

Date: November 30, 2021

Kimley»Horn

Kimley-Horn and Associates, Inc.
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Subject: Mount Analysis Report

Carrier Designation: Sprint PCS Equipment Change-Out
Carrier Site Number: SE05437A
Carrier Site Name: SE03XC331

Crown Castle Designation: BU Number: 880329
Site Name: SOUTH HILL MALL
JDE Job Number: 672578
Order Number: 574014, Rev. 0

Engineering Firm Designation: Kimley-Horn Project Number: 019558057

Site Data: 3150 S Meridian, Puyallup, Pierce County, WA 98373
Latitude 47° 9' 43.46" Longitude -122° 17' 40.04"

Structure Information: Tower Height & Type: 120 ft Monopole
Mount Elevation: 122 ft
Mount Type: 12 ft Platform w/ Support Rails

Kimley-Horn is pleased to submit this "Mount Analysis Report" to determine the structural integrity of Sprint PCS's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform w/ Support Rails

Sufficient

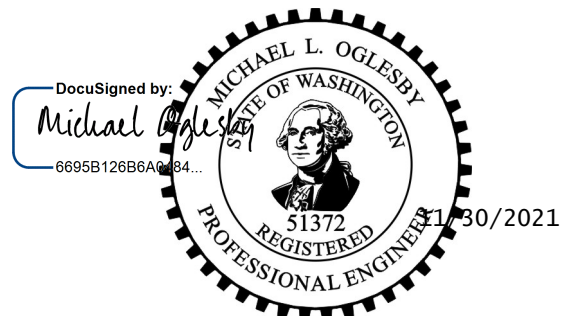
This analysis has been performed in accordance with the 2018 Washington State Building Code based upon an ultimate 3-second gust wind speed of 97 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Xavier Jones

Respectfully Submitted by:

Michael L. Oglesby, P.E

Lic. #51372, Exp. 5/16/2023
Kimley-Horn and Associates, Inc. COA #954



THE APPROVED CONSTRUCTION PLANS,
DOCUMENTS AND ALL ENGINEERING 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 PROVIDED BY THE
PERMITEE ON SITE FOR INSPECTION

APPROVED

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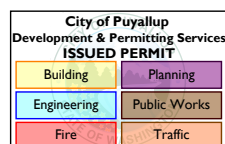


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1) INTRODUCTION

The mounting configuration consists of an existing 12 ft Platform w/ Support Rails.

2) ANALYSIS CRITERIA

Building Code:	2018 Washington State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	97 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1 in
Wind Speed with Ice:	30 mph
Seismic S_s:	1.264
Seismic S_1:	0.436
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 – Proposed Equipment Configuration

Elevation (ft)		Antennas			Mount / Modification Details
Mount	Centerline	#	Manufacturer	Model	
122	126	1	DbSpectra	DS7C06P36U-D	Existing 12 ft Platform w/ Support Rails
	124	2	RADWIN	2000C	
	122	1	RADWIN	2000C	
		1	Ceragon	FibeAir IP-20C	
		1	CommScope	VHLPX3-11W-6GR	
	120	3	Samsung Telecommunications	RRH-P4	
		3	Nokia	AHLOA_T-MOBILE	
		3	Nokia	AHFIG_TMO	
		3	Nokia	AEHC	
		2	CommScope	HCS 2.0	
		3	CommScope	CDX68T-DS-43_TMO	
		3	CommScope	FFVV-65C-R3-V1_TMO	
	119	1	DragonWave	Horizon Compact Plus	
		1	Andrew	VHLP1-23	

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Site Photos	-	-	CCISites
Supplemental Loading	Sprint RFDS	Dated: 5/18/2021	TSA

3.1) Analysis Method

RISA-3D (version 17.02.00), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A proprietary tool internally developed by Kimley-Horn was used to calculate wind loading on all appurtenances, dishes and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Mount Analysis* (Revision D).

3.2) Assumptions

- 1) The antenna mounting system (including any considered modifications) was properly fabricated, installed and maintained in good condition in accordance with its original design, TIA standards, and/or manufacturer specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the provided reference information.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members that could not be verified at this time.
- 5) Any referenced prior structural modifications to the tower mounting system are assumed to be installed as shown per available data unless noted otherwise.
- 6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (Gr. 36)
HSS (Rectangular)	ASTM A36 (Gr. 36)
Pipe	ASTM A53 (Gr. B-35)
Connection Bolts	ASTM A325
Threaded Rods	ASTM A36 (Gr. 36)

This analysis may be affected if any assumptions are not valid or have been made in error. Kimley-Horn should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 – Mount Component Stresses vs. Capacity

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Face Horizontals	M50	122	72%	Pass
1, 2	Corner Plates	M138		59%	Pass
1, 2	Bracing Members	M2		46%	Pass
1, 2	Mount Pipes	M139B		39%	Pass
1, 2	Connections	-		6%	Pass

Structure Rating (max from all components) =

72%

Notes:

- 1) See additional documentation in Appendix C and Appendix D for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H, Section 15.5.

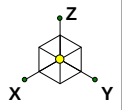
4.1) Recommendations

The mounting configuration has sufficient capacity to carry the referenced loading. No modifications are required at this time.

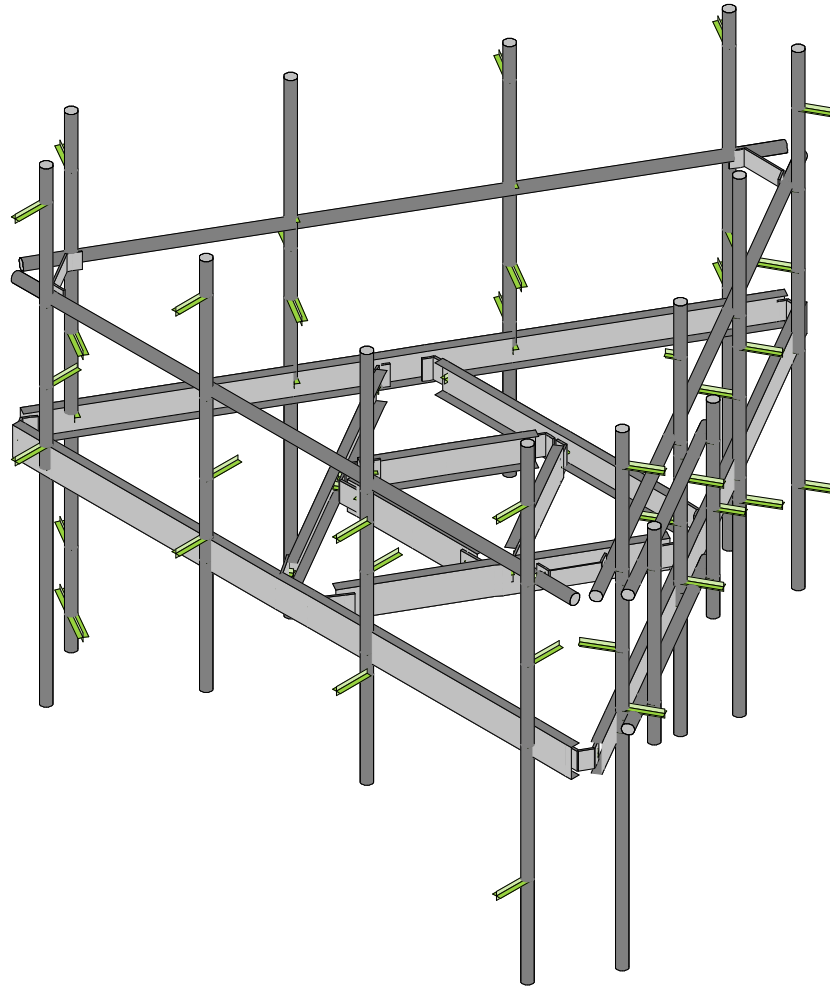
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APPENDIX A

WIRE FRAME AND RENDERED MODELS



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Envelope Only Solution

Kimley-Horn and Associates, Inc.

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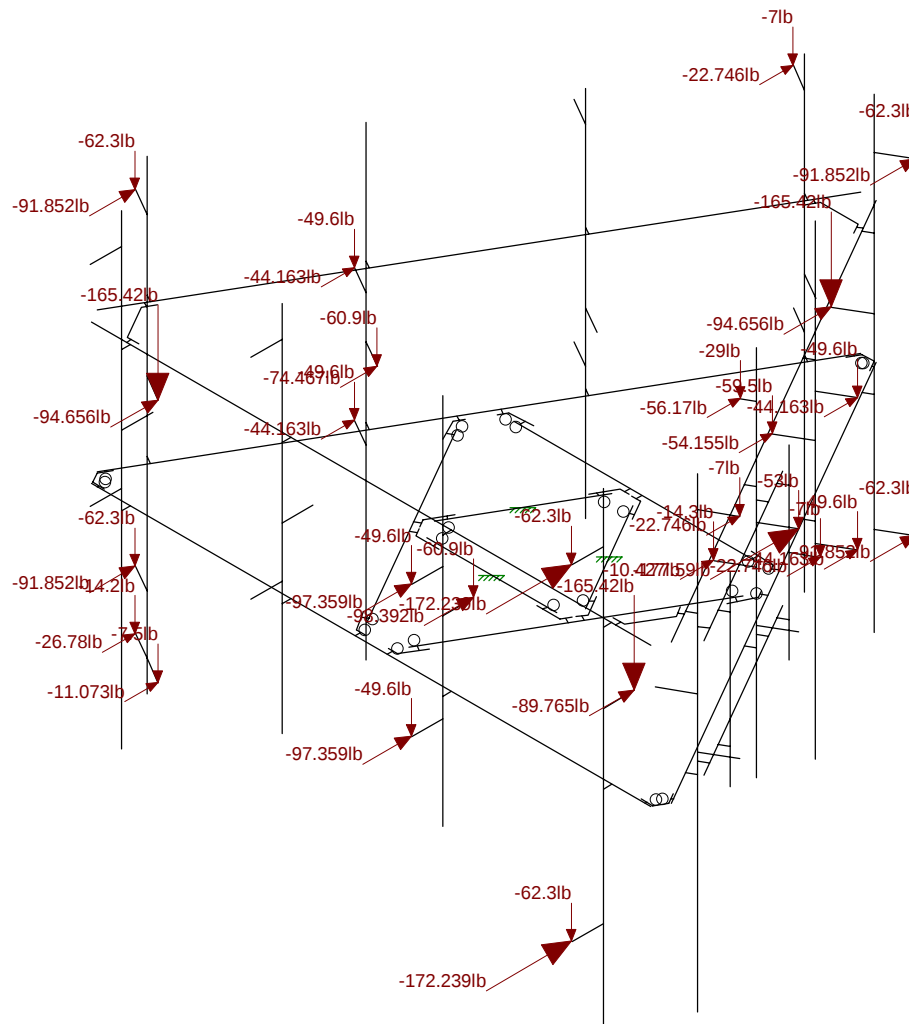
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APPENDIX B
SOFTWARE INPUT CALCULATIONS

General Criteria	
TIA Standard	H
IBC Edition	2018
Structure Class	-
Risk Category	II

Site-Specific Criteria	
Exposure Category	C
Topographic Factor, K_{zt}	1.00
Structure Base Elev. (AMSL), z_s (ft)	442.00
Ground Effect Factor, K_e	0.98

Mount & Structure Criteria	
Mount Elevation (AGL) (ft)	122.00
Structure Height (ft)	120.00
Structure Type	Monopole

Constants	
Wind Direction Probability Factor, K_d	0.95
Gust Effect Factor, G_h	1
Shielding Factor, K_s (antenna)	0.9
Shielding Factor, K_s (mount)	0.9

Wind Summary	
Basic Wind Speed w/o Ice, V (mph)	97.00
Velocity Pressure Coeff., K_z	1.32
Velocity Pressure, q_z (w/o Ice) (psf)	29.72

Ice Load Summary	
Basic Wind Speed w/ Ice, V_i (mph)	30.00
Design Ice Thick. (ASCE 7-16) , t_i (in)	1
Velocity Pressure, q_z (w/ Ice) (psf)	2.84
Escalated Ice Thick. @ Mount, t_{iz} (in)	1.14

Seismic Load Summary	
Spectral Response (Short Periods), S_s	1.264
Spectral Response (1-Sec. Period), S_1	0.436
Site Class	D
Seismic Design Category	D
Seismic Risk Category	II

Snow Load Summary	
Ground Snow Load, p_g (psf)	-
Snow Load on Flat Roofs, p_f (psf)	-



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Antenna Name	Qty	Shape	Dimensions (in)			Weight (lb)	Joint Labels								EPA (ft²)		Wind Force, F _A (lb)			
							Alpha		Beta		Gamma		Delta		Front	Side	No Ice		With Ice	
			H	W	D												Front	Side	Front	Side
FFVW-65C-R3-V1_TMO	3	Flat	95.9	25.2	9.3	124.6	A1B	A1T	B1B	B1T	G1B	G1T			12.88	4.86	344.48	130.11	36.48	15.22
AEHC	3	Flat	35.4	22.8	8.3	99.2	A2B	A2T	B2B	B2T	G2B	G2T			7.28	1.98	194.72	52.86	21.8	6.7
CDX68T-DS-43_TMO	3	Flat	7.1	6.5	4.8	11	A1R		B1R		G1R				0.39	0.28	10.3	7.55	1.76	1.41
AHFIG_TMO	3	Flat	28.7	12.9	5.6	70.6	A1R		B1R		G1R				1.54	1.47	41.22	39.31	5.01	5.48
AHLOA_T-MOBILE	3	Flat	26.6	12.9	8.1	83.8	A1R		B1R		G1R				1.43	1.85	38.24	49.42	4.67	6.46
RRH-P4	3	Flat	23.8	13.8	9	59.5	A2R		B2R		G2R				2.73	1.79	73.13	47.83	8.93	6.25
VHLP1-23	1	Dish (HP)	15.3	0	0	14.2			B1D						1.61	0.8	43.09	21.34	5.44	2.7
Horizon Compact Plus	1	Flat	9.6	8.7	4	7.5			B1DR						0.7	0.32	18.62	8.56	2.78	1.59
HCS 2.0	2	Flat	16.9	6.7	4.8	1.4	A2R		B2R						0.94	0.7	25.26	18.66	3.67	2.91
2000C	1	Flat	14.6	14.6	4.3	7					GD				1.78	0.54	47.58	14.47	6.08	2.38
2000C	2	Flat	14.6	14.6	4.3	7			B4T		G4T				1.78	0.54	47.58	14.47	6.08	2.38
VHLPX3-11W-6GR	1	Dish (HP)	39.4	0	0	53					G3T				10.68	5.29	285.73	141.54	30.59	15.15
DS7C06P36U-D	1	Round	100.8	2.5	2.5	29					OMNI				2.1	2.1	56.17	56.17	9.84	9.84
FibeAir IP-20C	1	Flat	9.1	9.1	3.9	14.3					G3R				0.68	0.29	18.3	7.8	2.74	1.49

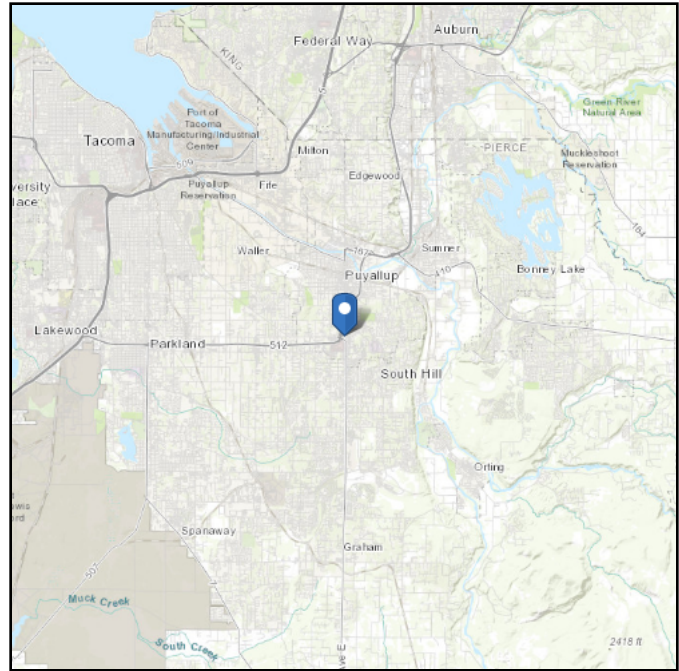
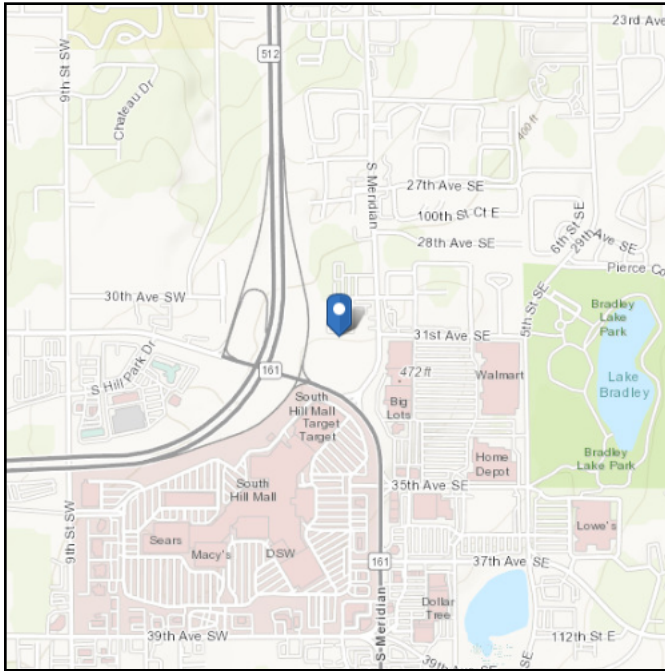
ASCE 7 Hazards Report

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Address:
No Address at This
Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 442.51 ft (NAVD 88)
Latitude: 47.162072
Longitude: -122.294456



Wind

Results:

Wind Speed	97 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Nov 30 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.264	S_{D1} :	N/A
S_1 :	0.436	T_L :	6
F_a :	1	PGA :	0.5
F_v :	N/A	PGA_M :	0.55
S_{MS} :	1.264	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.843	C_v :	1.353

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Tue Nov 30 2021

Date Source: [USGS Seismic Design Maps](#)

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 25 F
Gust Speed 30 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Tue Nov 30 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

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APPENDIX C
SOFTWARE ANALYSIS OUTPUT

Company : Kimley-Horn and Associates, Inc.
 Designer : XMJ
 Job Number : 019558057
 Model Name : 880329

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Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	SR Connection ...	PL4x0.375	Beam	None	A36 Gr.36	Typical	1.56	.02	2.08	.074
2	Connection Plate...	PL5x.5	Beam	None	A36 Gr.36	Typical	2.5	.052	5.208	.195
3	Connection Plate...	PL4.5x0.5	Beam	None	A36 Gr.36	Typical	2.25	.047	3.797	.174
4	Mount Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
5	Support Rail	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
6	Platform Base H...	C7x2x0.227	Beam	None	A36 Gr.36	Typical	2.394	.752	15.723	.039
7	Connecting Cha...	C7x2x0.227	Beam	None	A36 Gr.36	Typical	2.394	.752	15.723	.039

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Connecting ...	33.5			Lbyy						Lateral
2	M2	Connecting ...	62.925									Lateral
3	M3	Connecting ...	62.925									Lateral
4	M4	Connecting ...	62.925									Lateral
5	M5	Connecting ...	33.5			Lbyy						Lateral
6	M6	Connecting ...	33.5			Lbyy						Lateral
7	M7	Connection ...	2.25			Lbyy						Lateral
8	M8	Connection ...	2.25			Lbyy						Lateral
9	M10	Connection ...	2.25			Lbyy						Lateral
10	M11	Connection ...	2.25			Lbyy						Lateral
11	M12	Connection ...	6			Lbyy						Lateral
12	M13	Connection ...	6			Lbyy						Lateral
13	M14	Connection ...	6			Lbyy						Lateral
14	M31	Connection ...	3			Lbyy						Lateral
15	M33	Connection ...	3.001			Lbyy						Lateral
16	M39	Connection ...	3			Lbyy						Lateral
17	M40	Mount Pipe	120			Lbyy						Lateral
18	M49	Platform Ba...	144									Lateral
19	M50	Platform Ba...	144									Lateral
20	M51	Platform Ba...	144									Lateral
21	M139	Support Rail	144									Lateral
22	M140	Support Rail	144									Lateral
23	M141	Support Rail	144									Lateral
24	M133	SR Connect...	3			Lbyy						Lateral
25	M134	SR Connect...	9.742			Lbyy						Lateral
26	M135	SR Connect...	3			Lbyy						Lateral
27	M136	SR Connect...	3			Lbyy						Lateral
28	M137	SR Connect...	9.742			Lbyy						Lateral

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 Designer : XMJ
 Job Number : 019558057
 Model Name : 880329

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Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Member)	Surface(...
7	Structure Wind (60)	None						140		
8	Structure Wind (90)	None						140		
9	Structure Wind (120)	None						140		
10	Structure Wind (135)	None						140		
11	Structure Wind (150)	None						140		
12	Structure Wind w/ I...	None						140		
13	Structure Wind w/ I...	None						140		
14	Structure Wind w/ I...	None						140		
15	Structure Wind w/ I...	None						140		
16	Structure Wind w/ I...	None						140		
17	Structure Wind w/ I...	None						140		
18	Structure Wind w/ I...	None						140		
19	Structure Wind w/ I...	None						140		
20	Antenna Wind (0)	None				68				
21	Antenna Wind (30)	None				68				
22	Antenna Wind (45)	None				68				
23	Antenna Wind (60)	None				68				
24	Antenna Wind (90)	None				68				
25	Antenna Wind (120)	None				68				
26	Antenna Wind (135)	None				68				
27	Antenna Wind (150)	None				68				
28	Antenna Wind w/ Ic...	None				68				
29	Antenna Wind w/ Ic...	None				68				
30	Antenna Wind w/ Ic...	None				68				
31	Antenna Wind w/ Ic...	None				68				
32	Antenna Wind w/ Ic...	None				68				
33	Antenna Wind w/ Ic...	None				68				
34	Antenna Wind w/ Ic...	None				68				
35	Antenna Wind w/ Ic...	None				68				
36	Seismic X	ELX				34		70		
37	Seismic Y	ELY				34		70		
38	Maintenance Live L...	OL1				1				
39	Maintenance Live L...	OL2				1				
40	Maintenance Live L...	OL3				1				
41	Maintenance Live L...	OL4				1				
43	Maintenance Live L...	OL6					1			

Load Combinations

	Description	Solve	PDelta	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	Summary: 1.0D + ...	Yes	Y		DL	1	20	1												
2	1.4D	Yes	Y		DL	1.4														
3	1.2D + 1.0W(0)	Yes	Y		DL	1.2	4	1	20	1										
4	1.2D + 1.0W(30)	Yes	Y		DL	1.2	5	1	21	1										
5	1.2D + 1.0W(45)	Yes	Y		DL	1.2	6	1	22	1										
6	1.2D + 1.0W(60)	Yes	Y		DL	1.2	7	1	23	1										
7	1.2D + 1.0W(90)	Yes	Y		DL	1.2	8	1	24	1										
8	1.2D + 1.0W(120)	Yes	Y		DL	1.2	9	1	25	1										
9	1.2D + 1.0W(135)	Yes	Y		DL	1.2	10	1	26	1										
10	1.2D + 1.0W(150)	Yes	Y		DL	1.2	11	1	27	1										
11	1.2D + 1.0W(180)	Yes	Y		DL	1.2	4	-1	20	-1										

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Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
12	1.2D + 1.0W(210)	Yes	Y		DL	1.2	5	-1	21	-1												
13	1.2D + 1.0W(225)	Yes	Y		DL	1.2	6	-1	22	-1												
14	1.2D + 1.0W(240)	Yes	Y		DL	1.2	7	-1	23	-1												
15	1.2D + 1.0W(270)	Yes	Y		DL	1.2	8	-1	24	-1												
16	1.2D + 1.0W(300)	Yes	Y		DL	1.2	9	-1	25	-1												
17	1.2D + 1.0W(315)	Yes	Y		DL	1.2	10	-1	26	-1												
18	1.2D + 1.0W(330)	Yes	Y		DL	1.2	11	-1	27	-1												
19	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	12	1	28	1										
20	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	13	1	29	1										
21	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	14	1	30	1										
22	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	15	1	31	1										
23	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	16	1	32	1										
24	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	17	1	33	1										
25	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	18	1	34	1										
26	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	19	1	35	1										
27	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	12	-1	28	-1										
28	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	13	-1	39	-1										
29	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	14	-1	30	-1										
30	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	15	-1	31	-1										
31	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	16	-1	32	-1										
32	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	17	-1	33	-1										
33	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	18	-1	34	-1										
34	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	19	-1	35	-1										
35	1.2D + 1.0E(0)	Yes	Y		DL	1.2	E...	-1	E...													
36	1.2D + 1.0E(30)	Yes	Y		DL	1.2	E...	-.8...	E...	.5												
37	1.2D + 1.0E(45)	Yes	Y		DL	1.2	E...	-.7...	E...	.707												
38	1.2D + 1.0E(60)	Yes	Y		DL	1.2	E...	-.5	E...	.866												
39	1.2D + 1.0E(90)	Yes	Y		DL	1.2	E...	-.2...	E...	1												
40	1.2D + 1.0E(120)	Yes	Y		DL	1.2	E...	.5	E...	.866												
41	1.2D + 1.0E(135)	Yes	Y		DL	1.2	E...	.707	E...	.707												
42	1.2D + 1.0E(150)	Yes	Y		DL	1.2	E...	.866	E...	.5												
43	1.2D + 1.0E(180)	Yes	Y		DL	1.2	E...	1	E...	4.5...												
44	1.2D + 1.0E(210)	Yes	Y		DL	1.2	E...	.866	E...	-.5												
45	1.2D + 1.0E(225)	Yes	Y		DL	1.2	E...	.707	E...	-.7...												
46	1.2D + 1.0E(240)	Yes	Y		DL	1.2	E...	.5	E...	-.8...												
47	1.2D + 1.0E(270)	Yes	Y		DL	1.2	E...	6.8...	E...	-1												
48	1.2D + 1.0E(300)	Yes	Y		DL	1.2	E...	-.5	E...	-.8...												
49	1.2D + 1.0E(315)	Yes	Y		DL	1.2	E...	-.7...	E...	-.7...												
50	1.2D + 1.0E(330)	Yes	Y		DL	1.2	E...	-.8...	E...	-.5												
51	0.9D + 1.0E(0)	Yes	Y		DL	.9	E...	-1	E...													
52	0.9D + 1.0E(30)	Yes	Y		DL	.9	E...	-.8...	E...	.5												
53	0.9D + 1.0E(45)	Yes	Y		DL	.9	E...	-.7...	E...	.707												
54	0.9D + 1.0E(60)	Yes	Y		DL	.9	E...	-.5	E...	.866												
55	0.9D + 1.0E(90)	Yes	Y		DL	.9	E...	-.2...	E...	1												
56	0.9D + 1.0E(120)	Yes	Y		DL	.9	E...	.5	E...	.866												
57	0.9D + 1.0E(135)	Yes	Y		DL	.9	E...	.707	E...	.707												
58	0.9D + 1.0E(150)	Yes	Y		DL	.9	E...	.866	E...	.5												
59	0.9D + 1.0E(180)	Yes	Y		DL	.9	E...	1	E...	4.5...												
60	0.9D + 1.0E(210)	Yes	Y		DL	.9	E...	.866	E...	-.5												
61	0.9D + 1.0E(225)	Yes	Y		DL	.9	E...	.707	E...	-.7...												
62	0.9D + 1.0E(240)	Yes	Y		DL	.9	E...	.5	E...	-.8...												
63	0.9D + 1.0E(270)	Yes	Y		DL	.9	E...	6.8...	E...	-1												

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Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
64	0.9D + 1.0E(300)	Yes	Y		DL	.9	E...	-.5	E...	-.8...										
65	0.9D + 1.0E(315)	Yes	Y		DL	.9	E...	-.7...	E...	-.7...										
66	0.9D + 1.0E(330)	Yes	Y		DL	.9	E...	-.8...	E...	-.5										
67	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	4	.096	20	.096	O...	1.5								
68	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	5	.096	21	.096	O...	1.5								
69	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	6	.096	22	.096	O...	1.5								
70	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	7	.096	23	.096	O...	1.5								
71	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	8	.096	24	.096	O...	1.5								
72	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	9	.096	25	.096	O...	1.5								
73	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	10	.096	26	.096	O...	1.5								
74	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	11	.096	27	.096	O...	1.5								
75	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5								
76	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5								
77	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5								
78	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5								
79	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5								
80	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5								
81	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5								
82	1.2D + 1.5Lm(1) + ...	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5								
83	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	4	.096	20	.096	O...	1.5								
84	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	5	.096	21	.096	O...	1.5								
85	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	6	.096	22	.096	O...	1.5								
86	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	7	.096	23	.096	O...	1.5								
87	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	8	.096	24	.096	O...	1.5								
88	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	9	.096	25	.096	O...	1.5								
89	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	10	.096	26	.096	O...	1.5								
90	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	11	.096	27	.096	O...	1.5								
91	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5								
92	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5								
93	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5								
94	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5								
95	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5								
96	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5								
97	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5								
98	1.2D + 1.5Lm(2) + ...	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5								
99	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	4	.096	20	.096	O...	1.5								
100	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	5	.096	21	.096	O...	1.5								
101	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	6	.096	22	.096	O...	1.5								
102	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	7	.096	23	.096	O...	1.5								
103	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	8	.096	24	.096	O...	1.5								
104	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	9	.096	25	.096	O...	1.5								
105	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	10	.096	26	.096	O...	1.5								
106	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	11	.096	27	.096	O...	1.5								
107	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5								
108	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5								
109	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5								
110	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5								
111	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5								
112	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5								
113	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5								
114	1.2D + 1.5Lm(3) + ...	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5								
115	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	4	.096	20	.096	O...	1.5								

Company : Kimley-Horn and Associates, Inc.
 Designer : XMJ
 Job Number : 019558057
 Model Name : 880329

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Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
116	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	5	.096	21	.096	O...	1.5										
117	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	6	.096	22	.096	O...	1.5										
118	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	7	.096	23	.096	O...	1.5										
119	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	8	.096	24	.096	O...	1.5										
120	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	9	.096	25	.096	O...	1.5										
121	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	10	.096	26	.096	O...	1.5										
122	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	11	.096	27	.096	O...	1.5										
123	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	4	-0.0...	20	-0.0...	O...	1.5										
124	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	5	-0.0...	21	-0.0...	O...	1.5										
125	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	6	-0.0...	22	-0.0...	O...	1.5										
126	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	7	-0.0...	23	-0.0...	O...	1.5										
127	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	8	-0.0...	24	-0.0...	O...	1.5										
128	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	9	-0.0...	25	-0.0...	O...	1.5										
129	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	10	-0.0...	26	-0.0...	O...	1.5										
130	1.2D + 1.5Lm(4) + ...	Yes	Y		DL	1.2	11	-0.0...	27	-0.0...	O...	1.5										
131	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	4	.096	20	.096	O...	1.5										
132	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	5	.096	21	.096	O...	1.5										
133	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	6	.096	22	.096	O...	1.5										
134	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	7	.096	23	.096	O...	1.5										
135	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	8	.096	24	.096	O...	1.5										
136	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	9	.096	25	.096	O...	1.5										
137	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	10	.096	26	.096	O...	1.5										
138	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	11	.096	27	.096	O...	1.5										
139	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	4	-0.0...	20	-0.0...	O...	1.5										
140	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	5	-0.0...	21	-0.0...	O...	1.5										
141	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	6	-0.0...	22	-0.0...	O...	1.5										
142	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	7	-0.0...	23	-0.0...	O...	1.5										
143	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	8	-0.0...	24	-0.0...	O...	1.5										
144	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	9	-0.0...	25	-0.0...	O...	1.5										
145	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	10	-0.0...	26	-0.0...	O...	1.5										
146	1.2D + 1.5Lv(1) + ...	Yes	Y		DL	1.2	11	-0.0...	27	-0.0...	O...	1.5										

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N17	max	2125.276	6	1179.554	14	2085.158	28	907.774	5	1602.814	4	83.346	3
2		min	-2051.89	14	-1174.057	6	-9.049	72	-928.205	125	-1506.051	124	-104.378	14
3	N21	max	2586.983	3	1455.34	3	2895.632	22	1089.654	74	1209.614	18	111.07	8
4		min	-2608.239	11	-1607.196	11	239.065	14	-653.896	18	-1748.33	74	-124.823	3
5	N19	max	69.191	11	2688.59	13	2352.594	27	2071.724	71	21.738	3	98.699	14
6		min	-56.092	15	-2722.605	5	176.239	3	-1448.304	127	-77.203	107	-101.53	8
7	Totals:	max	3917.988	3	4087.153	15	6847.776	33						
8		min	-3917.966	11	-4087.229	7	2393.383	57						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

Member	Shape	Code Check	Loc[in]	LC	Shear C...	Lo...	Dir	...	phi*P...	phi*P...	phi*Mn y-y [lb-ft]	phi*Mn z-z [l...	Cb	Eqn
1	M50	C7x2x0...	.759	76.5	10	.165	72	z	7	8192...	7756...	2095.474	8021.266	1.448H1-1b
2	M51	C7x2x0...	.733	76.5	4	.158	76.5	z	...	8192...	7756...	2095.474	8660.546	1.563H1-1b
3	M49	C7x2x0...	.728	76.5	15	.150	9	z	8	8192...	7756...	2095.474	8220.053	1.484H1-1b
4	M138	PL4x0.3...	.618	1	4	.847	1	y	6	4871...	50544	410.4	4212	2.362H1-1b

Company : Kimley-Horn and Associates, Inc.
 Designer : XMJ
 Job Number : 019558057
 Model Name : 880329

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Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear C...Lo...	Dir	...	phi*P...	phi*P...	phi*Mn y-y [lb-ft]	phi*Mn z-z [l...	Cb	Eqn
5	M136	PL4x0.3...	.580	2	4	.687 3	y	5	4871...	50544	410.4	4212	2.349	H1-1b
6	M137	PL4x0.3...	.563	0	4	.131 9.7...	y	3	3422...	50544	410.4	4212	2.227	H1-1b
7	M135	PL4x0.3...	.524	1	8	.360 1	y	8	4871...	50544	410.4	4212	2.278	H1-1b
8	M141A	PL4x0.3...	.513	1	14	.404 1	y	...	4871...	50544	410.4	4212	2.362	H1-1b
9	M133	PL4x0.3...	.499	2	8	.276 2	y	...	4871...	50544	410.4	4212	2.273	H1-1b
10	M134	PL4x0.3...	.497	9.742	8	.284 9.7...	y	8	3422...	50544	410.4	4160.216	1.039	H1-1b
11	M2	C7x2x0...	.484	33.429	11	.252 31...	z	4	3994...	7756...	2095.474	14868.052	1.26	H1-1b
12	M140A	PL4x0.3...	.483	9.742	6	.160 9.7...	y	...	3422...	50544	410.4	4212	1.926	H1-1b
13	M139A	PL4x0.3...	.480	2	14	.600 2	y	7	4871...	50544	410.4	4212	2.318	H1-1b
14	M3	C7x2x0...	.462	29.496	3	.248 31...	z	7	3994...	7756...	2095.474	14868.052	1.257	H1-1b
15	M4	C7x2x0...	.424	33.429	15	.204 31...	z	...	3994...	7756...	2095.474	14868.052	1.258	H1-1b
16	M139B	PIPE_2.0	.411	66.25	8	.214 66...		9	9836...	32130	1871.625	1871.625	1.644	H1-1b
17	M174A	PL5x.5	.384	1.125	12	.380 2.25	y	...	7997...	81000	843.75	8437.5	1.732	H1-1b
18	M109	PIPE_2.0	.371	66.25	8	.277 66...		9	9836...	32130	1871.625	1871.625	1.929	H3-6
19	M173A	PL5x.5	.362	1.125	12	.382 2.25	y	...	7997...	81000	843.75	8437.5	2.956	H1-1b
20	M10	PL5x.5	.350	1.125	15	.294 2.25	y	...	7997...	81000	843.75	8437.5	1.724	H1-1b
21	M11	PL5x.5	.339	1.125	15	.315 2.25	y	...	7997...	81000	843.75	8437.5	2.907	H1-1b
22	M40	PIPE_2.0	.322	66.25	13	.179 66...		...	9836...	32130	1871.625	1871.625	1.741	H1-1b
23	M97	PIPE_2.0	.315	67	14	.139 67		3	1491...	32130	1871.625	1871.625	3.477	H1-1b
24	M168A	PL5x.5	.306	1.125	17	.324 2.25	y	...	7997...	81000	843.75	8437.5	1.749	H1-1b
25	M127	PIPE_2.0	.305	67	3	.214 34		4	1491...	32130	1871.625	1871.625	3.043	H1-1b
26	M167A	PL5x.5	.302	1.125	10	.337 2.25	y	...	7997...	81000	843.75	8437.5	1.603	H1-1b
27	M115	PIPE_2.0	.286	67.5	14	.225 66...		6	9836...	32130	1871.625	1871.625	1.59	H1-1b
28	M103	PIPE_2.0	.282	67	7	.175 67		9	1491...	32130	1871.625	1871.625	3.869	H1-1b
29	M121	PIPE_2.0	.273	66.25	11	.205 66...		...	9836...	32130	1871.625	1871.625	2.266	H1-1b
30	M133A	PIPE_2.0	.267	65	3	.221 31...		4	9836...	32130	1871.625	1871.625	2.973	H1-1b
31	M145	PIPE_2.0	.266	66.25	5	.220 66...		8	9836...	32130	1871.625	1871.625	2.269	H1-1b
32	M157	PIPE_2.0	.256	66.25	14	.210 66...		...	9836...	32130	1871.625	1871.625	1.853	H1-1b
33	M6	C7x2x0...	.250	16.75	7	.094 16...	y	...	6426...	7756...	2095.474	14868.052	1.361	H1-1b
34	M151	PIPE_2.0	.246	67	14	.120 67		...	1491...	32130	1871.625	1871.625	3.53	H1-1b
35	M5	C7x2x0...	.228	30.708	12	.087 16...	y	...	6426...	7756...	2095.474	14868.052	1.318	H1-1b
36	M1	C7x2x0...	.209	16.75	18	.070 16...	y	...	6426...	7756...	2095.474	14868.052	1.369	H1-1b
37	M141	PIPE_2.0	.201	51	6	.251 135		6	6830...	32130	1871.625	1871.625	2.433	H1-1b
38	M140	PIPE_2.0	.195	133.5	8	.208 9		5	6830...	32130	1871.625	1871.625	3.457	H1-1b
39	M139	PIPE_2.0	.177	51	17	.136 10.5		8	6830...	32130	1871.625	1871.625	2.752	H1-1b
40	M180	PL5x.5	.155	1.125	4	.310 2.25	y	...	7997...	81000	843.75	8437.5	1.72	H1-1b
41	M165	PIPE_2.0	.133	44.958	4	.150 44...		4	2489...	32130	1871.625	1871.625	1.766	H1-1b
42	M8	PL5x.5	.130	1.125	9	.246 2.25	y	...	7997...	81000	843.75	8437.5	1.592	H1-1b
43	M184	PL5x.5	.130	1.125	6	.267 2.25	y	...	7997...	81000	843.75	8437.5	2.064	H1-1b
44	M179	PL5x.5	.121	1.125	7	.288 2.25	y	...	7997...	81000	843.75	8437.5	1.655	H1-1b
45	M7	PL5x.5	.114	1.125	13	.291 2.25	y	...	7997...	81000	843.75	8437.5	1.661	H1-1b
46	M166	PIPE_2.0	.113	10.375	3	.171 10...		4	2489...	32130	1871.625	1871.625	1.692	H1-1b
47	M176	PIPE_2.0	.111	39	3	.149 39		4	2652...	32130	1871.625	1871.625	1.722	H1-1b
48	M175B	PL5x.5	.103	4.5	71	.176 4.5	y	...	7395...	81000	843.75	8437.5	1.217	H1-1b
49	M176B	PL5x.5	.103	4.5	72	.176 4.5	y	...	7395...	81000	843.75	8437.5	1.215	H1-1b
50	M183	PL5x.5	.101	1.125	18	.239 2.25	y	...	7997...	81000	843.75	8437.5	1.702	H1-1b
51	M175	PIPE_2.0	.097	9	5	.099 24		4	2652...	32130	1871.625	1871.625	1.619	H1-1b
52	M176A	PL5x.5	.091	4.063	72	.243 4.0...	y	...	7395...	81000	843.75	8437.5	1.656	H1-1b
53	M14	PL5x.5	.091	4.063	72	.242 4.0...	y	...	7395...	81000	843.75	8437.5	1.658	H1-1b
54	M169A	PL5x.5	.090	4.5	126	.152 4.5	y	...	7395...	81000	843.75	8437.5	1.22	H1-1b
55	M170A	PL5x.5	.088	4.5	126	.154 4.5	y	...	7395...	81000	843.75	8437.5	1.211	H1-1b
56	M13	PL5x.5	.087	4.5	28	.147 4.5	y	...	7395...	81000	843.75	8437.5	1.229	H1-1b

Company : Kimley-Horn and Associates, Inc.
 Designer : XMJ
 Job Number : 019558057
 Model Name : 880329

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 12/22/2021 JM

Nov 30, 2021
 12:26 PM
 Checked By: ZAM

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear C...	Lo...	Dir	...	phi*P...	phi*P...	phi*Mn y-y [lb-ft]	phi*Mn z-z [l...	Cb	Eqn
57	M169B	PL4.5x0...	.087	0	8	.147	1.5	y	8	7126...	72900	759.375	6834.375	1.353	H1-1b
58	M171B	PL4.5x0...	.084	0	8	.219	0	y	8	7126...	72900	759.375	6834.375	1.355	H1-1b
59	M12	PL5x.5	.084	4.5	28	.151	4.5	y	...	7395...	81000	843.75	8437.5	1.212	H1-1b
60	M175A	PL5x.5	.081	4.063	28	.212	4.0...	y	...	7395...	81000	843.75	8437.5	1.627	H1-1b
61	M179A	PL5x.5	.079	4.063	126	.212	4.0...	y	...	7395...	81000	843.75	8437.5	1.655	H1-1b
62	M177A	PL5x.5	.078	4.063	126	.209	4.0...	y	...	7395...	81000	843.75	8437.5	1.658	H1-1b
63	M178A	PL5x.5	.078	4.063	28	.213	4.0...	y	...	7395...	81000	843.75	8437.5	1.634	H1-1b
64	M174B	PL4.5x0...	.061	0	3	.064	1.5	y	...	7126...	72900	759.375	6834.375	1.356	H1-1b
65	M176C	PL4.5x0...	.059	0	3	.100	0	y	3	7126...	72900	759.375	6834.375	1.361	H1-1b
66	M170B	PL4.5x0...	.057	3.001	8	.543	3.0...	y	8	7126...	72900	759.375	6834.375	2.168	H1-1b
67	M175C	PL4.5x0...	.050	3.001	3	.244	3.0...	y	...	7126...	72900	759.375	6834.375	2.012	H1-1b
68	M31	PL4.5x0...	.049	0	14	.067	1.5	y	...	7126...	72900	759.375	6834.375	1.35	H1-1b
69	M39	PL4.5x0...	.047	0	14	.111	0	y	...	7126...	72900	759.375	6834.375	1.353	H1-1b
70	M33	PL4.5x0...	.036	3.001	14	.251	3.0...	y	...	7126...	72900	759.375	6834.375	2.032	H1-1b

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APPENDIX D
ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

Elevation = 120 ft.

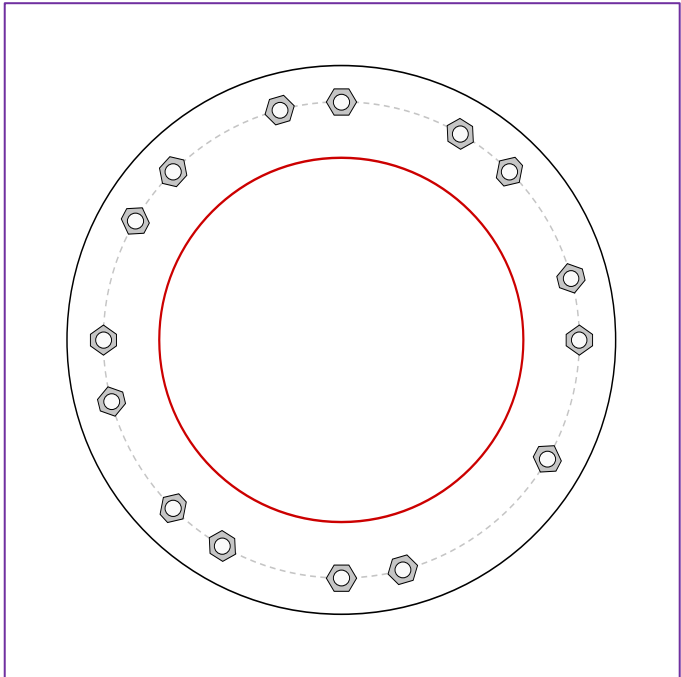


BU #	880329
Site Name	SOUTH HILL MALL
Project #	19558057
TIA-222 Revision	H

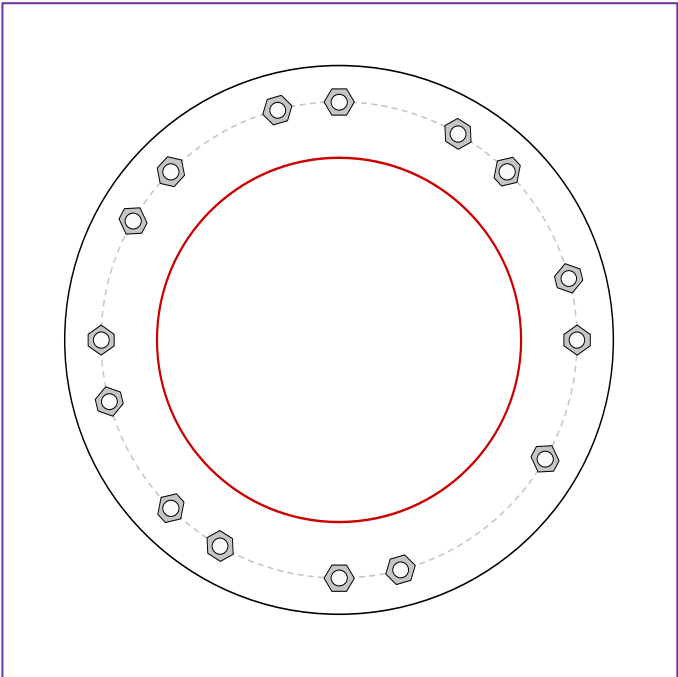
Applied Loads	
Moment (kip-ft)	5.06
Axial Force (kips)	6.85
Shear Force (kips)	4.09

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(15) 7/8" $\varnothing$ bolts (A36 N; Fy=36 ksi, Fu=58 ksi) on 26" BC
pos. (deg): 0, 15, 45, 60, 90, 105, 135, 150, 180, 195, 225, 240, 270, 285, 330

Top Plate Data
30" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data
N/A

Top Pole Data
19.9" x 0.25" 12-sided pole (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data
30" OD x 1" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data
N/A

Bottom Pole Data
19.9" x 0.25" 12-sided pole (A36; Fy=36 ksi, Fu=58 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	0.26
Allowable (kips)	20.09
Stress Rating:	1.2% Pass

Top Plate Capacity		
Max Stress (ksi):	0.86	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	2.5%	Pass
Tension Side Stress Rating:	0.5%	Pass

Bottom Plate Capacity		
Max Stress (ksi):	1.95	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	5.7%	Pass
Tension Side Stress Rating:	1.1%	Pass