed by Jeffrey L Griffin
Date: 2022.11.10 11:15:31 -06'00'

JEFF L. GRIFFIN
LICENSE
No. 43607
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Robert–James & Associates, Inc.
12255 West 187th Street, Mokena Illinois 60448-9737
phone: 708-479-8385 fax: 708-479-8395 email: rja37@comcast.net

TITLE
100'-0" OAH SINGLE POLE FOR ID AND TWO PRODUCT PRICE SIGNS

DRAWN BY	A. KLOTZKE	DATE	20 May 22	SCALE	DRAWING NUMBER	SHEET	REV.
CHECKED BY	J. HOGAN	DATE	20 May 22	NONE	2205129	2 OF 2	B