LANE SUPPLY, INC.

120 Fairview
Arlington, TX 76010
817-261-9116

DESIGN CALCULATIONS FOR :

Chick-fil-A #05248 Order Canopy
SWC Highway 50 & State Route 291
Lee's Summit, MO

Six-Column Canopy :	25'-3" X 53'-9" Canopy
Lane Reference Number :	LSC-78797
Date :	12-Nov-24

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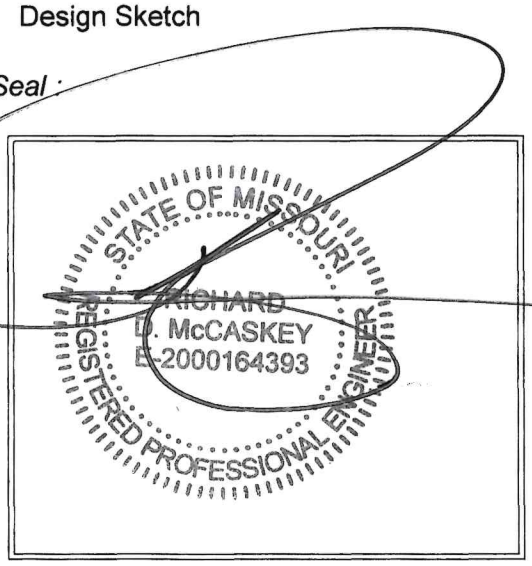
Engineer's Seal :



C.O.A. 2001015838

NOV 12 2024

Calculations By:	**Lane Supply, Inc.**	*LSC -* 78797
Customer:	Chick-fil-A #05248 Order Canopy	*By:* CP
Project:	25'-3" X 53'-9" Canopy	*Check:*

Code: **2018 International Building Code**

Roof Loads:

Dead Load =	3.00	psf	(SL-316 Deck)
Live/Snow Load =	20.00	psf	
TOTAL =	23.00	psf	

Fascia Load:

Height =	10.00	in.
Dead Load =	5.83	plf

Wind Loads:

Risk Category =	II			
V, ULT Speed =	116	m.p.h. Exp	C	
V, ASD Speed =	90	m.p.h. Exp	C	
Height =	20	ft		
Kd =	0.85			
Kh =	0.90			
G =	0.85			
qz =	15.81	psf		

Lateral Load =	1.0	(H)•qz =	16.00	psf
Deck Uplift =	-1.7	(V)•G•qz =	-22.85	psf
Frame Uplift =	-1.1	(V)•G•qz =	-14.78	psf

Seismic:

Base Shear : V = CS • W = 0.085 • W

Site Class =	D	(Default)	
Risk Category =	II		
Ss(0.2) =	0.100		
S1(1.0) =	0.068		
Fa =	1.60		
Fv =	2.40		
SMS = Fa•Ss =	0.160	(11.4-1)	
SM1 = Fv•S1 =	0.163	(11.4-2)	
SDS = 2/3•SMS =	0.107	(11.4-3)	
SD1 = 2/3•SM1 =	0.109	(11.4-4)	
R =	1.25		
CS = (SDS/R) =	0.085	(12.8-2)	

Seismic Design Category Based on SDS :	A
Seismic Design Category Based on SD1 :	B
Design Category :	B

Section 7.1--Symbols & Notation

Ce = 1.2 Exposure Factor as determined from Table 7-2
Ct = 1.2 Thermal factor as determined from Table 7-3
D = Snow Density in pcf as determined from Eq. 7-4
hb = Height of balanced snow load determined by dividing Pf by D, in feet.
hd = Height of snow drift, in feet
hc = Clear height from top of balanced snow to top of parapet, ft
hr = 0.83 = Fascia height, ft
Is = 1.0 = Importance factor (see Table 7-4).
Pf = Snow load on flat roofs, psf.
Pg = 20 =ground snow, psf.
Pd = Maximum intensity of drift surcharge load, psf.
lu = 25.67 = Length of roof upwind of the drift, feet
w = Width of snow drift, in feet

Section 7.3--Flat-Roof Snow Loads, Pf

The snow load, Pf, on a roof with a slope equal to or less than 15° shall be calculated in psf using equation 7.3-1, but not less than tl following mimimum values for low slope roofs: where Pg is 20 psf or less Pf = I(Pg), where Pg exceeds 20 psf, Pf = 20 (I).

Section 7.7 & Section 7.8

The geometrey of the surcharge load due to snow drifting shall be approximated by a triangle as shown in figure 7-8. Drift loads shall be superimposed on the balanced snow load. If hc/hb is less than 0.2, drift loads are not required to be applied. The height of such drifts shall be taken as 0.75 x hd as determined from Fig 7-9, with lu equal to the length of the roof upwind of the projection or parapet wall. If the side of a roof projection is less than 15 ft long, a drift load is not required to be applied to that side. If the height, hd, is equal to or less than hc, the drift width shall equal 4hd and the drft height shall equal hd. If this height exceeds hc, the drift width, w, shall equal 4 hd^2/hc and the drift height shall equal hc. However, the drift width w shall not exceed 8hc. The maximum intensity of the drift surcharge load, pd, equals hd x D where the snow density, D, is defined by Eq 7.7-

Section 7.10--Rain-On-Snow Surcharge Load

For locations where Pg is 20 psf or less but not zero, all roofs with a slope less than W/50, shall have a 5 psf rain-on-snow surcharge load appled to establish the design snow loads. This rain-on-snow augmented design load applies only to the balanced load case and need not be used in combination with drift, sliding, unbalanced, or partial loads.

Pf = 0.7 x Ce x Ct x Is x Pg *Eq 7.3-1*
Pf = 20.0 psf
hd = 0.75 x (0.43(lu)^1/3 x (Pg+10)^1/4-1.5) *Ref. Fig. 7-9*
hd = 1.10 ft
D = 0.13Pg + 14 < 30 psf *Eq 7.7-1*
D = 16.60 psf
hb = 1.20 ft
hc =hr-hb = -0.37 ft
hc/hb = -0.31
Drift Loads Not Considered
w = -13.06 ft

Pd = D x hd<D x hc
Pd = -6.17 psf

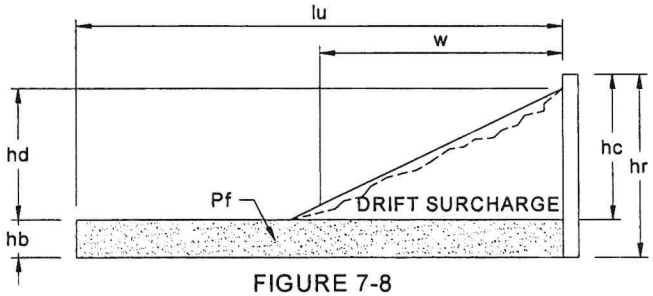
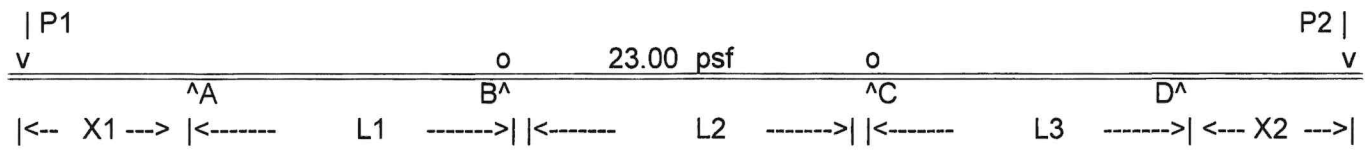


FIGURE 7-8
Configuration of Snow Drifts on Lower Roofs

DECK DESIGN:



Wd=	3.00	psf	X1=	0.75	ft
Wl=	20.00	psf	L1=	6.92	ft
Deck : Ww=	-22.85	psf	L2=	6.92	ft
Frame : Ww=	-14.78	psf	L3=	7.17	ft
P1=	5.83	plf	X2=	3.50	ft
P2=	5.83	plf			

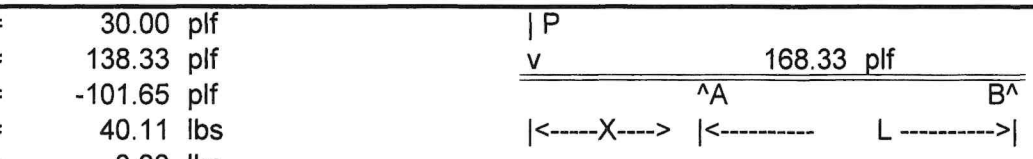
			RAd=	19.21	plf
			RAl=	84.98	plf
			Frame : RAw=	-62.82	plf
			Deck : RAw=	-97.08	plf
MAd=	5.22	ft-lbs/ft	RA(d+l)=	104.19	plf
MAl=	5.63	ft-lbs/ft	Frame : RA(d+w)=	-43.60	plf
Deck : MAw=	-6.43	ft-lbs/ft	Deck : RA(d+w)=	-77.87	plf
MA(d+l)=	10.84	ft-lbs/ft			
Deck : MA(d+w)=	-1.21	ft-lbs/ft			
			RBd=	20.00	plf
			RBl=	138.33	plf
			Frame : RBw=	-101.65	plf
			Deck : RBw=	-157.10	plf
MAB(d+l)=	134.94	ft-lbs/ft	RB(d+l)=	158.33	plf
Deck : MAB(d+w)=	-118.09	ft-lbs/ft	Frame : RB(d+w)=	-81.66	plf
			Deck : RB(d+w)=	-137.10	plf
MBC(d+l)=	137.54	ft-lbs/ft	RCd=	15.71	plf
Deck : MBC(d+w)=	-118.69	ft-lbs/ft	RCl=	140.83	plf
			Frame : RCw=	-91.47	plf
			Deck : RCw=	-141.36	plf
MCD(d+l)=	128.90	ft-lbs/ft	RC(d+l)=	156.55	plf
Deck : MCD(d+w)=	-81.87	ft-lbs/ft	Frame : RC(d+w)=	-75.75	plf
			Deck : RC(d+w)=	-125.64	plf
			RDd=	32.50	plf
MDd=	38.79	ft-lbs/ft	RDl=	158.76	plf
MDl=	122.50	ft-lbs/ft	Frame : RDw=	-117.35	plf
Deck : MDw=	-139.94	ft-lbs/ft	Deck : RDw=	-181.36	plf
MD(d+l)=	161.29	ft-lbs/ft	RD(d+l)=	191.26	plf
Deck : MD(d+w)=	-101.15	ft-lbs/ft	Frame : RD(d+w)=	-84.86	plf
			Deck : RD(d+w)=	-148.87	plf

USE 20 GAUGE GRADE C DECK

+S=.3961 in^3 -S=.3036 in^3 FY=40 ksi

BEAM DESIGN: P-a

Wd=	30.00	plf					
Wl=	138.33	plf					
Ww=	-101.65	plf					
Pd=	40.11	lbs					
Pl=	0.00	lbs					
Pw=	0.00	lbs					
L=	5.92	ft					
X=	1.94	ft					
MA(d) =	134	ft-lbs					
MA(l) =	260	ft-lbs					
MA(w) =	-191	ft-lbs					
MA(d+l) =	394	ft-lbs	lu=	1.33	ft		
MA(d+w) =	-57	ft-lbs	lu=	1.94	ft		
MAB(d+l)=	671	ft-lbs	lu=	5.92	ft		
MAB(d+w)=	-286	ft-lbs	lu=	1.33	ft		



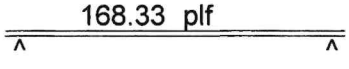
Deflections: (inches)	Overhang	Midspan
DL=	0.000	0.000
DL+LL=	-0.002	0.004
(+downward, -upward)		

RAd=	210	lbs	
RAl=	721	lbs	
RAw=	-530	lbs	
RA(d+l)=	931	lbs	
RA(d+w)=	-320	lbs	
RBd=	66	lbs	
RBl(Max)=	409	lbs	
RBw=	-268	lbs	
RB(d+l)=	475	lbs	
RB(d+w)=	-202	lbs	

USE: W8X10 Fy = 50 ksi

BEAM DESIGN: P-b

Wd=	30.00	plf					
Wl=	138.33	plf					
Ww=	-101.65	plf					
L=	19.00	ft					
Md=	1353.5	ft-lbs					
Ml=	6242.3	ft-lbs					
Mw=	-4587.1	ft-lbs					
M(d+l)=	7595.8	ft-lbs					
M(d+w)=	-3233.5	ft-lbs					



Rd=	285	lbs	
Rl=	1314	lbs	
Rw=	-966	lbs	
R(d+l)=	1599	lbs	
R(d+w)=	-681	lbs	
Lu=	9.50	ft	**OK**
Lu=	1.33	ft	**OK**

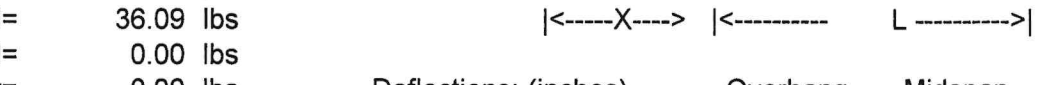
USE: W8X10 Fy = 50 ksi

Deflections: (inches)	Midspan
DL=	0.098
DL+LL=	0.553
(+downward, -upward)	

BEAM DESIGN: P-c

Wd=	25.71	plf					
Wl=	140.83	plf					
Ww=	-91.47	plf					
Pd=	36.09	lbs					
Pl=	0.00	lbs					
Pw=	0.00	lbs					
L=	5.92	ft					
X=	1.94	ft					
MA(d) =	118	ft-lbs					
MA(l) =	264	ft-lbs					
MA(w) =	-172	ft-lbs					
MA(d+l) =	383	ft-lbs	lu=	1.33	ft		
MA(d+w) =	-53	ft-lbs	lu=	1.94	ft		
MAB(d+l)=	671	ft-lbs	lu=	5.92	ft		
MAB(d+w)=	-262	ft-lbs	lu=	1.33	ft		

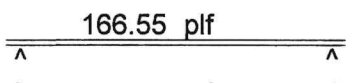
Deflections: (inches)	Overhang	Midspan	
DL=	0.000	0.000	
DL+LL=	-0.002	0.004	
(+downward, -upward)			
RAd=	182	lbs	
RAl=	734	lbs	
RAw=	-477	lbs	
RA(d+l)=	916	lbs	
RA(d+w)=	-295	lbs	
RBd=	56	lbs	
RBl(Max)=	417	lbs	
RBw=	-242	lbs	
RB(d+l)=	473	lbs	
RB(d+w)=	-185	lbs	



USE: W8X10 Fy = 50 ksi

BEAM DESIGN: P-d

Wd=	25.71	plf					
Wl=	140.83	plf					
Ww=	-91.47	plf					
L=	19.00	ft					
Md=	1160.3	ft-lbs					
Ml=	6355.1	ft-lbs					
Mw=	-4127.4	ft-lbs					
M(d+l)=	7515.4	ft-lbs					
M(d+w)=	-2967.2	ft-lbs					



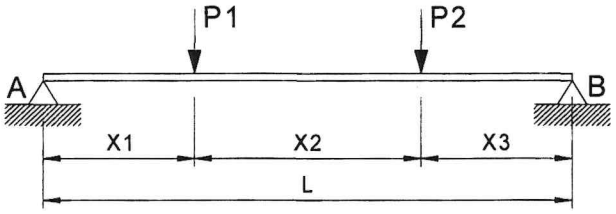
Rd=	244	lbs	
Rl=	1338	lbs	
Rw=	-869	lbs	
R(d+l)=	1582	lbs	
R(d+w)=	-625	lbs	
Lu=	9.50	ft	**OK**
Lu=	1.33	ft	**OK**

USE: W8X10 Fy = 50 ksi

Deflections: (inches)	Midspan
DL=	0.084
DL+LL=	0.547
(+downward, -upward)	

BEAM DESIGN: P-e

P1d =	209.61	lbs
P1l =	721.14	lbs
P1w =	-529.92	lbs
P2d =	181.95	lbs
P2l =	734.17	lbs
P2w =	-476.82	lbs
Wd =	16.00	plf
Wl =	0.00	plf
Ww =	0.00	plf



X1 =	6.92	ft
X2 =	6.92	ft
X3 =	7.17	ft
L =	21.00	ft

RAd =	371	lbs
RAl =	734	lbs
RAw =	-518	lbs
RA(d+l) =	1105	lbs
RA(d+w) =	-147	lbs

RBd =	357	lbs
RBl =	721	lbs
RBw =	-489	lbs
RB(d+l) =	1078	lbs
RB(d+w) =	-132	lbs

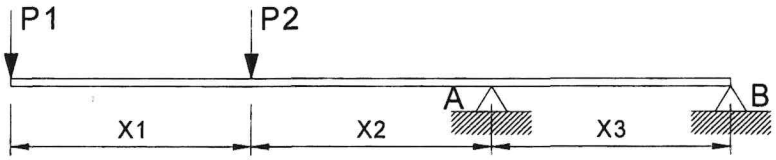
MAB(dl) =	2260	ft-lbs		
MAB(ll) =	5168	ft-lbs		
MAB(wl) =	-3584	ft-lbs		
MAB(dl+ll) =	7384	ft-lbs	lu =	7.17 ft
MAB(dl+wl) =	-1403	ft-lbs	lu =	7.17 ft

Deflection

dl =	0.195	in
dl+ll =	0.640	in

USE: W6X16 Fy = 50 ksi

P1d=	24.79	lbs
P1l=	0.00	lbs
P1w=	0.00	lbs
P2d=	370.67	lbs
P2l=	734.17	lbs
P2w=	-518.11	lbs
Wd =	39.21	plf
Wl =	84.98	plf
Ww =	-62.82	plf
X1=	1.94	ft
X2=	5.92	ft
X3=	19.00	ft



RAd=	1265 lbs
RAl=	2576 lbs
RAw=	-1872 lbs
RAd+l=	3841 lbs
RAd+w=	-606 lbs
RBd=	183 lbs
RBl=	441 lbs
RBw=	-333 lbs
RBd+l=	624 lbs
RBd+w=	-150 lbs

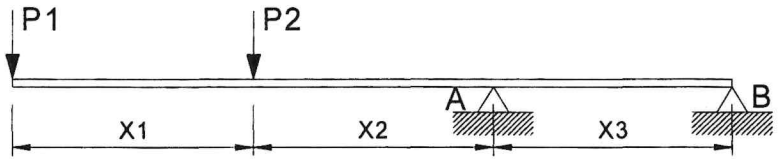
MA(d)=	3597	ft-lbs		
MA(l)=	6965	ft-lbs		
MA(w)=	-5003	ft-lbs		
MA(d+l)=	10562	ft-lbs	lu =	1.33 ft
MA(d+w)=	-1406	ft-lbs	lu =	5.92 ft
MAB(d+l)=	1539	ft-lbs	lu =	9.50 ft
MAB(d+w)=	-473	ft-lbs	lu =	1.33 ft

Deflections

	OH	SPAN
dl (in)=	0.219	-0.023
dl+ll (in) =	0.611	-0.045

USE: W6X20 Fy = 50 ksi

P1d=	46.30	lbs
P1l=	0.00	lbs
P1w=	0.00	lbs
P2d=	356.89	lbs
P2l=	721.14	lbs
P2w=	-488.63	lbs
Wd =	45.50	plf
Wl =	158.76	plf
Ww =	-117.35	plf
X1=	1.94	ft
X2=	5.92	ft
X3=	19.00	ft



RAd=	1397	lbs
RAl=	3959	lbs
RAw=	-2868	lbs
RAd+l=	5355	lbs
RAd+w=	-1471	lbs
RBd=	228	lbs
RBl=	1026	lbs
RBw=	-772	lbs
RBd+l=	1254	lbs
RBd+w=	-544	lbs

MA(d)=	3879	ft-lbs		
MA(l)=	9164	ft-lbs		
MA(w)=	-6511	ft-lbs		
MA(d+l)=	13042	ft-lbs	lu =	1.33 ft
MA(d+w)=	-2632	ft-lbs	lu =	5.92 ft
MAB(d+l)=	3830	ft-lbs	lu =	9.50 ft
MAB(d+w)=	-2060	ft-lbs	lu =	1.33 ft

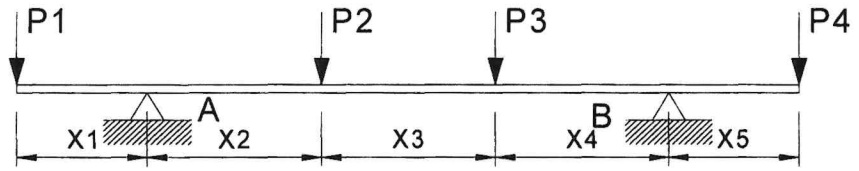
Deflections

	OH	SPAN
dl (in)=	0.236	-0.017
dl+ll (in) =	0.615	0.070

USE: W8X13 Fy = 50 ksi

HEADER BEAM DESIGN: H-a

P1d =	1265	lbs
P1l =	2576	lbs
P1w =	-1872	lbs
P2d =	351	lbs
P2l =	1723	lbs
P2w =	-1234	lbs
P3d =	300	lbs
P3l =	1755	lbs
P3w =	-1111	lbs
P4d =	1397	lbs
P4l =	3959	lbs
P4w =	-2868	lbs



X1 =	1.04	ft
X2 =	5.88	ft
X3 =	6.92	ft
X4 =	0.87	ft
X5 =	6.29	ft
L =	21.00	ft

Wd =	24.00	plf
Wl =	0.00	plf
Ww =	0.00	plf

RAd=	1093	lbs	RBd=	2724	lbs
RAl=	2044	lbs	RBl=	7968	lbs
RAw=	-1469	lbs	RBw=	-5615	lbs
RAd+l=	3138	lbs	RBd+l=	10692	lbs
RAd+w=	-375	lbs	RBd+w=	-2891	lbs

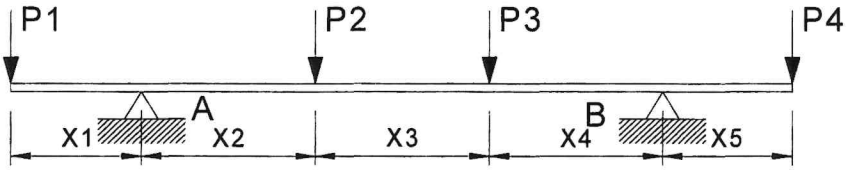
MA(DL):	-1331.0	ft-lbs				
MA(LL):	-2682.8	ft-lbs				
MA(WL):	1949.5	ft-lbs			Deflection	
MA(DL+LL):	-4013.9	ft-lbs	lu =	1.04 ft	DL =	0.02 in
MA(DL+WL):	618.5	ft-lbs	lu =	1.04 ft	DL+LL =	0.05 in

	SPAN				Deflection	
M(DL+LL):	-4013.9	ft-lbs	lu =	6.92 ft	DL =	-0.06 in
M(DL+WL):	618.5	ft-lbs	lu =	6.92 ft	DL+LL =	-0.07 in

MB(DL):	-9263.7	ft-lbs				
MB(LL):	-24906.0	ft-lbs				
MB(WL):	18043.5	ft-lbs			Deflection	
MB(DL+LL):	-34169.8	ft-lbs	lu =	6.29 ft	DL =	0.10 in
MB(DL+WL):	8779.8	ft-lbs	lu =	6.29 ft	DL+LL =	0.36 in

USE: W8X24 Fy = 50 ksi

P1d =	366	lbs
P1l =	881	lbs
P1w =	-667	lbs
P2d =	570	lbs
P2l =	2628	lbs
P2w =	-1931	lbs
P3d =	489	lbs
P3l =	2676	lbs
P3w =	-1738	lbs
P4d =	456	lbs
P4l =	2052	lbs
P4w =	-1544	lbs



X1 =	1.04	ft
X2 =	5.88	ft
X3 =	6.92	ft
X4 =	0.87	ft
X5 =	6.29	ft
L =	21.00	ft

Wd =	20.00	plf
Wl =	0.00	plf
Ww =	0.00	plf

RAd=	670	lbs	RBd=	1631	lbs
RAl=	1674	lbs	RBl=	6564	lbs
RAw=	-1219	lbs	RBw=	-4661	lbs
RAd+l=	2344	lbs	RBd+l=	8195	lbs
RAd+w=	-549	lbs	RBd+w=	-3030	lbs

MA(DL):	-392.5	ft-lbs				
MA(LL):	-918.2	ft-lbs				
MA(WL):	694.7	ft-lbs				Deflection
MA(DL+LL):	-1310.7	ft-lbs	lu =	1.04	ft	DL = -0.00 in
MA(DL+WL):	302.2	ft-lbs	lu =	1.04	ft	DL+LL = -0.01 in

		SPAN				Deflection
M(DL+LL):	4659.7	ft-lbs	lu =	6.92	ft	DL = -0.01 in
M(DL+WL):	-1627.1	ft-lbs	lu =	6.92	ft	DL+LL = 0.01 in

MB(DL):	-3265.8	ft-lbs				
MB(LL):	-12909.6	ft-lbs				
MB(WL):	9716.6	ft-lbs				Deflection
MB(DL+LL):	-16175.4	ft-lbs	lu =	6.29	ft	DL = 0.06 in
MB(DL+WL):	6450.7	ft-lbs	lu =	6.29	ft	DL+LL = 0.29 in

USE: W6X20 Fy = 50 ksi

P DL =	2.72	kips	Clr. Ht.=	9.50	ft
P LL =	7.97	kips	Fascia Ht.=	1.00	ft
P WL =	-5.62	kips	Col. Trib=	19.27	ft
Base Shear =	0.20	kips	Wind Load=	16.00	psf
Total Base Shear =	0.85	kips	# of COL.=	2	
M WL =	w(Fascia Ht•2.5•Col Trib./# of col•L)+ w(Wrap•1/2 Clr. Ht^2)		Max All. Defl =	1.20	in
M Seis =	Base Shear x L		Max Defl Ratio =	L/ 100	
M Unbal =	Live Load x Col. Trib.x (Canopy Width/2)^2/2		Max Defl. =	0.13	in, OK
L =	Clr. Ht. + Fascia Ht/2				
Pr =	10.69	kips 1.6Pr<0.5Py First-Order Analysis Allowed (A-7-1)			
Py =	326.60	kips			
N =	0.00	•Yi (A-7-2)			
B2 =	1.05	OK, A-8-6			
M WL =	4.58	kip-ft			
M Seis =	2.01	kip-ft			
M DL(Nod) =	0.11	kip-ft			
M LL(Nod) =	0.33	kip-ft			
M Unbal DL=	0.00	kip-ft			
M Unbal LL=	0.00	kip-ft			
M Unbal WL=	0.00	kip-ft			

Use: TS8X8X1/4		
Fy =	46.00	ksi
K =	1.00	
L, Col =	10.00	ft
A =	7.10	in^2
I =	70.70	in^4
Cm =	1.00	
Pe1 =	447.31	kips
B1 =	1.04	(A-8-3)
P,All =	177.38	kips
M, All =	44.10	kip-ft

Load Combination	Pr, Kips	Mr, Kip-ft	Equation	Result
D+L	10.69	0.47	0.04	OK
D+W	2.72	4.88	0.12	OK
D+0.7E	2.72	1.58	0.04	OK
D+0.75W+0.75L	8.70	3.95	0.11	OK
D+0.525E+0.75L	8.70	1.48	0.06	OK

Top Connection : Standard Cap Plate	Base Plate : LBP 8 - 20

Foundation: (Restrained at Grade)

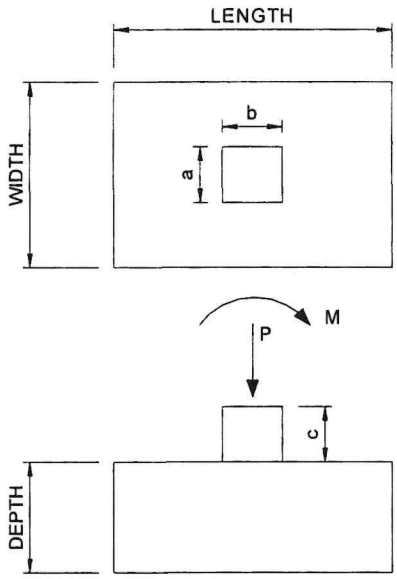
d^2=(4.25*M)/(S3*b)

M(MAX)=	4878	ft-lbs	Pmax=	10.69	kips
S3=	100	PCF X d	Footing Area=	7.07	ft^2
b=	3.000	ft	Bearing=	1512.62	psf
d=	4.104	ft			
Footing=	Round				
USE:	3.00	FT.RND. X	5.00	ft deep footing	

As=12*M/(jd*24000)= 0.0653 in^2

USE: 8 #8's (RND. Cage) w/ #4 Ties @ 12" O.C. w/135 hooks

P dl =	2724	lbs
P ll =	7968	lbs
P w =	-5615	lbs
M =	4878	ft-lbs
Soil Density =	110	pcf
Width =	4.50	ft
Length =	4.50	ft
Depth =	3.00	ft
a =	0.00	ft
b =	0.00	ft
c =	0.00	ft
Footing Weight =	9112.5	lbs
Soil Weight =	0	lbs



Overturning :

OTM =	4878	ft-lbs
RM =	11546	ft-lbs
FS =	2.37	> 1.5 Therefore OK

Soil Pressure :

q(dl+ll) =	528.00	psf Net	
q(ALLOW) =	1500	psf	OK

For dl+(wl, seismic) :

P =	11837	lbs	
e=M/P=	0.41	ft	
L/6 =	0.75	ft	
Resultant within middle 3rd			
q(dl+wl, seismic)=	455.69	psf Net	
q(ALLOW)=	1500.00	psf	OK

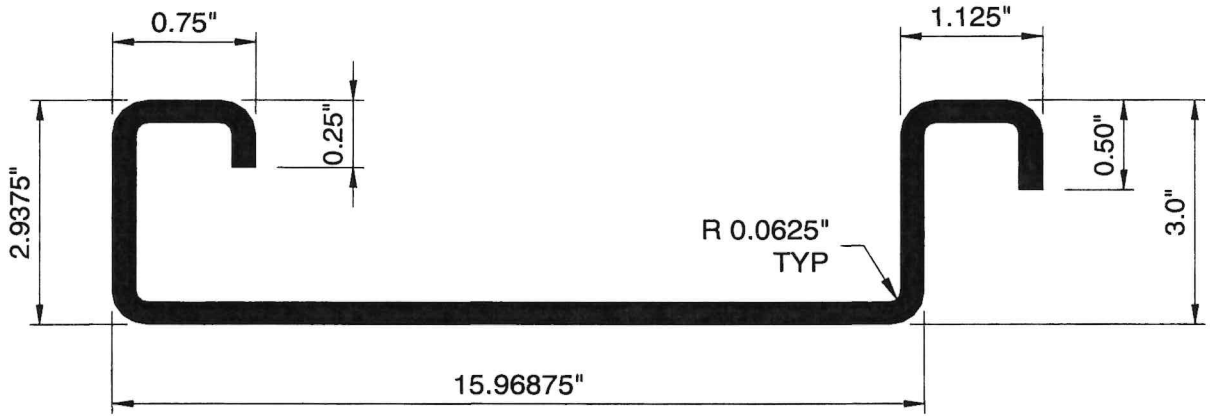
REINFORCING:

M(dl+ll) =	1336.51	ft-lbs/ft
M(dl+wl, seismic) =	517.68	ft-lbs/ft
dl+ll Controls		
Assume: f'c 3000 psi, Fy=40000 psi		
d =	32.63	in
As(REQ'D)=	0.03	in^2
As(PROV.)=	0.44	in^2

USE #6's AT 12"O.C. T&B, EACH WAY

LANE SUPPLY, INC.

120 Fairview
Arlington, Texas 76010
817-261-9116



SL-316 DECK PANEL

Section Properties

Gage	Wt, psf	Thickness, in	ASTM 653	+I, in^4	-I, in^4	+S, in^3	-S, in^3	+M, ft-lbs/ft	-M, ft-lbs/ft
20	2.20	0.0359	Grade 40	0.9346	0.4680	0.3961	0.3036	592.70	454.44
			Grade 50	0.9208	0.4522	0.3879	0.2880	725.86	538.92
18	2.93	0.0478	Grade 40	1.2486	0.6827	0.5329	0.4377	797.77	655.28
			Grade 50	1.2129	0.6518	0.5141	0.4296	962.09	803.92

Notes:

1 Designed per AISI Cold Formed Steel Manual, 2016 ed.
2 Complete calculations are available upon request.
3 ± M is allowable bending moment.

Issued 12-5-17

LANE SUPPLY, INC.

120 Fairview
Arlington, Texas 76010
817-261-9116
FAX 817-275-1660

STANDARD BASE PLATE DESIGN

LBP # (D - M)	M (ft-k)	P_{BOLT} (k)	Bolt Dia. (in)	$t_{REQ'D}$ (in)	t_{ACTUAL} (in)	Weld Req'd (1/16 in)	Weld Actual (in)	Base Plate Mark
8 - 10	10	5.58	1 1/2	0.72	3/4	1.52	1/4	LBP 1
8 - 20	20	10.91	1 1/2	0.99	1	3.03	5/16	LBP 2
8 - 30	30	16.00	1 1/2	1.17	1 1/4	4.55	5/16	LBP 3
8 - 40	40	20.87	1 1/2	1.32	1 1/2	6.06	F.P.	LBP 4
8 - 50	50	26.09	1 1/2	1.46	1 1/2	7.58	F.P.	LBP 5

TS 8 X 8 COLUMN:

D= 8 in.
e= 2 in.
b,d= 8 in.

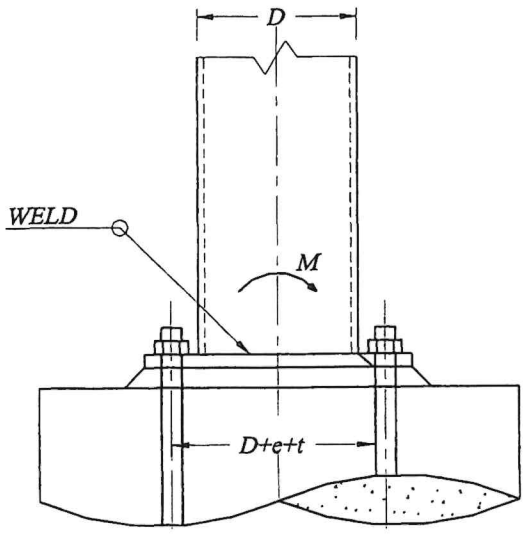
CONSTANTS:

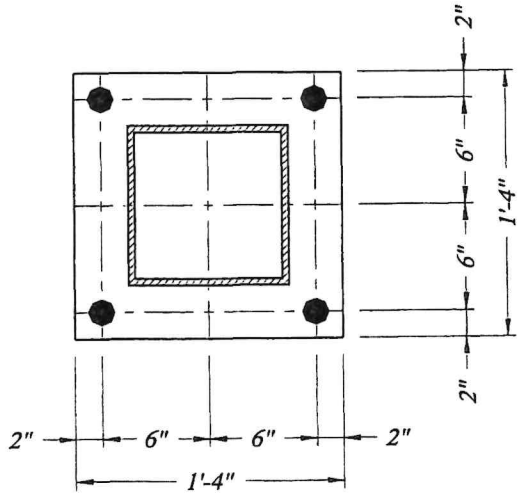
A36 Steel Plate	Fy = 36 ksi
E70xx Electrode	Fw = 0.928 k/in/16th
A307 Anchor Bolts	Ft = 20 ksi

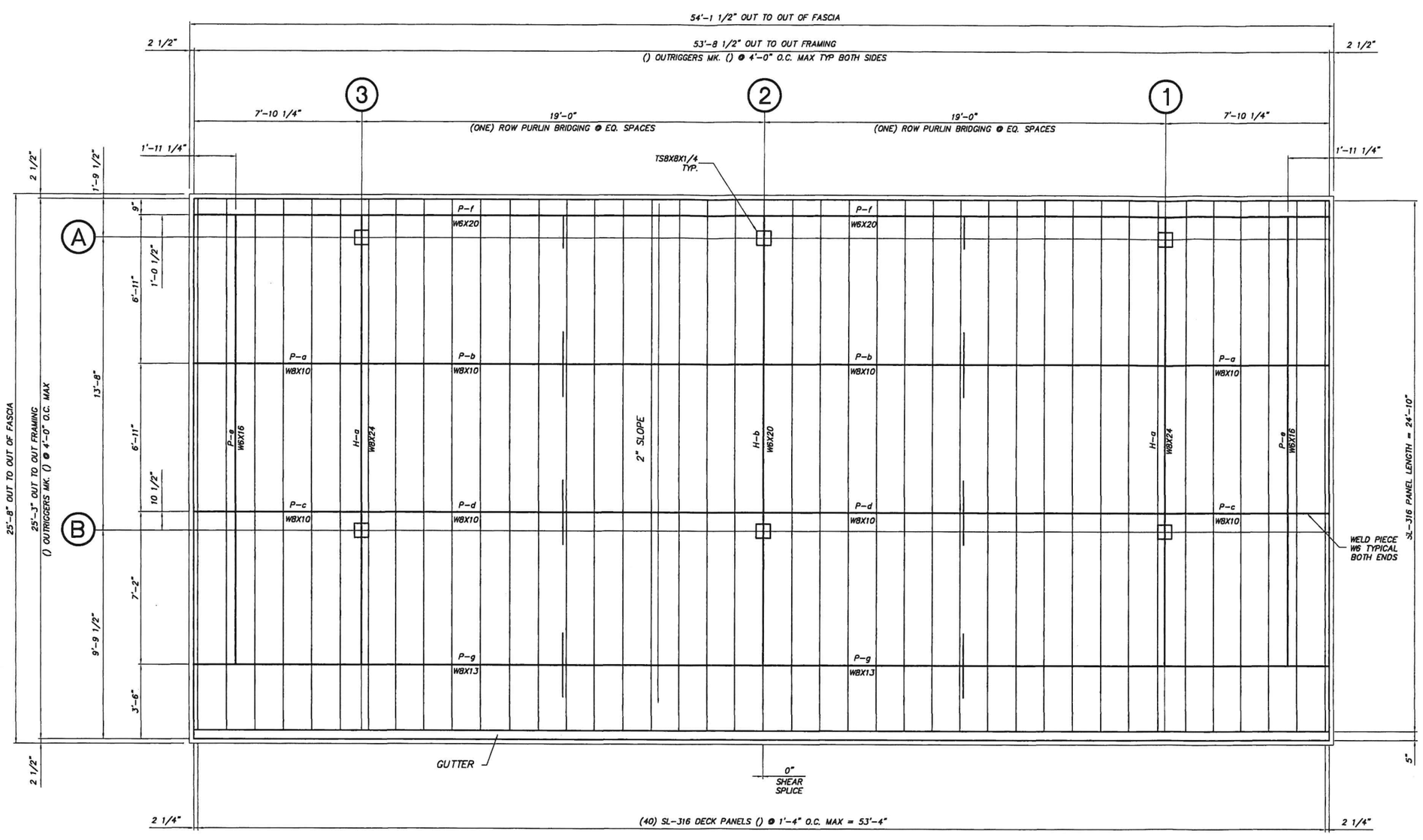
EQUATIONS:

$$P_{BOLT} = \frac{M \times 12\ in/ft}{2\ bolts\ (D+e+t)} \qquad Weld = \frac{M \times 12\ in/ft}{S_{Weld} \times Fw} = \frac{M \times 12\ in/ft}{Fw\ (bd+d^2/3)}$$

$$t_{REQ'D} = \sqrt{\frac{6 \times P \times e \times 2\ bolts}{0.75 \times Fy \times (D+2t)}}$$







DESIGN LOADS:

DEAD LOAD = 3 p.s.f.(DECK + LIGHTS) + WEIGHT OF STRUCTURAL COMPONENTS
LIVE LOAD = 20 p.s.f.
SNOW LOAD = 20 p.s.f.
WIND LOAD V,ULT = 116 m.p.h. EXP. C
WIND LOAD V.ASD = 90 m.p.h. EXP C
BLDG CODE = 2018 INTERNATIONAL BUILDING CODE
EQUIVALENT LATERAL FORCE PROCEDURE
LATERAL FORCE RESISTING SYSTEM = CANTILEVERED COLUMN SYSTEM-ORDINARY STEEL MOMENT FRAME
Pf = 20 p.s.f.
Ce = 1.2
Ct = 1.2
Is = 1.0
W = DRIFT LOADS NOT CONSIDERED
Pd = DRIFT LOADS NOT CONSIDERED
SITE CLASS = D (DEFAULT)
Ss (0.2) = 0.100
S1 (1.0) = 0.068
SDS = 0.107
SD1 = 0.109
Fa = 1.60
Fv = 2.40
R = 1.25
IMPORTANCE FACTOR = 1.0
RISK CATEGORY = II
SEISMIC DESIGN CATEGORY = B
CS = 0.085
CONSTRUCTION TYPE = VB
OCCUPANCY CATEGORY = M
TOTAL SEISMIC BASE SHEAR BOTH DIRECTIONS = 0.85 KIPS