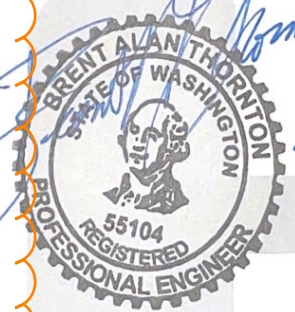
Korum Lincoln
100 River Road
Puyallup, WA 98371

RBA Job No. 22 4639

CALCULATIONS FOR:
LN-P6

Designed in accordance with:
2018 International Building Code
ASCE 7-16
105 mph wind velocity

THE APPROVED CONSTRUCTION PLANS AND ALL ENGINEERING DOCUMENTS MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.



5/11/2022

FABRICATOR
Architectural Graphics, Inc.
2655 International Parkway
Virginia Beach, Virginia 23452

DESIGN ENGINEER
RBA Structural Engineering, LLC
1 Vantage Way, Suite B-400
Nashville, Tennessee 37228

City of Puy
Development & Perm
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CODES: 2018 International Building Code
AISC Steel Construction Manual, 13th Edition
ACI 318, Building Code Requirements for Structural Concrete

SIGN DIMENSIONS:

Sign Length, B		Sign Depth, s		Left Column Offset, e		Distance Between Columns, l
12.563	ft.	**5.95**	ft.	**1.734**	ft.	**6.96**

Overall Height, h		Column Height, c	
5.95	ft.	5.96	ft.

MAIN COLUMN SECTION PROPERTIES:

Section: **HSS6X6X3/16** F_y = 50 ksi E = 29000 ksi Slender Flanges

A =	3.98	$in.^2$	S_x =	7.42	$in.^3$	I_x =	22.30		Compact Webs
d =	6.00	in.	S_y =	0.00	$in.^3$	I_y =	0.00	$in.^4$	
t =	0.17	in.	Z_x =	8.63	$in.^3$	C =	11.80	$in.^3$	
b =	6.00	in.	Z_y =	0.00					

DEAD LOADS:

Sign Weight =	12	psf	Concrete =	150	pcf
Column Weight =	14.51	lb/ft	Soil =	90	pcf

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PRSG20220116

Project	Lincoln	ROSS BRYAN ASSOCIATES, INC.	Sheet No.	3	of 6
Model	LN-P6 SWL	CONSULTING ENGINEERS	Job No.	224639	
By	SEQ	NASHVILLE, TN	Date	5/10/22	

CODES:

Wind Loads per provisions of ASCE 7-16, Chapter 29

SIGN DIMENSIONS:

Length, B = 12.563 ft. Height, s = 5.95 ft. OAH Above Grade, h = 5.95 ft.

Depth = 1.42 ft. A_{sign} = 74.74985 ft^2

WIND LOADS:

Natural Frequency = 1 **RIGID STRUCTURE**

Exposure Category = C Risk Category = I

$q_h = 0.00256 * K_z * K_{zt} * K_d * K_e * V^2$ Velocity Pressure, ASCE 7-16, Section 26.10.2

K_z = 0.85 Velocity Pressure Exposure Coefficient, ASCE 7-16, Table 26.10-1

K_{zt} = 1.0 Topographic Factor, ASCE 7-16, Section 26.8.2

K_d = 0.85 Wind Directionality Factor, ASCE 7-16, Table 26.6-1

K_e = 1.00 Ground Elevation Factor, ASCE 7-16, Table 26.9-1

V = 105 Basic Wind Speed, mph, ASCE 7-16, Figure 26.5-1A

q_h = 20.39 lb/ft^2

$F/A = q_h * G * C_f$ Design Wind Loads, ASCE 7-16, Section 29.3.1

G = 0.85 Gust Effect Factor, ASCE 7-16, Section 26.11

B/s = 2.11 Length of Sign/Depth of Sign

s/h = 1.00 Depth of Sign/Overall Height

C_f = 1.38 Force Coefficient, ASCE 7-16, Figure 29.3-1

F/A = 23.85 lb/ft^2

CASE A: resultant acts normal to the sign face at a distance above the geometric center equal to 0.30'

CASE B: resultant acts normal to the sign face at a distance of 1.76' toward the windward edge and 0.30' above the geometric center

LRFD Loading:

Use wind pressure = 23.85 lb/ft^2 for 1.0*W from ASCE 7-16, Section 2.3.1

ASD Loading:

Use wind pressure = 14.31 lb/ft^2 for 0.6*W from ASCE 7-16, Section 2.4.1

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Project	Lincoln	**ROSS BRYAN ASSOCIATES, INC.**	**Sheet No.**	4	of 6
Model	LN-P6 SWL	**CONSULTING ENGINEERS**	**Job No.**	224639	
By	SEQ	**NASHVILLE, TN**	**Date**	5/10/22	

CHECK COLUMN: HSS6X6X3/16 F_y = 50 ksi Slender Flanges

ASD Load Combinations: D + 0.6W ASCE 7-16, Section 2.4

ASD Safety Factor for Flexure: Ω_b = 1.67 AISC Specification F1

Service Wind Loads: **Moment Arms:**

Sign, P_w = 1.07 kips 3.27 ft.

Load Distribution to One Column (Case B): M = 3.50 k-ft

Max= 100.00%

Column Design is Controlled by Wind Load CASE B: 100% of sign load is transferred to column due to offset.

ASD Moment at base of one column: M_{ASD} = 3.50 k-ft

Yielding: $M_n = M_p = F_y * Z_x$ M_n = 35.96 k-ft AISC Specification F7-1

Flange Local Buckling: Mn = FySe Mn = 31.52 k-ft AISC Specification F7-2

Web Local Buckling: Does Not Apply AISC Specification F7-3

M_n/Ω_b = 18.87 k-ft > M_{ASD} = 3.50 k-ft **O.K.**

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Project	Lincoln	ROSS BRYAN ASSOCIATES, INC.	Sheet No.	5 of	6
Model	LN-P6 SWL	CONSULTING ENGINEERS	Job No.	224639	
By	SEQ	NASHVILLE, TN	Date	5/10/22	

CHECK WELD OF COLUMN TO BASE PLATE:

ASD Safety Factor for Welds: Ω = 2.00 AISC Specification J2

Fillet weld size = 1/4 S_{weld} = 9.96 in^3 **Stiffener fillet weld size =** n/a

Wind Load and Moment: M_{ASD} = 3.50 k-ft $P_{w,ASD}$ = 1.07 kips

Transverse Load In Weld = (M_{ASD}/S_{weld})*(effective throat) = 0.75 kips/in

Longitudinal Load In Weld = $P_{ASD}/(2* L_{weld})$ = 0.07 kips/in

Total Load In Weld = Transverse / $(1+0.5*\sin^{1.5}\Phi)$ + Longitudinal / $(1+0.5*\sin 1.5\Phi)$ = 0.57 kips/in AISC Specification J2-5

Weld Design Strength, R_n/Ω = $(0.6*F_{exx})$*(Effective Throat)/Ω AISC Specification J2

R_n/Ω = 3.71 kips/in > 0.57 kips/in **O.K.**

CHECK BASE PLATE AND ANCHOR BOLTS:

LRFD Load Combinations (Base Plate and Concrete): 1.2D + 1.0W ASCE 7-16, Section 2.3

ASD Load Combinations (Anchor Bolts): D + 0.6W ASCE 7-16, Section 2.4

LRFD Resistance Factors: Φ_b = 0.9 AISC Specification F1

Φ_c = 0.65 ACI 318

Φ_{bo} = 0.75 ACI 318

ASD Safety Factor for Anchors: Ω = 2.00 AISC Specification J3

Base Plate Size: Length, N = 14 in. Width, B = 8 in. F_y = 50 ksi

Anchor Rods: No. of Bolts = 2 Anchor Spacing, B-dir. = 0 in. (width)

Size of Bolts = 3/4 in. Anchor Spacing, N-dir. = 12 in.

ASTM Designation = A36 Edge Distance = 1 in.

Tensile Stress, F_u = 58 ksi Embedment = 16 in.

Wind Load Moment: M_u = 5.84 k-ft **Dead Load at Base:** P_{du} = 0.64 kips

Equivalent Eccentricity $e = M_u/P_{du}$ = 109.08 in. AISC Steel Design Guide 1 (3.3.6)

Critical Eccentricity: $e_{crit} = (N/2)-(P_u/(2*q_{max}))$ AISC Steel Design Guide 1 (3.3.7)

$f_{p(max)} = \Phi_c*0.85*f'_c*(A_2/A_1)^{1/2}$ = 2.76 ksi ACI 318

$q_{max} = f_{p(max)}*B$ = 22.10 kips/in AISC Steel Deisgn Guide 1 (3.3.4)

e_{crit} = 6.99 in. < e = 109.08 in. DESIGN PLATE FOR LARGE MOMENT

Bearing Length: Y = 0.26 in. AISC Steel Design Guide 1 (3.4.4)

Plate Thickness: $t_{p(req)}$ = 0.51 in. < $t_{p(prov)}$ = 3/4 in. **O.K.**

Total Tension in Anchors, T_{ASD} = 3.06 kips AISC Steel Design Guide 1 (3.4.2)

T_{ASD} per anchor = 3.06 kips

$R_n/\Omega = 0.75*F_u*A_b/\Omega$ = 9.61 kips > 3.06 kips **O.K.**

Concrete Breakout: $\Phi_{bo}*N_{cbg}$ = 85.72 kips > T_u = 5.10 kips **O.K.**

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USE 14 in. x 8 in. x 3/4 in. plate with 2 - 3/4 in. diameter A36 bolts.

Project	**Lincoln**	**ROSS BRYAN ASSOCIATES, INC.**	**Sheet No.**	**6**	of **6**
Model	**LN-P6 SWL**	**CONSULTING ENGINEERS**	**Job No.**	**224639**	
By	**SEQ**	**NASHVILLE, TN**	**Date**	**5/10/22**	

CHECK FOUNDATIONS:

LRFD Load Combinations: 1.2D + 1.0W ASCE 7-16, Section 2.3

Resistance Factors: Φ_{plain} = 0.6 ACI 318

Φ_v = 0.75 ACI 318

Φ_b = 0.9 ACI 318

f'_c = 2500 psi

P_a = 150 psf/ft

q_a = 2000 psf

Total Wind Load: P_w = 1.07 kips

Total Service Moment at base: M = 3.50 k-ft

Circular Caisson Foundation:

No. of Caissons= **2** Diameter = **2** ft. Depth = **5** ft.

$M_{(top\ of\ caisson)}$ = 4.04 k-ft

Height to P_w, h = 3.77 ft.

Required Depth, d = 4.70 ft. **O.K.** IBC 2018, Section 1807.3.2.1

Moment in Footing, M_u = 6.73 k-ft

Use **8** No. **5** Vertical Bars

Use No. 3 Ties at 10 inches o.c max.

Moment Capacity, ΦM_n = 90.81 k-ft > M_u = 6.73 k-ft **O.K.**

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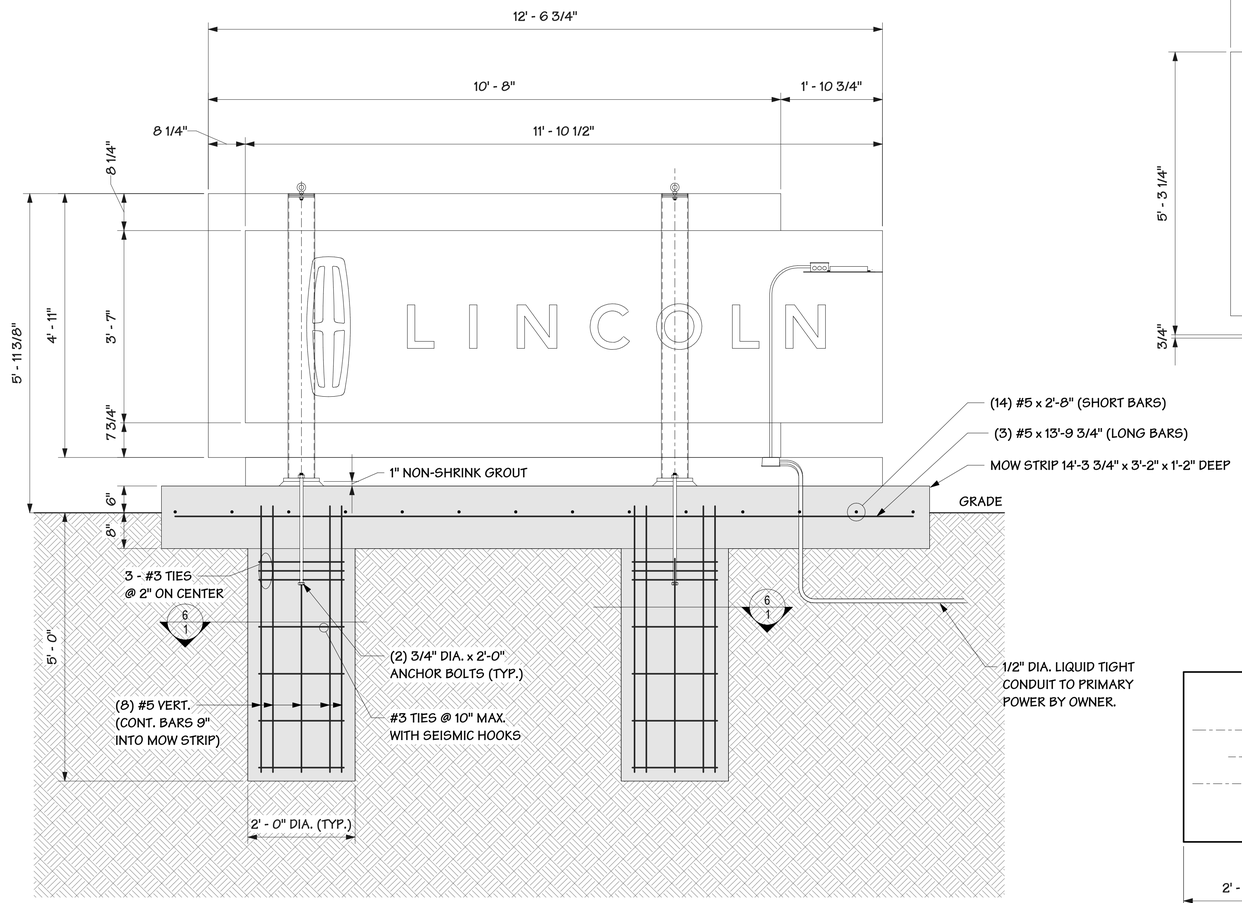
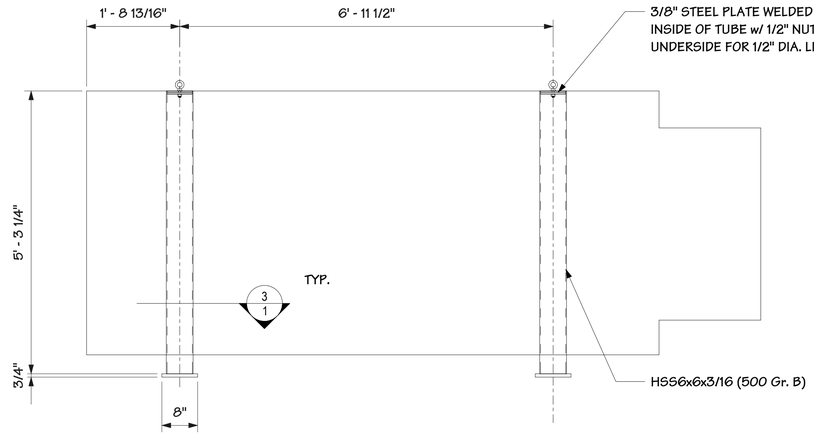
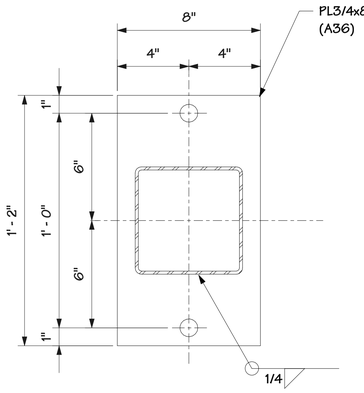


INSTALLATION PROCESS #2 (PROVIDE SIGNBOX UNIT)

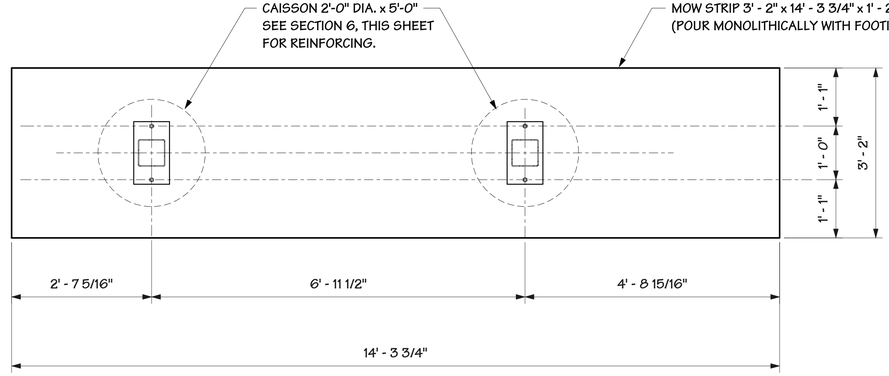
2/1 — 3/4" = 1'-0"





BASE PLATE DETAIL

3/1 — 3" = 1'-0"



FOUNDATION PLAN

4/1 — 3/4" = 1'-0"

THE APPROVED CONSTRUCTION PLANS AND ALL ENGINEERING DOCUMENTS MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.

FULL SIZED LEDGIBLE COLOR PLANS ARE REQUIRED TO BE PROVIDE BY THE PERMITTEE ON SITE FOR ALL INSPECTIONS MIN. PLAN SIZE 24 X 36

INSTALLATION PROCESS #1 (INSTALL FOUNDATION)

1/1 — 3/4" = 1'-0"

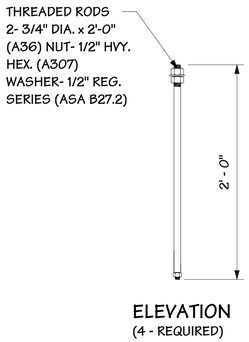
City of Puyallup
Building
REVIEWED
FOR
COMPLIANCE
DLeahy
05/19/2022
7:38:05 AM
CITY OF PUYALLUP STATE OF WASHINGTON

INSTALLATION SEQUENCE

1. OWNER TO PROVIDE UNDERGROUND POWER FEED TO THE SIGN IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS AND LOCAL CODES.
2. INSTALL FOUNDATION TO DETAILS SHOWN ON THIS DRAWING IN INSTALLATION PROCESS # 1, ANCHOR BOLTS SHALL BE SET TO CORRECT ELEVATION AND POSITION.
3. INSTALL SIGN BOX UNIT SHOWN IN INSTALLATION PROCESS # 2 BY LIFTING UNIT AND LOWERING UNIT TO ALIGN HOLES IN COLUMN BASE PLATES WITH ANCHOR BOLTS SHOWN IN INSTALLATION PROCESS # 1. GROUT UNDER BASE PLATE WITH NON-SHRINK GROUT.
4. COAT TOP OF ANCHOR BOLTS AND NUTS WITH ONE COAT OF RUSTPROOF PRIMER PAINT.
5. CONNECT UNDERGROUND POWER FEED TO SIGNBOX ELECTRICAL LEADS.
6. INSTALL (ALUMINUM) BASE COVER PER FABRICATORS DRAWINGS.
7. TAKE COMPLETION PHOTOGRAPHS OF SIGN, DEALERSHIP, AND RESTORED SITE AT FOUNDATION. OBTAIN SIGNATURE AND ANSWER TO QUESTIONNAIRE FROM DEALERSHIP REPRESENTATIVE.

FOUNDATION NOTES:

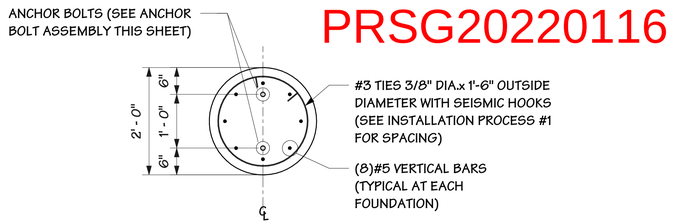
1. ALL CONCRETE SHALL BE A MINIMMUM OF 5-1/2 BAGS OF CEMENT PER CUBIC ARD. (EQUIVALENT TO 2,500 PSI COMPRESSIVE STRENGTH AT 28 DAYS.)
2. REINFORCING STEEL SHALL BE ASTM A615, GRADE 60 (BARS SHALL NOT BE WELDED.)
3.. ANCHOR BOLTS SHALL BE LOCATED USING PLYWOOD TEMPLATE SHIPPED WITH SIGN, REMOVE TEMPLATE BEFORE ERECTING COLUMNS.
4. FOUNDATION DEPTH MUST COMPLY WITH LOCAL CODES.
5. FOUNDATION SHALL HAVE 8" MINIMUM OF SOIL OVERBURDEN, AS DETAILED.
6. CONCRETE MOWSTRIP SHALL BE FORMED TO DIMENSIONS SHOWN ON FOUNDATION DETAILS AND CAST MONOLITHIC.
7. FOUNDATIONS ARE DESIGNED FOR A MINIMUM SOIL BEARING PRESSURE OF 2,000 PSF AND MAXIMUM LATERAL PRESSURE OF 150 PSF/FT OF DEPTH, WITH A FACTOR OF SAFETY AGAINST OVERTURNING OF 1.5. IF SOIL CONDITIONS APPEAR UNSUITABLE, THE BEARING CAPACITY SHALL BE VERIFIED BY EXPLORATION.
8. REINFORCING STEEL PLACED AGAINST SOIL SHALL HAVE A MINIMUM OF 3" CONCRETE COVER.



ELEVATION
(4 - REQUIRED)

ANCHOR BOLT ASSEMBLY

5/1 — 1 1/2" = 1'-0"



SECTION AT CAISSON

6/1 — 3/4" = 1'-0"

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APPROVED PLAN
CITY OF PUYALLUP
PLANNING DIVISION
APPROVED BY: NComstock
DATE: 05/24/2022
CASE NO.: PRSG20220116
CONDITIONS: N/A

BRENT ALAN THERNTON
STATE OF WASHINGTON
55104
REGISTERED
PROFESSIONAL ENGINEER
5/11/2022

"SEALED FOR STRUCTURAL COMPONENTS ONLY"

DATE	ISSUED FOR	APPROVED

FORD MOTOR COMPANY
DEALERSHIP REAL ESTATE OFFICE
DEARBORN MICHIGAN

FORD PROJ. NO.

DEALERSHIP
IDENTIFICATION PROGRAM

DRAWING TITLE:
FOUNDATION DETAILS, COLUMN DETAILS AND INSTALLATION DRAWING

RBA STRUCTURAL ENGINEERING, LLC
CONSULTING STRUCTURAL ENGINEERS
1 Vantage Way, Suite B-400
NASHVILLE, TN. 37228 PHONE (615) 329-1300

DATE:	5/10/22	DRAWN BY:	DLP
CHECKED BY:	SEQ	APPROVED BY:	SEQ
COORD. BY:		JOB NO.	224639

SIGN MODEL
LN-P6

105 MPH WIND VELOCITY PER 2018 IBC (ASCE 7-16)
RISK CATEGORY I

DRAWING NO. 224639-P6
SHEET NO. 1

RBA STRUCTURAL ENGINEERING, LLC
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www.rossbryan.com

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