Jimco Sales and Manufacturing

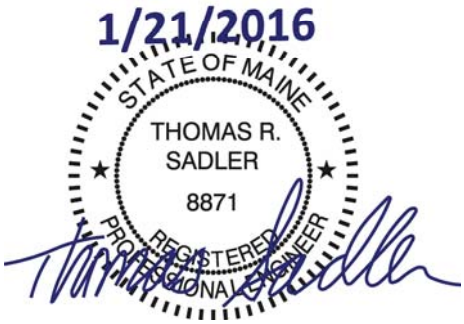
jimcosales.com

3113 St Louis Ave, Fort Worth TX 76110 (817) 924-6173

Job Number :	**16-1122R0**
Date :	**18-Jan-2016**
Prepared for:	**7-Eleven Inc, One-Arts Plaza** **1722 Routh Street, Suite 1000** **Dallas, TX 75221** **(972) 828-7725**
Project Location:	**7-Eleven #32541** **1917 Forest Ave** **Portland, ME 04103**

Engineer of Record:

Prepared by: Russel Lauer



Design Criteria:		**2009 International Building Code**					**16-1122R0**
		ASCE 7-05	/	AISC Manual -13th Edition			
Canopy Size:		**Width**		**Length**			
		20	X	**36**		**Canopy SQFT:**	
Clearance:	**14.5**	FT				**720**	Sqft
Fascia Hgt:	**36**	"					
Column Size:	12	SQR					
# of Columns:	**2**		**# of Column Rows:**		1		
Wind Speed:	**100**	mph - (3-Sec Gust)					
Exposure:	**B**						
Roof Design Loads:				**Dead Load:**	6.32	psf	
Snow Loads:				**Roof Live Load:**	**20.00**	psf (MAX reduced per Code)	
Ground Pg:	**60**	psf		**Colateral Load:**	**0.00**	psf	**Add Drift**
Roof Pf:	50.40	psf					
Maximum Deflection:	l /	180	Simple Span				
	l /	90	Cantilever				
Wind Loads:							
H mean:		16.00	ft	G = 0.85			
Ht & Exp Coef: Kz =		0.59					
Direct Factor: Kd =		0.85					
Importance Factor: I =		1.00					
Vel. Pressure: qz =		12.74	psf	MFWRS			
Lat Pressure:	$qzGC_N$	12.99	psf		**Wind**	**MWFRS on Fascia (windward)**	
Uplift: Deck		-11.91	psf		**Pressure**	19.11	psf
Downforce:		12.99	psf				
Seismic Data:			**Ss:**	**0.321**	g	**S1:**	**0.078**
Equivalent Lateral Force Procedure:			**Sds:**	0.330	g	**SD1:**	0.125
$V=C_SW$			**Seismic Base Shear - V:**		3.37	k	**R** 1.25
Site Class =	**D**		**SDC:**	C	**Cs:**	0.26	
Cantilevered Column					**W:**	12.77	k (+20% if Snow Load > 30 psf)

Summary:

Column Size:	HSS12X12X1/4			
Header Beam Size:	W14X22			
Purlin Beam Size:	W12X14			
Baseplate Size:	PL	1.25"	x 22.00	x 22.00
Anchor Bolt Size:		1.25	" Dia x	36.00

Material Properties:

				Geotechnical Report Required by Building Code	
Concrete:	f'c=	3000	psi	**Geotech Engineer:**	
Reinforcing bars:	fy=	60000	psi	**Project No.:**	
Structural Steel:	Fy=	50	ksi	**Dated:**	
HSS - Square:	Fy=	46	ksi		
HSS - Round:	Fy=	42	ksi		
Steel Plates:	Fy=	50	ksi		

Soil Properties:

Allowable Bearing Pressure:	**1500**	psf
Lateral Pressure:	**100**	psf/ft of depth

Soil properties are presumptive values from the Building Code and shall be verified by the Customer's Geotechnical Engineer prior to construction. Clay w/ PVR < 1.5"

Header Beam

Beam Size:	W14X22				16-1122R0
Beam Weight:	22 plf			Wtot=	1.02 klf
I:	199 in^4			DL=	0.11 klf
				(Lr or S)=	0.91 klf
				Wdn=	0.23 klf
Calc Width:	18.00 ft			Wup=	-0.21 klf
				Ev=	0.19 klf

Cantilevered Beam: L1= 10.00

L2= 10.00

M1= W x (L1)^2/2	=	1.021	x	50.00	=	51.05	ft-k	
M2= W x (L2)^2/2	=	1.021	x	50.00	=	51.05	ft-k	
Moment applied to top of column						0.00	ft-k	

Deflection: $\frac{W \times l^4}{8EI} = \frac{1.021 \times l^4}{8 \times 29000 \times 199} =$ 0.38 LL <= 1.33

0.04 DL

Frame Deflection (D+.75(W+(Lr or S)))

	Gravity	Lateral	Tot	
Tip1	-1.91	-0.35	-2.26	in
Tip2	0.31	-0.35	-0.05	in
.75*Lat=	1.29	k		

Column Unbalanced Moments

MunbLr=	15.1	ft-k
MunbSn=	22.7	ft-k
MunbW=	10.7	ft-k

Beam Size	Flange Comp	Web Comp	Mp	Mltb	Mflb	Ma		
W14X22			138.3	99.9	--	60.0	ft-k	OK

Unbraced Length: 8.50 ft

Skew: 0 degrees

Purlin Spacing:	3.00	8.50	5.50	3.00	20.0
Header Spacing:	10.00		10.00		20.0

Purlin Beam

Beam Size: W12X14 — 16-1122R0

Beam Weight: 14 plf
I: 88.6 in^4

Calc Width: 7.25 FT

Wtot= 0.40 klf
DL= 0.04 klf
(Lr or S)= 0.37 klf
Wdn= 0.09 klf
Wup= -0.09 klf
Ev= 0.08 klf

Cantilevered Beam: Lc= 12.00 ft

$$M1 = \frac{W \times l^2}{2} = \frac{0.40 \times 12^2}{2} = 28.88 \text{ ft-k}$$

Deflection:

$$\frac{W \times l^4}{8EI} = \frac{0.40 \times l^4}{8 \times 29000 \times 88.6} = 0.70 \text{ TL} \quad 0.06 \text{ DL} \quad <= 1.60$$

$$\frac{W(4L+3a)a}{24EI} = 1.63 \text{ TL} \quad 0.15 \text{ DL}$$

Wtot= 0.40 klf
DL= 0.04 klf
(Lr or S)= 0.37 klf
Wdn= 0.09 klf
Wup= -0.09 klf
Ev= 0.08 klf

Simple Beam: Ls= 12.00 ft

$$M = \frac{W \times l^2}{8} = \frac{0.40 \times 12^2}{8} = 7.22 \text{ ft-k}$$

Deflection:

$$\frac{5W \times l^4}{384EI} = \frac{5 \times 0.40115 \times l^4}{384 \times 29000 \times 88.6} = 0.0728 \text{ LL} \quad 0.0065 \text{ DL} \quad <= 0.80$$

Beam Size	Flange Comp	Web Comp	Mp	Mltb	Mflb	Ma		
W12X14			72.5	53.4	--	32.0	ft-k	OK

Number of spaces: 2
Max. Unbraced Length: 6.00 ft

Hc+Pc = 0.10
Hc+Ps = 0.05
OK

Columns

Column: HSS12X12X1/4 — 16-1122R0

Column Wt: 39.4 plf

Fascia Height: 3 ft — k= 2.1

Height: 19.0 ft — kl/r= 2.1 x 228 / 4.79 = 99.9582 in

Column Width: 1.00 ft

Trib Area: 360 ft^2

Calc width (P) = 20 ft

Calc length (P)= 18 ft

Calc horiz.l.(M)= 18 ft

0.7pQeOm= 1.48 k/col — Wv= 1.72 k/col

	Table B4.1				Compression				Bending (ft-k)			
	Typ	Shape	Flanges	Webs	Fe (ksi)	Qa	Fcr (ksi)	Pa (k)	Mpx	Mflbx	Mwlbx	Max
	HSS	SQR	Slender	Comp	28.6	0.90	13.6	147	109	81	--	81

Check: D+(Lr or S)

P= 20.00 x 18.00 x 0.057 = 20.4 k

Munb= 22.68 ft-k

Pa = 146.6 k — Ma= 80.99 ft-k

AISC H1.1 0.07 + 0.28005 = 0.35 < = 1.00 OK

Check: D+W +MunbW

P= 20.00 x 18.00 x 0.019 = 6.95 k

M= 18 x 3 x 0.032 x 19 + 10.72 = 43.39 k-ft

Pa = 147 k — Ma= 80.99 ft-k — Pdelta (ft-k) 0.55

AISC H1.1 0.02 + 0.53583 = 0.56 < = 1.00 OK

Check: D+0.75(W+(Lr orS)) +0.75M

P= 20.00 x 18.00 x 0.054 = 19.3922 k

M= 43.39 x 0.75 + 0.75 x 22.7 = 49.56 ft-k 1.14

Pa = 146.62 k — Ma= 80.99 ft-k

AISC H1.1 0.07 + 0.61191 = 0.678 < = 1.00 OK

Check: D+.7E

P= 20.00 x 18.00 x 0.017 = 6.2 k

M= 1.48 x 19.00 = 28.04 k-ft 0.42

Pa = 146.6 k — Ma= 81.0 ft-k

AISC H1.1 0.02 + 0.35 = 0.37 < = 1.00 OK

OK

Check: D+.75(.7E+(Lr orS))+0.75Mu

P= 20.00 x 18.00 x 0.055 = 19.7 k

M= 1.11 x 19.00 + 0.75 x 22.7 = 38.04 k-ft 1.00

Pa = 146.6 k — Ma= 81.0 ft-k

AISC H1.1 0.07 + 0.47 = 0.54 < = 1.00 OK

OK

Lateral Drift:

deflection = $\frac{H \times h^3}{3 \times E \times I} = \frac{1.72 \times 19^3}{3 \times 29000 \times 248} = 0.94$ < = h/60 3.8 OK

Header Beam to Column Connection

16-1122R0

Mreq:	51.1	ft*k					
			Ma				
Header:	W14X22		60	ft*k		Bolts	
Column:	HSS12X12X1/4 HSS		81	ft*k	db:	0.750	A307
dc:	12.00	in	OK		Tall:	9.94	k/bolt
bc:	12.00	in			#bolts (Used):	4	per side
Purlin:	W12X14				#bolts (Min):	3.98	
dp:	11.90	in			Ma:	51.4	ft*k
					Tblts:	9.88	k/bolt

Prying Action of Header					Vertical Fillet Welds		
bfb:	5.00	in			tw:	0.12	in (min)
tfb:	0.335	in					
tmin:	0.49	in	1.45		Shear on T		
q:	1.97	k	1.19		Vreq:	39.5	k
					Va:	54.0	k

Bending on T

	Top Pl	Knife Pl				
tp:	0.750	0.500				
wp:	12.0	6.00	8.90	in (max)	OK	
lp:	25.0	25.00				
			Totals			
A:	9.00	3.00	12.00	in^2	6.00	:A/2
y:	0.38	3.75	1.22	in	0.50	:PNA
Ay:	3.38	11.25	14.63	In^3	0.25	:ytop
I:	0.42	9.00	9.42	in^4	1.69	:ybot
Ad^2:	6.41	19.22	25.63	in^4	11.63	:Zx
		Itot:	35.05	in^4		
		Sx:	6.34	in^3		
		Mreq:	138.3	in*k		
		Ma:	190.1	in*k	OK	

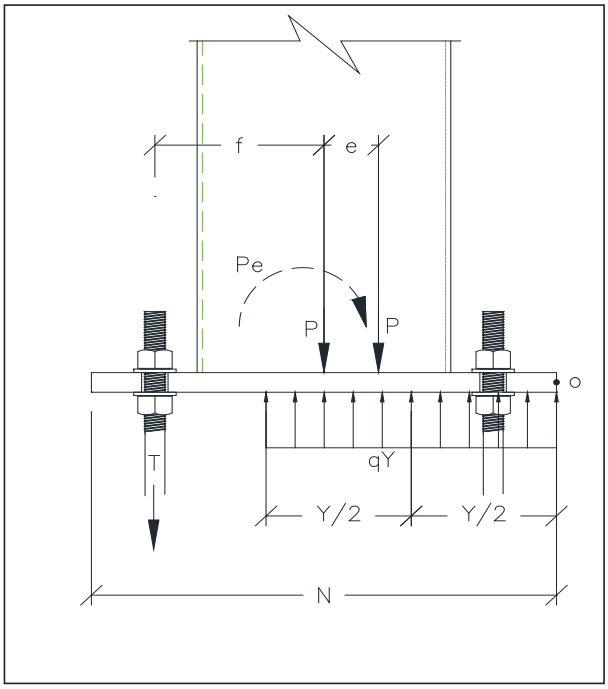
Baseplate & Anchor Rods

16-1122R0

Baseplate Size: 22.00"x 22.00"x 1.25 OK

Load Criteria: D+W +MunbW tpreq= 0.94 in

P=	6.95	k				Col d=	12	n'	3.00
M=	43.39	k-ft	N=	22.00	in	Col bf =	12 in	X	0.025
ecc=	74.89	in	B=	22.00	in	Fyp=	50 ksi	L	0.161
ecrit=	10.85		Y=	1.40	in	Fup=	75 ksi		
T=	24.54	k	Trod=	12.27	k				
tpmin=	0.76	in	tpdes=	0.65	in				
				0.94					



Load Criteria:	.6D+W		Load Criteria:	D+(Lr or S)	
P=	-2.92	k	P=	20.42	k
Trod=	13.00	k	l=	11.40	in
tpmin=	0.55	in	tpmin=	0.60	in

Load Criteria: D+0.75(W+(Lr orS)) +0.75Munb

P=	19.39	k			
M=	49.56	k-ft			
ecc=	30.67	in			
ecrit=	10.57	in	Y=	1.85	in
T=	22.09	k	Trod=	11.04	k
tpmin=	0.72	in	tpdes=	0.94	in
				1.05	

Anchor Rod: ACI 318 App D 1.25" Dia x 36.00"

ASTM F1554 Gr. 55

Trod=	13.00	k/rod		Vrod=	0.43	k/rod		dreq=	0.77	in (tensile rupture)	
Nu=	20.80	k/rod		Vu=	0.69	k/rod					
phiNn=	52.61	k/rod	OK	phiVn=	22.7	k/rod	OK	Combine	0.40	<1.0	
PhiSt=	0.75		PhiSv=	0.65		PhiCt=	0.70	PhiCv=	0.70		
Steel: phiNsa=	54.51	k/anchor		ca1=	34.0	in	hef=le=	25.75	in	Ase=	0.97 in^2
phiVsa=	22.68	k/anchor		ca2=	38.6	in				Abrg=	2.24 in^2

Spread Footing Tension Concrete Breakout: phiNcbg= 180.5 k (2 rods)

Anc/Anco=	1.09	Psi ed,N=	0.96	Psi cp,N=	1.00
Psi ec,N=	1.00	Psi c,N=	1.25	Nb=	196.8 k

Tension Pullout Strength: phiNpn= 105.2 k (2 rods)

Psi c ,p= 1.40 Np= 53.68 k

Spread Footing Tension Side Face Blowout: phiNsb= Does Not Control

Nsb= Does Not Control Nsbg= Does Not Control

Spread Footing Shear Concrete Breakout: phiVcbg= 58.3 k (2 rods)

Avc/Avco=	0.58	Psi ed,V=	0.93	Psi h,V=	1.00
Psi ec,V=	1.00	Psi c,V=	1.20	Vb=	128.8 k

Spread Footing Shear Concrete Pryout Strength: phiVcpg= 361.0 k (2 rods)

Pier Anchors

16-1122R0

Pier Information			Anchor Information			Load Information		
D=	3.50	ft, dia	da=	1.25	in	Nu=	20.80	kip/anchor
f'c=	3.00	ksi	Lemb=	25.75	in	Vu=	0.69	kip/anchor
# bar=	12		Fya=	55	ksi			
bar size=	#7							
db=	0.875	in						
fy=	60	ksi						

Tension (with anchor reinforcement):

Development Length of Hooked Bars (ACI 318)

Ldh= 0.02*Psi*fy*db / lambda*(f'c)^.5 *(0.70) = 13.42 in

dv= 3"(clr)+0.5"(tie)+db/2= 3.94 in

rv= rp-dv 17.06 in

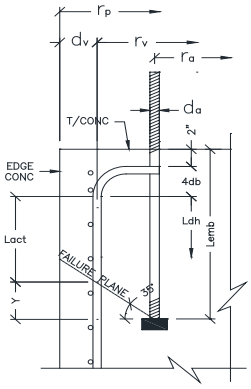
11.31 in

21.00 in

5.75 in

y= tan(35)*Dist = 4.03 in

Lact= Lemb-2"(clr)-4db-y = 16.22 in



Tension Capacity (Lact/Ldh) = 1.00 x 100 percent

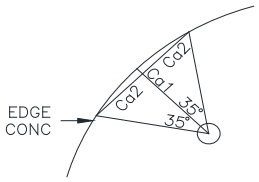
Spacing of Vertical Bars

s= pi(D-2dv)/#bar = 8.93 in c/c of bars

arc= CL of reinf within Lemb/2= 29.18

#bars within Lemb/2 = 3.27 use 3.00 bars

PhiNn= Phi*Ab*Num*fy*TC(%) 81.18 k/anchor OK



Shear (without anchor reinforcement):

Ca1= rp-ra = 9.69 in

Ca2= (rp-ra)*sin(35)= 5.56 in

Avc= (2*Ca2)*(1.5*Ca1)/2= 80.72 in^2

Avco= 4.5*Ca1 = 422.21 in^2

Vb= 7*(Lemb/da)^.2*(da^.5)*lambda*(f'c^.5)*Ca1^1.5= 23.67 k

Psi ed,v= 0.81

Psi h,v= 1.00

Psi c,v= 1.40 due to #4 ties

phiVcb= phi*(Avc/Avco)*Psi ed,v*Psi h,v*Psi c,v*Vb= 4.81 k/anchor OK

Tension Side Face Blowout: OK

Nsb= 89.71 k PhiNsb= 62.80 k

Foundation

16-1122R0

Spread Footing: Soil Bearing Pressure = 1500 psf

Assume B= 7.00 ft H= 7.00 ft Lateral Pressure = 100 psf/ft

Load Case:		D+(Lr or S)	D+W +MunbW	.6D+W	D+0.75(W+(Lr orS)) +0.7		
					OK		Overturning check
Vertical load:	P =	20.42	7.0	-2.9	19.4	k	
Lateral Load:	V=	0	1.7	1.7	1.3	k	
Col Moment:	M=	23	43.4	32.7	49.6	k-ft	
	e=	0.30	0.70	0.63	0.67	ft	
Min. Brg Press:	qmin=	309	1180	646	1293	psf	OK (P/B^2)(1-6e/B)
Max. Brg Press:	qmax=	524	1351	582	1745	psf	OK (P/B^2)(1+6e/B)
Footing OTM:		23	43	35	50	k-ft	includes column heigh+footing depth
Footing Resisting:		187	140	105	183	k-ft	(.6*(Foot+soil)+P)*H/2

Weight of Footing and Soil: 55.05 k Depth of Soil: 3.00 ft

Spread Footing: Width: 7.00 ft X Length: 7.00 ft A= 49 sqft

Calculate depth(one way shear):

assumed depth= 3 ft

$$d = \frac{Vu}{0.75 * 2 * \sqrt{fc} * B} \times \left(1 + \sqrt{\left[1 + \frac{0.621 \times S \times d \times b \times M}{H^2} \right]} \right)$$

d= 4.5644 in

Vu= 31500 lbs

B= 7 ft

f'c= 3000 psi

Check punching(two way shear): Capacity = 1514.3 k > 17.99 k OK

check for uplift: Footing = 22.05 kips Canopy DL/Col = 2.28 kips

Overburden(3.00ft soil): 33.00 k Total = 57.33 kips

Load Combination: .6D+W Uplift = -2.92 < 34.40 kips OK

Drilled Pier: say: 3.5 ft diam Soil Bearing Pressure = 1500 psf

Check - Gravity Loads: assumed depth= 9 ft Lateral Pressure = 100 psf/ft

Soil bearing = 19.2423 k A= 9.62 sqft Adhesion= 130 psf

Adhesion= 10.72 k +0.75(W+(Lr orS)) +0.75Munb

Total allowable load: 29.96 k > 19.4 OK

check for uplift: .6Pier Weight= 7.79

.6Adhesion= 6.43 k

14.23 > = -2.92 k OK

Check - Lateral Loads:

diameter	D	3.5	ft	Constrained at Top		
depth of embedment	d	9	ft			
column height	h	17.50	ft		Depth:	
Applied force	Mmax/h	2831.75	lbs		(Req'd) d= 7.57 ft	OK
Lateral pressure	S3	1050	psf			

Drilled Pier:	Diameter	Bearing Depth	Qty:	Vertical Rebar	Rebar Stir-Ups
	3.50 ft dia	10.5 ft	12	#7	(2) #4 in top 5"; Ties @ 12" O.C.

Shallow Spread:	Length	Width	Bearing Depth	Qty:	Rebar Mat Top & Bottom	
	7.00 ft	7.00 ft	6.00 ft	7	#6	Each Way

Cladding

16-1122R0

Pan Deck:

Lc=	3.0	ft	Ls=	8.5	ft	a=	3.0	ft		DL=	0.008 klf*
EWAc=	3.00	ft^2	EWAs=	24.1	ft^2	a^2=	9.00	ft^2		Wdncc=	0.051 klf*
Zone 3	Uplift			Gravity					Zone 3	Wupcc=	-0.071 klf*
Mcant=	3.57	in-k	OK	Mcant=	-5.23	in-k	OK			(Lr orS)=	0.067 klf
Mpos=	-1.91	in-k	OK	Mpos=	5.32	in-k	OK			Wdesup=	-0.066 klf
Mneg=	2.56	in-k	OK	Mneg=	-5.58	in-k	OK			Wdesdn=	0.097 klf
Rc=	-0.32	k		Rc=	0.62	k				DL=	0.003 klf
Rs=	-0.23	k		Rs=	0.65	k				Wdncc=	0.031 klf
									Zone 2	Wupcc=	-0.029 klf
Zone 2										(Lr orS)=	0.067 klf
Mpos=	-1.20	in-k	OK	Mpos=	5.32	in-k	OK			Wdesup=	-0.028 klf
Mneg=	2.56	in-k	OK	Mneg=	-5.58	in-k	OK			Wdesdn=	0.077 klf
Rs=	-0.23	k		Rs=	0.65	k				DL=	0.003 klf
										Wdncc=	0.021 klf
Zone 1									Zone 1	Wupcc=	-0.019 klf
Mpos=	-1.20	in-k	OK	Mpos=	4.86	in-k	OK			(Lr orS)=	0.067 klf
Mneg=	1.60	in-k	OK	Mneg=	-6.51	in-k	OK			Wdesup=	-0.017 klf
Rs=	-0.15	k		Rs=	0.60	k				Wdesdn=	0.070 klf
										Mapos=	8.853 in-k
										Maneg=	-6.913 in-k

Deck Clip:

Clamp Yeild	1200#	=	719#
Safety Factor	1.67		

Applied Force per Deck Clip -	651 lbf	Clamp Points:		
Max. Fy per Deck Clip -	719 lbf	Double	Clamp @ 16" O/C	
Check -	OK	Both	Sides	